TowerXchange Europe:
- The three pillars of Cellnex Telecom’s growth
- Infrastructure for Smart Cities and 5G
- Towers in Italy: the seven key scenarios

TowerXchange Americas:
- CALA towercos go beyond steel and grass
- Telefónica and Claro bet on renewables and efficiency
- Argentina needs 50,000+ towers

TowerXchange Africa:
- Helios Towers’ fibre play with Vulatel
- Madagascar: towercos and MNOs’ perspectives
- Pan African Towers and its ambitious plans for Nigeria

TowerXchange Asia:
- The Philippines: the irruption of a tower industry
- edotco the sustainable towerco
- Unleashing the potential of Bangladesh

TowerXchange MENA:
- Insights on Saudi Arabia, Pakistan and Bahrain
- How MENA towercos are reinventing their model
- The turbulent history of MENA tower transactions

Collaboration and optimisation
Cellnex CEO Tobías Martínez on the new paradigm for towercos and MNOs

Don’t miss TowerXchange Meetups for Europe (9-10 April) and CALA (9-10 July)
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About TowerXchange

Founded in 2012, TowerXchange is your independent community for operators, towercos, investors and suppliers interested in EMEA, CALA and Asian towers. We’re a community of practitioners formed to promote and accelerate infrastructure sharing. TowerXchange don’t build, operate or invest in towers; we’re a neutral community host and commentator on telecoms infrastructure.

TowerXchange produces a monthly newsletter and quarterly journal, both available to subscribers, which cover industry news and provide deep insights into telecoms infrastructure worldwide. We also host annual Meetups on each of four continents to bring together the leading tower industry stakeholders.

TowerXchange was founded by Kieron Osmotherly, a TMT community host and events organiser with 21 years’ experience, and is governed with the support and advice of the TowerXchange “Inner Circle” – an informal network of advisors.

TowerXchange was acquired by Euromoney Institutional Investor PLC on December 1, 2017.

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While 2018 saw deal flow in European towers slow a little, the foundations were laid for a very busy 2019.

Although Altice was the only MNO which sought investment for carved out towers in France (Hivory) and Portugal (OMTEL), Telia, Telenor and Vodafone all set the wheels in motion to create internal ‘towerco’ entities which will play an important role in shaping the tower landscape in 2019, both in terms of colocation and partnerships.

The news in early 2019 that UK JV towerco CTIL (an infrastructure sharing venture between Vodafone and Telefónica covering 16,500 Uk towers) may come to market has piqued the interest of towercos across Europe and further afield. French TDF, with 7,728 towers and a rapidly growing fibre unit will also doubtless attract a lot of interest. In Italy, Wind Tre is also rumoured to be looking for a buyer for ~8,000 towers.

Although the path to 5G is still littered with obstacles, there are clear signs that infrastructure owners are beginning to lay the foundations for rollout. Macro networks are under review for strength and loading, infill sites are being built and passive equipment is being upgraded ready to cope with the demands of 5G technology. In urban areas, MNOs and neutral hosts are working to build relationships with local government, fibre providers and street infrastructure owners in order to secure the real estate needed for larger scale small cell rollout. Towercos such as Cellnex, Axion, Arqiva, Wireless Infrastructure Group and many more are acquiring businesses in adjacent verticals or forming partnerships which will enable...
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them to get ahead once larger scale 5G rollout takes place.

Make sure you find out all the inside news, as well as hearing from Europe’s leading towerco CEOs, MNOs and developing neutral host solutions providers at Meetup Europe 2019, taking place at the Business Design Centre in London on April 9-10. Find out more here.

The current state of play in Europe
Let’s review the current state of the European tower industry country by country. A couple of caveats before you start reading: firstly, TowerXchange includes Russia, Turkey, the CIS and former CIS States in our definition of Europe. Secondly, our definition of a “tower” is slightly different in Europe – when presenting tower counts, we are always interested in sites and structures that can accommodate multiple tenants, and which towercos might consider investible. While our tower statistics on emerging markets focus on ground based towers, in Europe we are equally interested in counting rooftop sites, but we exclude multi-tenant DAS, microcells and small cells from headline counts, and are working to complete national small cell counts in the near future.

TowerXchange tower counts are the result of qualitative market research and the aggregation of our own and other research firms’ work – as such they should be treated as estimates. We assert copyright over data sourced to TowerXchange – you will need to request our permission to quote our data and there may be a charge to do so.
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CIS

The CIS has been relatively low on tower activity. In 2017 VEON decided to bring over 12,000 towers to market in Ukraine, Kazakhstan, Armenia and Georgia. We did believe that this deal was quietly scrapped after the sale of VEON’s Russian towers was cancelled in May 2017, but are now aware that VEON may be courting a new buyer with experience in the region.

Emerging from recession after political instability, Ukraine is a growth market with 3G yet to be extensively rolled out and 4G still on the horizon, meaning a potential 2,500 PoP could be added in the next three years.

In 2016 Turkcell carved out and transferred 811 lifecell towers to UkrTOWER, the local subsidiary of their captive towerco Global Tower. UkrTOWER’s current site count is 1,201, including a number of in building solutions, and the company boasts a healthy tenancy ratio. Outside of UkrTOWER, there are multiple structures available for co-location in the market, so there is a significant margin for error in our site counts. While all parties agree VEON has around 3,500 sites, around 60% of which are rooftops and 40% ground based towers, our best estimate is that Kcell owns around 5,500 towers and rooftops, with Altel and Tele2 combining a total of around 4,200 towers and rooftops. Third party structures make up around 30% of Kazakhstan’s mobile networks, and total at least 1,500, perhaps significantly more.

Georgia and Armenia consist of around 3,000 and 2,200 sites respectively. Around 65% of sites are rooftops, but less alternate site typologies are used than in Kazakhstan; just a handful of broadcast tower co-locations.

Belarus

Global Tower controls Turkcell’s towers in Belarus, where they have owned subsidiary BeST since 2008. Global Tower currently operates 828 towers in the country under the name BelTower.

Czech Republic

With an ongoing project to decommission 35-40% of the country’s parallel infrastructure, TowerXchange estimate there are around 10,200 active cell sites in the Czech Republic’s telecom network, of which only around a quarter are ground based towers, with the balance being rooftops and IBS.

CETIN (Česká Telekomunikační Infrastruktura), an infraco carved out of O2, has 4,800 towers and 750 micro sites. CETIN’s business model includes all the physical assets which used to belong to O2, including active equipment and 38,000km of fibre, the MNO having been acquired by PPF and the infrastructure business spun off. CETIN absorbs O2’s RANsharing venture with T-Mobile, which operates under the MORAN model.

There were rumours that Macquarie-owned České Radiokomunikace (CRA) would come to market in 2018, but nothing has been officially announced.

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Estimated count of owned towers and rooftops

**Ukraine**

- Kyivstar (VEON): 2,000
- Vodafone (MTS): 4,000
- lifecell (Turkcell): 6,000
- TriMob / UkrTelecom: 7,400
- UkrTOWER: 1,201

**Kazakhstan**

- Kar-Tel (VEON): 1,500
- Kcell (Fintur): 3,500
- Other third party sites: 5,500
- Other third party sites: 4,200
- Altel+Tele2: 700

Source: TowerXchange
as yet. With an EBITDA of €63mn, the asset could fetch as much as €800mn for 800 towers in the Czech Republic. Macquarie bought the towerco for €574mn in 2010 and has attempted to sell it unsuccessfully at least twice since then.

**Denmark**

Infrastructure sharing is second nature in Denmark, where Telia and Telenor formed active infrastructure sharing joint venture TT-Network. There are around 4,500 towers in Denmark, with co-location management agreements managed through KPR Consult. Falck operates a small towerco in the country with around 75 towers, while Teracom operates the country’s broadcast towers. There is little possibility of sale and leasebacks in Denmark in the short term, but don’t discount the possibility in the medium to long term, with TT Networks working to streamline operations quite possibly in advance of a divestiture.

**Finland**

There are around 9,576 towers in Finland, around half of which are owned by incumbent operator Elisa, with the balance distributed across the other MNOs Telia and DNA. An active infrastructure sharing joint venture between Telia and DNA increases the efficiency of providing coverage to the sparsely populated Northeastern region. Digita operates Finland’s broadcast network, with 27 high masts and 530 smaller masts and was acquired in April 2018 by Digital Colony.

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**Current site numbers in France**

![Diagram showing current site numbers in France]

**France**

There are just over 52,298 sites (ground based towers and rooftops) in France, of which just 32% remain operator-captive. The remainder are divided among three independent towercos and one new MNO carve out towerco. Broadcast-telecom hybrid TDF has 7,728 telecom towers as well as an established broadcast business and growing fibre interest. TDF’s owners Brookfield, APG, Arcus and Credit Agricole Assurances are believed to have instructed banks to look for a buyer for France’s incumbent towerco, which will doubtless be of interest to the main independent players in France as well as infrastructure funds keen to deploy capital in towers.

In December 2016 American Tower announced the acquisition of FPS Towers for €697mn, a deal which closed in February 2017, gaining them a significant foothold in the market with 2,472 towers. Cellnex have bought into the French market having acquired 500 towers from Bouygues Telecom in two transactions in 2016, the first of which was for 230 towers at a valuation of €80mn and the subsequent tranche for 270 towers for €697mn, and in January 2017 they signed a deal with the aforementioned governing the transfer of 1,800 existing sites and 1,200 new build towers for a total of €354mn, giving Cellnex a good presence in France and a solid anchor tenant.

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Source: TowerXchange
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Now Altice’s new SFR TowerCo (“Hivory”) becomes France’s first carve-out towerco, with 10,198 more towers becoming available for co-location. Entering the market with 10,198 sites allows Hivory to leapfrog the current largest towerco in France, TDF, which has 7,728 towers, as well as Cellnex (with 2,000 towers and another 2,100 in the pipeline) and American Tower with 2,472 towers.

In terms of MNO activity in the market, there are reports in the French press that Orange and Iliad’s Free are teaming up to extend and deepen their infrastructure sharing agreement past the 2020 deadline may have an impact on France’s towercos, but the sheer volume of new sites needed in France, as well as the quality of tenants, keeps the market buoyant. According to French site BFM Business “By 2020, Orange, SFR and Bouygues must install another 50,000 antennas [in France]. Free, who entered the market six years ago, will have to catch up and install around 10,000.”

There has also been recent activity in the broadcast vertical of the French market. With TDF acquiring ITAS for a reported €100mn (420 towers) and NRJ seeking a buyer willing to part with ~€300mn for their 500-tower asset Towercast.

**Germany**

Just 20,006 of Germany’s 75,474 cell sites are ground based towers – the rest are rooftops, which can be problematic for tower owners seeking to lease up their assets. Deutsche Funkturm’s rooftop portfolio has a tenancy ratio which is currently 0.8x lower than their GBTs, and this gap could grow as they actively pursue further co-locations in the German market, as access and landlord contracts make leasing up rooftops a significantly trickier proposition than towers.

Deutsche Funkturm is Germany’s biggest towerco, with ~28,000 sites (of which ~9,000 are macro towers and a further ~19,000 are rooftops) across the country. Additionally, Deutsche Funkturm took control of 7,700 former TEF rooftop assets under the name Omega Towers, although it is believed that they are partway through a decommissioning programme to reduce this number to ~5,000.

As well as offloading their rooftops, Telefónica transferred 2,350 German towers into their towerco Telxius in 2016 in a deal valued at €587mn, where these towers sit under management with assets in Spain and CALA, and alongside Telefónica’s sub-sea cable assets.

American Tower have been active in Germany since acquiring KPN’s ~2,000 E-Plus towers for €393mn in 2012. Their portfolio has grown slightly over the last six years to a total of 2,206, mainly through the acquisition of 186 transmission towers from German broadcaster WDR. Although the cost of these towers was not publicised, we estimate that American Tower probably paid around €35-50mn for the assets.

German broadcast towerco Media Broadcast Group owns a further 450 towers in Germany, and was acquired by Freenet in 2016 for €295mn (around 12x EV/EBITDA).
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Of the remaining MNOs in the market, we believe Telefónica owns a further ~2,000 towers plus ~12,000 rooftops, and Vodafone owns around 4,000 masts and ~18,000 rooftops in Germany.

There are a total of around 23,000 co-locations in Germany, most being on Deutsche Funkturm and American Tower’s ground based towers, with tenancy ratios estimated at 2.5 and 1.8 respectively. Deutsche Funkturm is believed to be embarking on a policy of rapid growth in Germany, planning to double the number of GBTs by 2022.

**Greece**

While there are no independent towercos in the 12,000 site Greek market at present, tough economic conditions and the dominance of market leading Cosmote may prompt a sale and leaseback in the medium term.

Cosmote’s competitors Wind may have an appetite to monetise their towers, while the other MNO in Greece, Vodafone has less financial incentive. Joint venture infraco VICTUS Networks currently manages Vodafone Greece and Wind Hellas’ sites. There are around 10,500 tenants on VICTUS Networks’ 7,000 sites. Decommissioning could see VICTUS Networks’ site count fall to 6,000 and the tenancy ratio rise accordingly.

Broadcast towerco Digea owns 156 towers in Greece.

**Ireland**

60% of Ireland’s 4,000 cell sites sit in the hands of the country’s three MNOs: Vodafone, Eir and 3.
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A network sharing partnership between Meteor and O2 (Mosaic) is in place with 3 joining the alliance, putting downward pressure on current and prospective future tenancy ratios.

With little prospect of sale and leasebacks in Ireland, the most likely source of tower transactions remains consolidation among the many independent tower companies, broadcast operators and public sector players. Irish towerco Cignal seems keen to consolidate further after their acquisition of Cellcom in early 2017, and larger European players seem to be turning their attention to this small but interesting market as well. We anticipate seeing some smaller scale consolidation between existing Irish towercos in the short term, followed by the entry of a larger towerco in the medium term.

**Italy**

With the merger of 3 and WIND now complete, and Iliad having launched into the Italian market, Wind Tre are now rumoured to be selling their remaining towers, which we estimate at around 8,000 sites.

Currently, INWIT, Cellnex and EI Towers’ TowerTel lead the telecom tower market in Italy, where towercos own just under half the total sites, and where decommissioning may outstrip organic growth in the coming years. Wind Tre will no doubt have their eye on any of these towercos as a potential buyer, however with Vodafone’s towers also in the mix, it’s not clear that any buyer will jump at the Wind Tre portfolio.

TIM retains a 60% equity stake in INWIT, with the balance having been floated on the Milan Stock Exchange in June 2015, and had initiated a process to sell some or all of their retained equity in 2016 which was then halted ostensibly because the TIM management team believed that several value adds had yet to reach fruition and were not yet reflected in INWIT’s valuation. Although recent rumours were that TIM would sell its 60% stake in INWIT in 2018, a complete overhaul of the INWIT board in April 2018 and ongoing turbulence in the TIM board and management team may mean the operator has other plans for the asset.

By the end of 2018, INWIT had driven tenancy ratios to around 1.9x, decommissioned 800-1,000 more sites, and built as many as 500 new sites, primarily for TIM’s 4G rollout.

The continent’s largest pan-European towerco, Cellnex, has rolled up several small towercos in Italy, but the lion’s share of their portfolio comes from the acquisition of Wind’s towerco Galata, and their 7,377 towers, for €693mn in 2015.

Both INWIT and Cellnex remain bullish about the potential of small cells in Italy, highlighted by Cellnex’s acquisition of CommsCon for €18.65mn in June 2016.

The other key player in the Italian market is EI Towers, whose telecom-focused subsidiary TowerTel has built and acquired a portfolio of 700 telecom towers with an aggregate EV of up to €55mn, ~300 of which have been added through several small acquisitions. In October 2018, EI Towers delisted from the Milan stock exchange through...
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an acquisition by F2i and Mediaset through JV 2i. TowerXchange believes this delisting was completed as a result of EI’s desire to acquire Italy’s other broadcast towerco, RaiWay.

**The Netherlands**

Only 20% of The Netherlands’ 15,204 cell sites are macro cell sites, with the balance being rooftops, DAS and small cells.

Cellnex acquired Protelindo’s 261 Dutch towers for €109mn, (and is now marketing the towers under the name ‘Towerlink Netherlands’), and a further 460 as part of their deal with Shere Group. There is no duplication between the two portfolios. Following the small scale acquisition of local towers, Cellnex now owns 788 towers, or 24% of the macro towers in The Netherlands, where 1,781 (59%) of the country’s 3,031 ground based towers are already owned by towercos. Cellnex’s acquisition of Dutch broadcast towerco Alticom in 2017 gave them a further 30 towers in the country, as well as securing them high-quality infrastructure to support 5G rollout in the Netherlands.

Open Tower Company has around 850 towers, plus access to over 1,000 electricity pylons. Dutch pension fund ABP acquired a 75% stake in the company in late 2017. UK headquartered Wireless Infrastructure Group is also present in The Netherlands.

KPN sold their towers in four tranches between 2008-12, while Vodafone and T-Mobile retain around 1,250 towers between them. New entrant fourth MNO Tele2 has few if any towers, preferring to rely on co-location and a RANsharing deal with T-Mobile.

T-Mobile and Tele2 Netherlands agreed to deepen their existing co-locations and RANsharing deals at the end of 2017, announcing a merger of the two entities. Deutsche Telekom has ringfenced their tower assets in the market and is in the process of bringing them under the control of infrastructure arm Deutsche Funkturm, which has been operating almost exclusively in Germany to date.

**Poland**

There are around 22,000 telecom structures in the Polish network, a little under half of which are towers, with the rest being rooftops.

Poland has more subscribers per tower than the majority of other countries in Europe, indicating both potential demand for more towers, and indicating the extent of decommissioning that has already taken place in the country. A balanced, competitive MNO market amplifies the attractiveness of the Polish market to towercos.

T-Mobile and Orange share passive and active infrastructure in Poland through 50-50 joint venture NetWorkS! Initiated in 2011, the partnership was intended to last 15 years, but there has been speculation that one or both party might wish to exit the venture and sell towers to a third party.

While NetWorkS! operates around 13,000 towers, the assets remain on T-Mobile and Orange’s own
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Balance sheets. Outside of the NetWorkSI venture, as little as 2% of Poland’s towers are shared between multiple MNOs.

Alinda Capital Partners owned Emitel is the Polish broadcast towerco, operating 377 sites and diversifying into telecom. It was rumoured that Emitel would be coming to market in 2018, although nothing has been officially reported as yet.

Portugal
TowerXchange understands there to be ~7,100 ground based towers in Portugal, with a further ~4,700 sites in use across different topographies (rooftops, street poles, utilities etc). With no known bilateral sharing agreements in place between MNOs, co-location has been organised on an ad-hoc basis and the tenancy ratio across the country is close to one (the only exception to this being indoor DAS projects, where one operator provides the infrastructure and shares with the other two).

Altice’s MEO had the largest tower portfolio with 2,961 traditional structures, which have now been rolled up into towerco OMTEL, Vodafone owns approximately 2,500 and NOS about 1,300. In addition, there are around 350 broadcast towers run by state-owned Radiotelevisão Portuguesa, although TowerXchange are not aware of any current co-location agreements with Portugal’s three MNOs.

In 2018, Altice sold a 75% stake in its newly formed Portuguese towers business ‘Towers of Portugal’ (now trading as OMTEL) to a consortium including Morgan Stanley and Horizon Equity Partners. Comprising 2,961 towers, Towers of Portugal is valued at €660mn, or as much as 18.9x pro forma EBITDA for 2017. As with the French towerco, the deal also includes a build to suit agreement for a further 400 new sites for Altice’s Portuguese opco MEO (part of Portugal Telecom) over the next four years. Towers of Portugal is the country’s first towerco in any form, making them well placed to capitalise on the densification needed to complete 4G coverage and begin 5G rollout.

Romania
Romania hosts a competitive four MNO market, with no independent towerco activity to date. Orange and Vodafone Romania operate a joint venture infrastructure sharing company called Netgrid Telecom (formerly Ovidiu Telecommunications).

Despite being one of the poorest countries in Europe, ARPU is relatively high in Romania at around €20, which means there is little financial imperative for the country’s MNOs to monetise their towers.

Russia
TowerXchange estimate there are around 61,260 ground based towers and 65,400 rooftop structures across the vast Russian landscape. Each of Russia’s four MNOs has looked at utilising tower company business models, but in contrasting ways.
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Estimated ownership of Spain’s 49,461 telecom and broadcast sites

- **Cellnex Telecom**: 17,500
- **Axion**: 10,741
- **Orange**: 8,136
- **Telxius**: 12,500
- **Vodafone**: 584

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<th>Company</th>
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<td>Cellnex Telecom</td>
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<td>12,500</td>
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<tr>
<td>Vodafone</td>
<td>584</td>
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</tbody>
</table>

Source: TowerXchange

VEON’s creation of ‘National Tower Company’, into which they injected their ~13,000 Russian towers, was hailed as a precursor to the sale of the assets to an independent towerco. However, the company decided to pull the plug on the sale process in May 2017, and it is believed that the towers are being reabsorbed into the opco.

MegaFon has carved out First Tower Company, which it has announced will come to market in 2019, although as MegaFon has just delisted from the LSE, there are several queries about the shape of the future business and how this will develop over the next 12 months. Rumours persist that Tele2 Russia are selling their ~9,000 towers, but with no concrete process in the public domain as yet.

Leading local towercos Russian Towers and Vertical, as well as the Russian Direct Investment Fund, are all expected to be prominent bidders as Russia’s towers come to market, with Tele2’s towers the most likely up for grabs. Russian Towers is also undergoing a period of sustained organic growth, growing from ~2,300 to ~3,700 since the beginning of 2017. Newcomer Service-Telecom is also keen to expand organically and recently acquired Link Development, a Russian towerco with around 200 towers in the St Petersburg region. A new Russian towerco has also recently come onto the TowerXchange radar: Sotka Vysotok. Based in Tatarstan, Sotka Vysotok is believed to have around 200 towers centred mainly around the regional capital, Kazan.

**Serbia**

Managed service provider Konsing Group, which also owns a portfolio of 47 sites, counts all three MNOs among their client base (Telekom Serbia, Telenor and Telekom Austria).

**Slovakia**

Broadcast towerco Towercom, which has around 700 sites, was acquired by Macquarie Infrastructure Fund in 2013. Towercom turns over in excess of €50mn annually and includes O2, T-Mobile and Orange among their customer base. Towercom completed the roll up of TBDS, RK Tower and Rádiokomunikácie in 2008. Macquarie is believed to be considering exiting Towercom.

**Spain**

40% of the 49,461 broadcast and telecom towers and rooftops in Spain are owned by towercos, led by Telefónica’s Telxius and European market-maker Cellnex.

Cellnex has seen fast growth in its telecoms arm, deriving €471mn of its €789mn 2017 revenue from telecoms, an increase of 23% yoy. In 2017 they entered the Swiss market, as well as acquiring Alticom in the Netherlands.

In 2016, Telefónica transferred 11,000 Spanish towers and rooftops to their towerco Telxius for an undisclosed sum ahead of their planned IPO, however, the IPO was scrapped in October 2016 due to lack of interest in the market. Telefónica has since completed the sale of a 40% stake in Telxius to investment firm KKR for €1.3bn.

AMP Capital acquired Axion from Antin
METRO CONNECT EUROPE

September 2019, Amsterdam

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Infrastructure in 2018. Axion operates 584 broadcast towers, with some telecom co-location, 70% of which are in Andalucía.

**Sweden**
There are no independent tower companies in Sweden, largely because network sharing is efficiently managed through three network sharing joint ventures.

However in September 2018 Telia created a new towerco, Tower Co, in Sweden and Norway, aiming to make tower assets more visible and improve efficiency across their international portfolio. Telia is believed to own around 1,600 towers in Sweden.

Teracom operates Sweden’s broadcast tower network. There are a little over 8,000 sites in Sweden.

**Switzerland**
Cellnex acquired 2,339 towers from Sunrise in May 2017, creating Switzerland’s first fully fledged towerco Swiss Towers AG. Working with partners Swiss Life and Deutsche Telekom Capital Partners, the Cellnex-led consortium paid €430mn for roughly 20% of Switzerland’s 11,300 towers, mostly in rooftop locations. With future build to suit as well as 200 DAS nodes agreed in the deal, Cellnex sees a chance for significant growth through data usage and 5G rollout in this central European country.

**Turkey**
Established in 2006, Global Tower has 8,067 ground based towers among a portfolio of over 23,000 sites in Turkey. Of these macro towers, TowerXchange believes that Global Tower owns around 3,400 and leases around 2,390 from Turkcell, for which they
Who owns/operates the UK’s 42,500 active cell sites?

only receive revenue from co-locations. In addition they manage a portfolio of around 2,215 towers on behalf of Turkcell, for which they just receive maintenance fees.

Turkey is also home to one of the world’s largest government-owned universal service networks, called ‘Universal Services Project’ and implemented by the Ministry of Communication and Transportation. Phase one of the project was auctioned in 2011, with Turkcell implementing 1,100 rural sites following a successful bid. Phase two was recently auctioned and will see Vodafone and Turk Telekom creating a joint venture to build a further 2,500-3,000 RANsharing sites in rural areas.

In addition, the Turkish government has just launched a new towerco called PTT Kule Inc, which is currently focussed on very large scale tower structures for telecoms and broadcast as well as hosting datacentres and other facilities.

United Kingdom

The UK has a tower market structure unlike any other in the world. Independent towercos, headed by Arqiva, Wireless Infrastructure Group and Shere Group (acquired by Cellnex in 2016), own 38% of the 42,500 active towers in the UK. The balance are contained within two joint venture infracos: CTIL, which operates Vodafone and O2’s network (Telefónica), and MBNL, which performs a similar function for EE (now BT) and 3 (Hutchison).

CTIL and MBNL are both the primary clients of the UK’s independent towercos, and site sharing businesses in their own right. Their business models differ in that the tower assets are actually on CTIL’s balance sheet, while MBNL is a management company with the assets retained by the MNOs. CTIL is a passive infrastructure sharing play, while MBNL’s model extends to active infrastructure and transmission sharing.

Recent comments from Vodafone’s senior management suggest that Vodafone and O2 UK are considering their options in terms of monetising CTIL. This could relate to offering colocations on CTIL infrastructure outside of Vodafone or O2, or it could relate to the sale of CTIL’s 16,000 UK towers, a prospect which has raised the interest of towercos and investors across Europe.

The UK’s broadcast tower operator Arqiva has been through many changes of identity and ownership (BBC, Crown Castle, National Grid to name a few), and was initially believed to be close to closing a sale to a consortium of buyers led by Brookfield, before a short-lived attempt at an IPO in Q417. It remains to be seen whether Arqiva will revisit the option of a strategic sale, or give themselves some breathing room to try and show that their improving EBITDA is sustainable in order to close the gap between their expectations and market valuation.
## Major European towerco equity deals and listings since 2016

<table>
<thead>
<tr>
<th>Year</th>
<th>Seller</th>
<th>Entity and # towers</th>
<th>Buyer/Stock Exchange</th>
<th>Equity%</th>
<th>Deal value in €</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>Telefónica</td>
<td>Telxius 16,000</td>
<td>Pontegadea</td>
<td>10%</td>
<td>379,000,000</td>
</tr>
<tr>
<td>2018</td>
<td>Altice</td>
<td>SFR TowerCo 10,198</td>
<td>KKR</td>
<td>49.99%</td>
<td>1,799,000,000*</td>
</tr>
<tr>
<td>2018</td>
<td>Altice</td>
<td>Towers of Portugal 2,961</td>
<td>Morgan Stanley and Horizon Equity Partners</td>
<td>75%</td>
<td>495,000,000*</td>
</tr>
<tr>
<td>2017</td>
<td>Telefónica</td>
<td>Telxius 16,000</td>
<td>KKR</td>
<td>40%</td>
<td>1,300,000,000</td>
</tr>
<tr>
<td>2016</td>
<td>American Tower</td>
<td>American Tower Germany 2,197</td>
<td>PGGM</td>
<td>49%</td>
<td>Undisclosed</td>
</tr>
<tr>
<td>2016</td>
<td>Antin Infrastructure Partners</td>
<td>Axion 584</td>
<td>AMP Capital</td>
<td>100%</td>
<td>Undisclosed</td>
</tr>
<tr>
<td>2016</td>
<td>New equity investment</td>
<td>Wireless Infrastructure Group 2,000</td>
<td>3i Investments</td>
<td>Undisclosed</td>
<td>300,000,000</td>
</tr>
<tr>
<td>2015</td>
<td>Telecom Italia</td>
<td>INWIT 11,200</td>
<td>MIB</td>
<td>40%</td>
<td>875,300,000</td>
</tr>
<tr>
<td>2015</td>
<td>Abertis</td>
<td>Cellnex Telecom 15,091</td>
<td>MCE</td>
<td>66%</td>
<td>2,138,000,000</td>
</tr>
<tr>
<td>2015</td>
<td>Coillte</td>
<td>Telecoms assets 300</td>
<td>InfraVia Capital Partners</td>
<td>100%</td>
<td>70,000,000</td>
</tr>
</tbody>
</table>
## European sale and leaseback deals since 2008

<table>
<thead>
<tr>
<th>Year</th>
<th>Country</th>
<th>Seller</th>
<th>Buyer</th>
<th>Tower count</th>
<th>Deal value €</th>
<th>Cost per tower €</th>
<th>Deal structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>Italy</td>
<td>Wind (Veon)</td>
<td>Cellnex Telecom</td>
<td>*</td>
<td>77,000,000</td>
<td>104,054</td>
<td>SLB 10% stake out</td>
</tr>
<tr>
<td>2017</td>
<td>Spain</td>
<td>MasMovil</td>
<td>Cellnex Telecom</td>
<td>551</td>
<td>40,000,000</td>
<td>72,595</td>
<td>SLB</td>
</tr>
<tr>
<td>2017</td>
<td>Switzerland</td>
<td>Sunrise</td>
<td>Cellnex, Swiss Life and DTCP</td>
<td>2,339</td>
<td>430,000,000</td>
<td>183,839</td>
<td>SLB</td>
</tr>
<tr>
<td>2017</td>
<td>France</td>
<td>Bouygues</td>
<td>Cellnex Telecom</td>
<td>3,000</td>
<td>854,000,000</td>
<td>284,666</td>
<td>SLB</td>
</tr>
<tr>
<td>2017</td>
<td>France</td>
<td>Bouygues</td>
<td>Cellnex Telecom</td>
<td>600</td>
<td>170,000,000</td>
<td>283,333</td>
<td>SLB</td>
</tr>
<tr>
<td>2016</td>
<td>France</td>
<td>Bouygues Telecom</td>
<td>Cellnex Telecom</td>
<td>230</td>
<td>80,000,000</td>
<td>347,826</td>
<td>SLB</td>
</tr>
<tr>
<td>2016</td>
<td>France</td>
<td>Bouygues Telecom</td>
<td>Cellnex Telecom</td>
<td>270</td>
<td>67,000,000</td>
<td>248,148</td>
<td>SLB</td>
</tr>
<tr>
<td>2016</td>
<td>Ukraine</td>
<td>Lifecell</td>
<td>UkrTower</td>
<td>811</td>
<td>47,820,000</td>
<td>58,964</td>
<td>SLB</td>
</tr>
<tr>
<td>2015</td>
<td>Italy</td>
<td>Wind (Veon)</td>
<td>Cellnex Telecom</td>
<td>7,377</td>
<td>693,000,000</td>
<td>94,892</td>
<td>SLB with 10% equity</td>
</tr>
<tr>
<td>2014</td>
<td>Spain</td>
<td>Telefónica/Yoigo</td>
<td>Cellnex Telecom</td>
<td>4,277</td>
<td>385,000,000</td>
<td>90,016</td>
<td>SLB</td>
</tr>
<tr>
<td>2012</td>
<td>France</td>
<td>Bouygues Telecom</td>
<td>FPS Towers</td>
<td>2,166</td>
<td>185,000,000</td>
<td>100,400</td>
<td>SLB with 15% equity</td>
</tr>
<tr>
<td>2012</td>
<td>Germany</td>
<td>KPN</td>
<td>American Tower</td>
<td>2,031</td>
<td>393,000,000</td>
<td>193,501</td>
<td>SLB</td>
</tr>
<tr>
<td>2012</td>
<td>Netherlands</td>
<td>KPN</td>
<td>Protelindo</td>
<td>261</td>
<td>75,000,000</td>
<td>287,356</td>
<td>SLB</td>
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<tr>
<td>2012</td>
<td>Netherlands</td>
<td>KPN</td>
<td>Shere Group</td>
<td>460</td>
<td>115,000,000</td>
<td>250,000</td>
<td>SLB</td>
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<tr>
<td>2012</td>
<td>Spain</td>
<td>Telefónica</td>
<td>Cellnex Telecom</td>
<td>500</td>
<td>45,000,000</td>
<td>90,000</td>
<td>SLB</td>
</tr>
<tr>
<td>2010</td>
<td>Netherlands</td>
<td>KPN</td>
<td>Open Tower Company</td>
<td>500</td>
<td></td>
<td></td>
<td>SLB</td>
</tr>
<tr>
<td>2008</td>
<td>Netherlands</td>
<td>KPN</td>
<td>Open Tower Company</td>
<td>101</td>
<td></td>
<td></td>
<td>SLB</td>
</tr>
</tbody>
</table>

**Totals / average**: 25,474, 3,656,820,000, 147,019

Source: TowerXchange
## European towerco consolidation since 2008

<table>
<thead>
<tr>
<th>Year</th>
<th>Country</th>
<th>Seller</th>
<th>Buyer</th>
<th>Tower count</th>
<th>Deal value €</th>
<th>Cost per tower €</th>
<th>Deal structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>Finland</td>
<td>Digita</td>
<td>Digital Colony</td>
<td>556</td>
<td></td>
<td></td>
<td>Company acquisition</td>
</tr>
<tr>
<td>2017</td>
<td>Netherlands</td>
<td>Mom and Pop</td>
<td>Cellnex Telecom</td>
<td>32</td>
<td>12,000,000</td>
<td>375,000</td>
<td>Company acquisition</td>
</tr>
<tr>
<td>2017</td>
<td>Russia</td>
<td>Link Development</td>
<td>Service Telecom</td>
<td>400</td>
<td></td>
<td></td>
<td>Company acquisition</td>
</tr>
<tr>
<td>2017</td>
<td>Netherlands</td>
<td>Alticom</td>
<td>Cellnex Telecom</td>
<td>30</td>
<td>133,000,000</td>
<td>443,333</td>
<td>Company acquisition</td>
</tr>
<tr>
<td>2016</td>
<td>France</td>
<td>ITAS TIM</td>
<td>TDF</td>
<td>420</td>
<td></td>
<td></td>
<td>Company acquisition</td>
</tr>
<tr>
<td>2016</td>
<td>Germany</td>
<td>WDR</td>
<td>American Tower</td>
<td></td>
<td></td>
<td></td>
<td>Portfolio acquisition</td>
</tr>
<tr>
<td>2016</td>
<td>France</td>
<td>Antin/FPS</td>
<td>American Tower</td>
<td>2,482</td>
<td>697,000,000</td>
<td>280,821</td>
<td>Company acquisition</td>
</tr>
<tr>
<td>2016</td>
<td>UK &amp; Netherlands</td>
<td>Shere Group</td>
<td>Cellnex Telecom</td>
<td>1,004</td>
<td>393,000,000</td>
<td>391,434</td>
<td>Company acquisition</td>
</tr>
<tr>
<td>2016</td>
<td>Netherlands</td>
<td>Protelindo</td>
<td>Cellnex Telecom</td>
<td>261</td>
<td>109,000,000</td>
<td>417,624</td>
<td>Company acquisition</td>
</tr>
<tr>
<td>2015</td>
<td>Ireland</td>
<td>Coillte</td>
<td>Cignal</td>
<td>113</td>
<td></td>
<td></td>
<td>Portfolio acquisition</td>
</tr>
<tr>
<td>2015</td>
<td>Italy</td>
<td>Tecnorad</td>
<td>EI Towers</td>
<td>134</td>
<td>17,000,000</td>
<td>126,866</td>
<td>Portfolio acquisition</td>
</tr>
<tr>
<td>2015</td>
<td>Italy</td>
<td>TowerCo</td>
<td>Cellnex Telecom</td>
<td>212</td>
<td>94,600,000</td>
<td>446,226</td>
<td>Company acquisition</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>Totals / average</strong></td>
<td><strong>1,455,600,000</strong></td>
<td><strong>322,392</strong></td>
</tr>
</tbody>
</table>

Source: TowerXchange
European heatmap

Legend

☑️ TowerXchange research has not revealed any infracos or towercos to date
☑️ Towercos or infracos active in the market. No recent transactions have taken place and none rumoured to take place soon
☑️ Towercos or infracos active in the market. No current transactions taking place but an attempted tower sale has taken place in the last 3 years or there are unconfirmed rumours of a deal in this market.
☑️ Towercos or infracos active in the market. Rumours of deals confirmed in the market.
☑️ Towercos or infracos active in the market. Deals of significant size have taken place in the last 5 years.
☑️ Towercos or infracos active in the market. Deals have taken place in the last year and more imminent deals rumoured

Note: For the purposes of our European coverage, 'Towerco' describes an independent company which owns and operates passive infrastructure for commercial profit. ‘Infraco’ incorporates MNO joint venture organisations and carve outs which serve more than one entity or market their towers commercially

Source: TowerXchange
Meetup Europe 2019

The 4th Annual retreat for European Tower experts

9-10 April, Business Design Centre, London

To discuss your participation, contact Annabelle on +44 7423 512588 or email amayhew@towerxchange.com
# TowerXchange Meetup Europe Agenda

## London | Day one - April 9, 2019

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Break outs</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:00 - 09:00</td>
<td>Registration and welcome coffee</td>
<td></td>
</tr>
<tr>
<td>09:00 - 09:45</td>
<td><strong>TowerXchange analysis of the European tower market</strong></td>
<td>Kieron Osmotherly, CEO, TowerXchange; Frances Rose, Head of Europe, TowerXchange</td>
</tr>
<tr>
<td></td>
<td><strong>TowerXchange European CEO panel: our vision for the future of infrastructure in Europe</strong></td>
<td>Darragh Stokes, Managing Partner, Hardiman Telecommunications; Giovanni Ferigo, INWIT; Alexander Chub, Russian Towers; Rhys Phillip, CEO, CTIL; Bruno Jacobfeuerborn, CEO, Deutsche Funkturm</td>
</tr>
<tr>
<td>09:45 - 10:30</td>
<td><strong>Update from the EWIA</strong></td>
<td>Olivier Huart, Chair, EWIA</td>
</tr>
<tr>
<td>10:45 - 11:05</td>
<td><strong>Indoor and outdoor small cells in the UK market</strong></td>
<td>Graham Payne, CEO, Digital Colony UK Digital Infra Platform</td>
</tr>
<tr>
<td>11:05 - 11:25</td>
<td><strong>Fireside chat with Cellnex Telecom CEO, Tobias Martinez</strong></td>
<td></td>
</tr>
<tr>
<td>11:25 - 11:55</td>
<td>Coffee and networking sponsored by Defmec</td>
<td></td>
</tr>
<tr>
<td>11:55 - 12:55</td>
<td><strong>Roundtable Session I</strong></td>
<td></td>
</tr>
<tr>
<td>12:55 - 14:00</td>
<td>Networking lunch</td>
<td></td>
</tr>
<tr>
<td>14:00 - 15:00</td>
<td><strong>Roundtable Session II</strong></td>
<td>Working Group: Enabling collaboration between neutral host infrastructure providers and local government in the context of 5G</td>
</tr>
<tr>
<td>15:00 - 15:30</td>
<td>Networking break sponsored by tarantula</td>
<td></td>
</tr>
<tr>
<td>15:30 - 16:15</td>
<td><strong>Panel discussion: Sale and leaseback vs carveout: evaluating the pros and cons for MNOs</strong></td>
<td>Nick Elverston, Partner, Ashurst; Jörg Weber, SVP Investment Management, Deutsche Telekom; Alex Mestre, General Manager, Global Business, Cellnex Telecom; Nihat Narin, CEO, Global Tower; Pat Coxen, CEO, MBNL</td>
</tr>
<tr>
<td>16:15 - 17:00</td>
<td><strong>Panel discussion: who is investing in European infrastructure today? How and why is this changing?</strong></td>
<td>David Martin, Infrastructure M&amp;A Partner; Christopher Ehrke, Partner, Arcus Infrastructure Partners; Bruno Cades, Partner, InfraVia Capital Partners; Mauricio Bolana, Partner, Antin Infrastructure Partners; Tomas Budnik, CTO, PPF</td>
</tr>
<tr>
<td>17:00</td>
<td><strong>TowerXchange Europe drinks reception</strong></td>
<td></td>
</tr>
<tr>
<td>19:30</td>
<td><strong>TowerXchange networking dinner</strong></td>
<td></td>
</tr>
</tbody>
</table>

15:30 - 17:00 Breakout session: Meeting of the International Digital Infrastructure Alliance (IDIA)
# TowerXchange Meetup Europe Agenda

**London | Day two - April 10, 2019**

<table>
<thead>
<tr>
<th>Day and time</th>
<th>Session</th>
<th>Break outs</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:30 - 09:00</td>
<td>Welcome coffee</td>
<td></td>
</tr>
</tbody>
</table>
| 09:00 - 09:45 | Panel: 5G economics – what is needed to kick start the massive investment needed for 5G infrastructure rollout? | Moderator: Pankaj Agrawal, Partner, Capitel  
David Crawford, MD, Telecoms & M2M, Arqiva  
Oscar Pallarols, Innovation & Product Strategy Director, Cellnex Telecom  
Alastair Davidson, Director, Wireless Infrastructure Group  
Pat Coxen, CEO, MBNL  
Laurent Benet, Head of Strategy, Innovation & Business, ATC France |
| 09:45 - 10:30 | Panel: European infrastructure convergence: collaborate or compete? | Moderator: Doug Dimitroff, Partner, Phillips Lytle  
David Porte, SVP International, SBA Communications  
Jose A. Aranda, Product Strategy & Innovation Director, Cellnex Telecom  
Cara Mascini, CEO & Founder, EdgeInfra  
Graham Payne, CEO, Digital Colony UK Digital Infra Platform |
| 10:30 - 11:15 | Panel: M&A in European communications infrastructure: multiples, opportunities and longevity | Moderator: Darragh Stokes, Managing Partner, Hardiman Telecommunications  
Nikolay Berdin, CEO, Service Telecom  
Paolo Crochetti, Head of Institutional Affairs, EI Towers  
Jonathan Dann, Managing Director, Greenhill & Co |
| 11:15 - 11:45 | Networking break sponsored by accuen |  |
| 11:45 - 12:45 | Roundtable session 3 | Working group: Changing operational needs in Europe: resilience, technology and the shifting scope of infrastructure offerings |
| 12:45 - 14:00 | Networking lunch |  |
| 14:00 - 15:00 | Roundtable Session 4 | Working Group: Data utilisation and visualisation |
| 15:00 - 15:30 | Networking Break |  |
| 15:30 - 16:15 | Panel: exploring partnerships to unlock the value of existing infrastructure (street poles, ducting, billboards etc) | Marc Merlini, JCDecaux  
Jorge Jimenez, CEO, Axion  
Graham Thrower, Urban Foresight |
| 16:15 - 17:00 | Panel: European new build: the changing shape of infrastructure and what a more diverse portfolio means for passive infrastructure owners | Moderator: Spencer Crawford-White, CTO, Delmec  
Jonathan Freeman, Customer Infrastructure Programmes Director, Arqiva  
Timur Shikov, Head of Strategy, Russian Towers  
Tony Killarney, CEO, Towercom |
| 17:00 | End of Meetup |  |
New for 2019: Working Group: Enabling collaboration between neutral host infrastructure providers and local government in the context of 5G

Tuesday 9th April 14:00-15:00

This unique, invitation-only working group will bring together representatives from local government and municipal organisations, mobile network operators, towercos, fibrecos and other neutral host infrastructure providers to allow a one-of-a-kind workshopping session addressing some of the nascent opportunities presented by 5G rollout. Key topics to be addressed include:

- The concession terms needed for neutral host operators to invest in 5G infrastructure at the levels required
- Logistical issues re site assembly for neutral host operators and mobile network operators, including permitting and access to power
- A mobile network operator’s view of compelling business use cases
- The local government view of 5G as an enabling technology
- Local government views on priority outcomes from 5G roll-out
- Local government perspectives on financing and risk
- Local government capacity
- Timeframes for transition to true 5G, and for whom
- Future scoping applications that will further 5G business models  
  - Connected Automated Vehicles  
  - Smart City applications – sensors, smart parking, intelligent transport systems  
  - Connected buildings and communities  
  - Industry 4.0 and 5.0

To be considered for the invitation list or for more information, please email Frances Rose frose@towerxchange.com
Introducing the TowerXchange Investment Hub

Bringing together investors looking to deploy funds in infrastructure with neutral host operators and cleantech solutions providers seeking to raise capital

TowerXchange will leverage our unique contacts in the communications infrastructure community, and those of our parent company Euromoney Institutional Investor, one of the world’s leading publishers of investment journals and data, to create a pool of qualified investors.

The Investment Hub will expose those investors to four groups of potential investments:

1. Large listed / near IPO tower companies
2. Startup to medium sized tower companies
3. Other communications infrastructure innovations such as edge data centres, neutral host network operators (small cell and IBS), and smart poles
4. Cleantech for communications infrastructure power

Under the guidance of an expert moderator, the Investment Hub will showcase to potential investors 4-6 innovative businesses in each of the above categories through succinct pitches and Q&As, to be followed by private conversations in 1:1 meeting rooms and at presenting companies’ booths (subject to the presenters availing themselves of such facilities).

Participation in Investment Hub is strictly invitation only. To participate either as an investor or a presenter, please contact Annabelle Mayhew amayhew@towerxchange.com

TowerXchange is delighted to have welcomed some of the biggest and most influential infrastructure investors in the world to our Meetups across the globe. Attendees of TowerXchange Meetup Europe include:

- 1848 Capital Partners LLC
- 3i Investment Plc
- 4M Investments
- Albright Capital Management
- Alcazar Capital
- Alinda Capital Partners
- Allianz Capital Partners GmbH
- AMP Capital
- Amzak Capital Management
- Antin Infrastructure Partners SAS
- APG Asset Management NV
- Arcus Infrastructure Partners
- Bank of Tokyo Mitsubishi
- Barclays Capital
- Baring Vostok Capital Partners
- Barings
- Berkshire Partners
- BNP Paribas
- Brookfield Asset Management
- Capital International Private Equity Funds
- Consulta Limited
- Credit Suisse
- Crescent Park
- DekaBank
- Development Bank of Japan
- Digital Colony
- Digital World Capital LLP
- Edizione
- Equity International
- Fidelity International
- Fox Haven
- General Communications inc
- Genesis
- Goldman Sachs
- Grain Management LLC
- Highline Capital Management LP
- Indigo Capital
- ING Bank
- Inter-American Investment Corporation (IIC)
- International Finance Corporation (IFC)
- Invus
- IP Capital Partners
- Kempen & Co
- Kingsley Capital Partners
- KKR
- Kohlberg Kravis Roberts & Co LP
- Lansdowne Partners
- Lone Pine Capital
- Longview Asset Management
- Macquarie Group
- Madison Dearborn Partners
- Miton Group
- Morgan Stanley UK Limited
- Nomura
- Och-Ziff Real Estate
- Peppertree Capital Management
- Petrus Advisers
- PSP Investments
- RBC Capital Markets
- RENLAN, S.A
- Rothschild
- Scotiabank
- Silver Swan Capital
- Sojitz Corporation
- Soroban Capital Partners LP
- Southern Cross Group
- SPO Partners
- Sycale Advisors
- T.Rowe Price
- The Hongkong and Shanghai Banking Corporation Limited
- Tiger Global
- Tillman Global Holdings
- TPG Capital
- UFG Asset Management
- Wells Fargo Bank
- Wood Creek Capital Management
**Moderation of a session during the Investment Hub Theatre Europe 2019**
Position as thought leaders in the TowerXchange Investment Hub Theatre - moderate a plenary investment panel session to present your knowledge and expertise of investible platforms in the communication and infrastructure market. We will also raise your brand around a coffee break during the morning or afternoon of either day 1 or day 2. Open to all 200 attendees your brand will be further reinforced through signage and branded napkins, whilst delegates network and relax over their coffee.

**Host of the Investment Hub Theatre Europe 2019**
Be seen as the host of the TowerXchange Investment Hub Theatre - We will raise your brand in the Investment Hub Theatre to position you as Hosts of the theatre and thought leaders in advising on investible platforms in the communications and infrastructure market.

**Breakfast Briefing Europe 2019**
Sponsor a breakfast on Day 1 or Day 2 of the meetup giving you an opportunity to address the audience on your take on the state of the telecom infrastructure investment market whilst your company brand is emblazoned on signage supporting your message of being thought leaders and the advisor of choice in the market.

**Investor pre-event briefing call Europe 2019**
Join the pre-event briefing call where TowerXchange researchers will talk you through the attending delegates outlining innovative, disruptive new market entrants as well as proven established players in the European Communications Infrastructure market.

**Advisory firm pre-event briefing call Europe 2019**
Join the pre-event briefing call where TowerXchange researchers will talk you through the attending investors delegates and investment opportunities in innovative, disruptive new market entrants as well as proven established players in the European Communications Infrastructure market.
Speakers and roundtable hosts already confirmed to join us at Meetup Europe 2019

- Tobias Martinez, CEO, Cellnex Telecom
- Giovanni Ferigo, CEO, INWIT
- Jorge Alberto Jimenez, President, Axion
- Alex Mestre, Global Business Managing Director, Cellnex Telecom
- Nigel Moss, COO, Wireless Infrastructure Group
- Enda Hardiman, Managing Partner, Hardiman Telecommunications
- Rustem Umerov, MD, ASTEM
- Michele Vitale, Head of IR, INWIT
- David Crawford, MD Telecoms, Arqiva
- Joerg Weber, SVP Investment Management, Deutsche Telekom
- Paolo Crochetti, Director of Institutional Affairs, EI Towers
- Olivier Huart, CEO, TDF
- Christopher Ehrke, Partner, Arcus Infrastructure Partners
- Bruno Candes, Partner, InfraVia Capital Partners
- Graham Thrower, Head of Infrastructure & Investment, Urban Foresight
- Marc Merlini, Business Development Director, JCDecaux
- Alexander Chub, President, Russian Towers
- Nikolay Berdin, CEO, Service-Telecom
- Rhys Phillip, CEO, CTIL
- Pat Coxen, CEO, MBNL
- Nihat Narin, CEO, Global Tower
- Mauricio Bolana, Partner, Antin Infrastructure Partners

- Eric Crabtree, CIO, IFC
- David Porte, SVP International Strategy and Business Development, SBA Communications
- Jonathan Dann, Managing Director, Greenhill & Co
- Jonathan Freeman, Customer Infrastructure Programmes Director, Arqiva
- Cara Mascini, CEO & Founder, EdgelInfra
- Tony Killarney, CEO, Towercom
- Timur Shikov, Head of Strategy, Russian Towers
- Graham Payne, CEO, Digital Colony UK
- Bruno Jacobfeuerborn, CEO, Deutsche Funkturm
- Tomas Budnik, CTO, PPF
- Antony Tomlinson, CEO, Ontix
- Colin Cunningham, CEO, Cignal
- Arthur Akopyan, Managing Partner, UFG
- Jason Day, VP Telecom, Accruent
- Nick Elverston, Partner, Ashurst
- David Martin, Partner, Linklaters
- Pankaj Agrawal, Partner, Capitel
- Doug Dimitroff, Partner, Phillips Lytle
- Spencer Crawford-White, CTO, Delmec
- Laurent Benet, Head of Strategy, Innovation & Business, ATC France
How can I join?

250 passes available for 2019
All previous Meetups have **SOLD OUT**: Register early to avoid disappointment

**Conditions of entry**

1. Attendance is restricted to Director level or higher
2. Vendors (with the exception of MSPs) are restricted to a maximum of two delegates per company in order to balance the ratio of buyers to sellers (to enquire about increasing your presence through sponsorship or exhibition contact Annabelle Mayhew)

**Register today to guarantee your involvement**

- amayhew@towerxchange.com
- +44 (0) 7423 512588

**Pricing**

- **Standard pass**
  - £2,500

- **Towercos**
  - £1800*

- **Mobile network operators**
  - Free*

- **Sponsorship and exhibition**
  - On request

*Discount codes to be supplied on application to Annabelle Mayhew at amayhew@towerxchange.com. Please note these will only be supplied to qualified MNOs and independent towercos.
Europe’s largest gathering of tower owners in one room: How can you make the most of the opportunity?

The TowerXchange Meetup Europe enables you to condense months of travelling, client visits and business development calls into just two action packed days. Yet with such a large number of clients in one place, planning your time efficiently and finding a way to stand out from the crowd is a must.

As a sponsor or exhibitor at the event you open up a world of premium opportunities unavailable to delegates. Such opportunities have proven so valuable that over 60% of 2018’s sponsors and exhibitors rebooked their packages during the course of last year’s event!

Can you afford not to join them?

TowerXchange’s top five tips to meet your goals on site

1. Position yourself as a thought leader and let clients approach you
   - Share expertise in the TowerXchange Europe special edition journal
   - Lead the discussion by hosting a roundtable or discussion forum

2. Secure access to invitation-only working groups with MNO and towerco procurement teams
   - Closed door task forces eliciting intimate feedback from buyers responsible for trialing, procuring and using key energy equipment and monitoring and management systems

3. Create a meeting point and bring in reinforcements to cover a large client base
   - Vendors are limited to two Meetup passes to preserve the ratio of buyers to sellers; exhibitors can leverage two additional expo hall passes to cover more meetings with the large customer base
   - Welcome prospects to your exhibition stand or take a closed meeting room for ad hoc conversations when needed
   - Benefit from TowerXchange’s concierge service; facilitating one-to-one introductions

4. Strengthen brand awareness, reputation and likeability
   - Sponsor the networking breaks, drinks reception or networking dinner: this year’s most prominent branding opportunities

5. Arrive prepared: Benefit from a briefing on what your target clients are looking to buy
   - Get ahead of the crowd, don’t just find out which companies are attending but learn more about their portfolio, strategy and who will be representing them in our exclusive pre-event briefing

To discuss the opportunities available contact Annabelle Mayhew, Chief Commercial Officer
email: amayhew@towerxchange.com
phone: +44 (0) 7423 512588
TowerXchange Meetup Europe prices 2019

Benefits

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Delegate pass</th>
<th>Exhibitor</th>
<th>Bronze Sponsor</th>
<th>Silver Sponsor</th>
<th>Gold Sponsor</th>
<th>Platinum Sponsor</th>
<th>Diamond Sponsor</th>
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<tbody>
<tr>
<td>Access to TowerXchange Meetup</td>
<td>1 pass</td>
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<td>3 passes</td>
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<td>Logo on backdrop, signage, fliers &amp; invites</td>
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TowerXchange Meetup Prices 2019 (All prices in GBP £)

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<thead>
<tr>
<th></th>
<th>Bronze Sponsor</th>
<th>Silver Sponsor</th>
<th>Gold Sponsor</th>
<th>Platinum Sponsor</th>
<th>Diamond Sponsor</th>
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<tr>
<td>Roundtable hosting</td>
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<td>Buyer briefing call and supporting documentation</td>
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<td>£2,500</td>
<td>£3,000</td>
<td>£3,500</td>
</tr>
</tbody>
</table>

There is limited availability for roundtable hosts, panel moderators and inclusion on the Technology evaluation working groups please contact amayhew@towerxchange.com to learn more.

Bronze, Silver, Gold and Platinum Sponsorship Benefit Options - Bespoke packages can be created on request

Bronze Sponsorship
- Stationary sponsor (provided by client)
- Gift drop (provided by client)
- Drinks coaster sponsor (provided by client)
- Business card wallet (provided by client)

Silver Sponsorship
- Totes Bags (provided by client)
- Sponsorship of coffee break day one am
- Sponsorship of coffee break day one pm
- Sponsorship of coffee break day two am
- Sponsorship of coffee break day two pm

Gold Sponsorship
- Sponsorship of breakfast (Open) day one

Platinum Sponsorship
- Sponsorship of Lunch Day one
- Sponsorship of Lunch Day two
- Sponsorship of icebreaker drinks
- Champagne Roundtable session sponsor
- Targeted gift drop to selected delegates

Diamond Sponsorship
- Sponsorship of Drinks Reception
- Sponsorship of Networking Dinner

Industry breakdown of a comparable tower industry Meetup

- Independent towerco: 44%
- MNOs: 15%
- Investor: 9%
- Managed services, tower & accessory supply: 8%
- RMS and ILM: 5%
- Small cells and DAS: 5%
- Advisory firm: investment strategy legal: 5%
- Energy equipment and services: 5%
- Other: 4%

* Discounted rate available to Towercos, Government and Regulator representatives, 100% discount for qualifying Director - C-level execs from Operators.
Our sponsors & exhibitors

**Cellnex Telecom**
Cellnex is the main services and infrastructure operator for wireless telecoms in Europe. It operates in Spain, Italy, the Netherlands, France, Switzerland and the United Kingdom.

Its activities are structured around four main areas: telecoms infrastructure services, audiovisual content distribution networks, security and emergency services networks, and smart infrastructure and urban services management solutions (smart cities and the internet of things). The company is listed on the continuous market of the Spanish stock exchange. It is part of the selective IBEX 35 and EuroStoxx 600 indices and part of the FTSE4GOOD, Carbon Disclosure Project and Standard Ethics sustainability indices.


**Acsys International Ltd**
Acsys International is a global technology company specialized in security and access management of critical infrastructure through the emerging field of remote access management solution. Instigated in 1999 from the technologies of two French defense contractors, Acsys International provides remote access control using both smart-key and keyless solutions. The signature Intelligent Access Management System (iAMS) is a platform that brings together smart-padlocks, smart-keys and management software to provide a powerful means to control who goes where and when, indoors and outdoors.

Our highly specialized and international team of engineers develops world-unique and patented solutions—from the Code Generation System (CGS) and Keypad Key to remote staff management via the mobile App. This modular, and solution-oriented approach sets Acsys International apart from other security solution provider in the market. With presence in 64 countries, our clients are global leaders from different industries, including telecommunications, power, mining, logistics and more.

[www.acsys.com](http://www.acsys.com)

**Accruent**
Siterra, an Accruent Product, addresses the software needs of tower companies to sell co-locations, upgrade capacity, build-to-suit, maintain accurate asset registers, manage maintenance, and collaborate with vendors operationally as well as consolidate and integrate tower-related software technically. Sixteen of the towercos and infracos that TowerXchange tracks are current Siterra customers, spanning 18 countries and five continents. The first version of the Siterra site management platform was released in 2001. 100,000 users later, Siterra has become the industry standard, must-have operating software for tower companies today. Accruent works with its leading towerco customers to jointly develop new features that are deployed regularly through the SaaS platform to constantly improve customer value. Accruent has developed global process standards with local flexibility to pair with best-in-class software functionality.

Accruent's telecommunications division serves some of the world’s largest mobile network operators and service providers in addition to tower companies, helping link employees from different organizations in the industry to collaborate to projects. Accruent is the largest independent provider of commercial property management software, serving the telecom, retail, education, healthcare, and corporate markets with over 7,000 customers in 149 countries.

[www.accruent.com](http://www.accruent.com)

**Delmec**
Delmec has been a primary component in the telecommunication industry, not only within the infrastructure area but also providing state of the art telecom solutions for Ireland, UK, Africa, Europe, America and the Middle East for over 30 years. With the company’s headquarters based in Ireland, Delmec
Our sponsors and exhibitors

Signify

Signify, formerly known as Philips Lighting, is the world leader in lighting for professionals, consumers and lighting for the Internet of Things.

BrightSites by Signify delivers an innovative smart pole solution that promotes city livability, connectivity, and enables mobile network operators around the world to deliver Wi-Fi, 4G and 5G LTE as well as IoT applications to the citizens while maintaining the city’s aesthetics. This smart infrastructure supports multiple wireless platforms and provides a standardized, aesthetically pleasing, solution with all components enclosed and obscured from public view.

www.signify.com/brightsites

Delmec’s reputation can be witnessed in over 40 countries where key services have been provided to a wide range of clients whom many have continually sought the expert knowledge of Delmec for their telecom’s needs. Delmec strive to provide services ensuring the client is given the best customer service, maintaining a high efficiency and always to a quality that is highly regarded in the telecom industry with many of our clients stating that Delmec are; The best in the world at what we do.

http://delmec.ie

SILVER SPONSOR:

Tarantula

Tarantula is a proven market leader of telecom site management solutions and a trusted advisor and long-term partner for tower site owners worldwide. With extensive industry knowledge and customer understanding, Tarantula supports and empowers its customers to build profitable and sustainable businesses. Through an end-to-end, purpose-built telecom site portfolio management solution and knowledge-driven services, Tarantula helps telecom site owners to monetize their towers. Tarantula is a vital part of the daily management of more than 300,000 towers and US$25 billion worth of assets across the world.

Tarantula is owned by Volaris Group, an operating arm of Toronto-based software and services provider, Constellation Software Inc. Tarantula´s offices are situated in Singapore, Stockholm, London, and Hyderabad. For further information, please visit: www.tarantula.net.

www.tarantula.net

BRONZE SPONSOR:

STULZ GmbH

Since 1947, the STULZ company has evolved into one of the world’s leading suppliers of air conditioning technology. With focus on precision air conditioning

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www.sitetracker.com

SILVER SPONSOR:

www.tarantula.net

BRONZE SPONSOR:

www.sitetracker.com

BRONZE SPONSOR:

http://delmec.ie

SILVER SPONSOR:

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Our exhibitors

units, chillers, humidifying systems, service and facility management, this division of the STULZ Group achieved sales of around 450 million € in 2016. Since 1974 the Group has seen continual international expansion of its business, specializing in air conditioning for data centers and telecommunications installations. STULZ employs 2,400 workers at ten production sites and 21 sales companies worldwide and cooperates with sales and service partners in over 140 other countries. Current annual sales are around 1,300 million euros.

www.stulz.com

Vinson & Elkins R LLP

Vinson & Elkins is one of the oldest and largest international law firms, with approximately 700 lawyers located in 15 offices around the world.

Our global telecommunications team has extensive experience advising on international telecoms and telecoms infrastructure M&A transactions, including in respect of towers, data centres, fibre, wireless and wireline technology. We have significant industry experience, advising on telecoms transactions in numerous countries, including across Europe, Africa, Asia, the Americas and the Middle East and our team is well recognised for such transactions worldwide. Our telecommunications advice includes acquisitions and disposals, debt and equity financing, infrastructure development, operational arrangements, regulatory matters and dispute resolution. We also have significant experience in the negotiation and drafting of sale and purchase, debt and equity financing, master lease, build-to-suit, site management, site marketing and service level arrangements, fibre IRUs and other complex commercial contracts.

www.velaw.com

Exhibitor:

Abloy Oy

Abloy Oy is one of the leading manufacturers of high quality locks, locking systems and architectural hardware and the world’s leading developer of high security electromechanical locking technology.

For decades Abloy has delivered security solutions to protect telecommunications sites and assets. At its simplest level, the CLIQ® system eliminates the risks and expense caused by lost or stolen keys. The web managed system also facilitates financial savings, reduces CO2 emissions and provides significant time saving with ‘smart’ infrastructure integration, generating a fast pay-back and high ROI.

Abloy operates in all continents and several major companies have chosen ABLOY as their trusted advisor and the solution provider in the rapidly developing and changing telecom industry.

www.abloy.co.uk/en/abloy/abloy-co-uk/solutions1/telecommunications/

Exhibitor:

Asentria

Asentria provides solutions for mobile network and tower operators to manage power, security, and environmental issues at remote cell sites from their network operations center.

Telecom sites are evolving to include many new intelligent subsystem controllers for DC rectifiers, generators, cameras, access controllers, and HVAC. Asentria securely integrates these sub-systems into our hardware based site controller to present a single interface for management of power, security and environment at remote sites.

Beyond simple alarming, Asentria generates data for comparative site analysis and provides remote access to the underlying systems for OPEX reducing cell site optimization.

www.asentria.com

Exhibitor:

Atrebo

Atrebo is a telco asset and infrastructure management solution provider. Atrebo´s asset and infrastructure management suite of solutions TREE, helps Towercos and MNOs manage the life cycle of their fixed and mobile network assets in a simple, effective and collaborative way. TREE provides a new perspective on how to manage infrastructure of mobile and fixed networks, focusing on collaboration instead of self-centered management of own infrastructure, focusing on performance instead of execution of tasks, maximizing the overall efficiency of your assets.

Atrebo´s solution TREE has been conceived as a hub for convergence, where infrastructure providers and clients exchange resources. With the irruption of new technologies, such as IoT or 5G, the collaborative nature of TREE will become more crucial, helping Towercos and MNOs transform their networks.

www.atrebo.com
Our exhibitors

**Crowd SiteIntel by M2Catalyst, LLC**

M2Catalyst is a big data/business analytics licensor that crowdsources trillions of cell tower, mobile network, device, and application data points from millions of mobile devices.

Our data scientists then utilize proprietary algorithms to generate invaluable actionable intelligence for members of the wireless ecosystem, i.e., infrastructure providers, tower owners, wireless carriers, mobile device manufacturers, and app developers.

http://www.m2mobileinsights.com/blog/a-r-evolution-in-how-towers-are-valued-and-how-co-locations-are-sold/

**Exhibitor:**

**Polar Power Inc**

Polar Power, Inc. (POLA), designs, manufactures and sells direct current, or DC, power systems, lithium battery powered hybrid solar systems for applications primarily in the telecommunications market. Polar’s systems provide reliable and low-cost energy for applications for off-grid and bad-grid applications with critical power needs that cannot be without power in the event of utility grid failure. Our systems integrate DC Generators, Solar PV, DC Air-conditioning, and batteries. Our Hybrid Solar Systems provide reliable power with very low maintenance and operational costs. Our Prime Power DC Generators provide very low fuel consumption, low maintenance with 3,000-hour oil change interval and long generator life. Our Backup DC Generators provide compact, lightweight, minimum fuel storage providing long reserve.

www.polarpower.com

**TIDBO**

TIDBO (Telecoms Infrastructure Design Build Operate) is a 3D Platform that provides MNOs and Asset Owners a virtual, highly accurate “Digital Twin” of their Network sites (Rooftop, Towers, Monopoles, Streetworks etc).

TIDBO “brings the sites into the office” through 3D digitisation and thereby eliminates unnecessary site visits, slashes lead-times for Acquisition and Design, whilst improving Health and Safety. The Digital Twins are used also to speed up and simplify Optimisation and Operations activities as well as management of space - e.g. for operator sharing or for vertical space on towers. All for much reduced cost. TIDBO will ensure that 5G will be delivered much faster and much lower cost than any previous Technology Generation through the Rapid Digitisation approach.

www.tidbo.com

**Ashurst**

Nick Elverston leads Ashurst’s global Digital Economy Transactions team. Based in London, Nick has over 25 years’ experience providing cross-border legal advice to clients in the TMT sector.

www.ashurst.com/en/people/nick-elverston/

**Capitel**

Capitel is a specialist transaction advisory firm with a focus on addressing the most complex techno-commercial issues for our clients, especially for major transactions and investments.

Our primary focus area is techno-commercial due diligence and planning to support transactions and investment decisions for TMT infrastructure such as wireless towers, fiber, data centers as well as TMT networks such as fixed broadband, wireless broadband and media distribution networks. Capitel is headquartered in Singapore with offices in New Delhi and New York, and the recently opened branch office in London for EMEA markets. Capitel advises global infrastructure funds, private equity funds, public market
investors as well as towercos, fibercos and telecom operators, and has advised on 25+ transactions and investment decisions with a cumulative investment value of $40bn+ in the last six years.

http://capitelpartners.com

Hangar

Hangar is reinventing how tower owners and operators see and manage their assets. We’ve created an enterprise-grade platform that automates drone data workflows specific to your tower assets, helping you tap into previously unseen insights that enable your teams to work more safely, efficiently and intelligently - across your entire portfolio.

The best way to capture, process and interpret drone data depends on the needs of each individual telecom company, department and user. Using off-the-shelf drones and best-in-class partners, Hangar automatically collects, processes and performs machine learning analysis on tens of thousands of towers - solving operational inefficiencies at scale and eliminating bad data problems that have troubled the industry for decades.

www.hangar.com

Hardiman Telecommunications

Hardiman Telecommunications Ltd. was established in 1994. We are a boutique consultancy specialised in strategy development, due diligence assessment and valuation support.

Our clients include major TowerCos, private equity funds, corporate finance / advisory and investment functions of leading banks, and telecommunications carriers. We are particularly active in end-to-end support of mergers, acquisitions and divestitures.

All of our staff have held profit-accountable positions with global telecommunications carriers, manufacturers and systems integration houses prior to joining us. This allows full support of clients across the continuum from technology through to market effectiveness, spanning engineering, commercial strategy, financial structuring and proven operating methodologies.

www.telecoms.net

StrattoOpencell

StrattoOpencell is the UK’s leading indoor, neutral host, mobile signal service provider.

Trusted by all four UK mobile network operators, they deploy and manage in-building signal services bespoke to 130+ customer needs. Much like a utility provider, customers get an end to end service that connects them today, while factoring in the mobile connectivity technology of tomorrow.

Radio frequency experts, the team champions a best available, most upgradable approach to in-building signal technology, and combine this with a multi-operator mindset. In this way they've made it possible for building owners and tenants to access reliable carrier-grade mobile connectivity inside. A model they plan to replicate and expand by using outdoor small cells and growing the business within Europe.

Whether a building is large or small, publicly or privately owned, a commercial or residential development, StrattoOpencell ensures that anywhere people work and play, everyone indoors has network.

https://strattoopencell.co.uk/

Peppertree Capital Management, Inc.

Peppertree Capital Management, Inc. is a private equity firm focused on making investments in growing communication infrastructure companies. Peppertree was formed in 2004 and is currently investing out of its seventh private equity fund.

Peppertree has more than $1B under management and has made more than 75 investments in communication infrastructure companies in 10 countries.

In addition to sponsoring tower, DAS, data center and communication rooftop developers, fiber network operators and spectrum auction participants, Peppertree seeks investments in real estate related to its areas of focus, non-telecom infrastructure projects and other businesses and assets with contractually recurring revenue.

www.peppertreecapital.com
France: TDF for sale
TDF is believed to have hired two banks in order to launch a sale process at the end of January. Acquired by Brookfield, Arcus and APG in 2014, TDF has focussed on fibre growth in recent years and CEO Olivier Huart has turned around the fortunes of France’s incumbent broadcast towerco, which is now reporting growth after a few tough years. The sale is expected to raise as much as €5bn, or 14x EBITDA.

Italy: Cellnex secures 5G agreement with Fastweb in Italy
Cellnex’s latest deal will allow Italian ISP Fastweb to access Cellnex’s 5G infrastructure in Rome, Genoa, Bari and Matera. “Through this agreement, Fastweb confirms its commitment to play a leading role in developing 5G infrastructure and services in Italy and today the company has added another key element to its strategy to position itself as the first Italian fixed-mobile telephony operator that is fully convergent for 2020,” said Andrea Lasagna, Fastweb Technology Manager. “The agreement with Fastweb represents one more step in our strategy to create innovative multi-operator infrastructures” said Alfonso Álvarez, deputy GM of Cellnex Italia. “We are proud that an operator such as Fastweb has chosen our infrastructure for testing 5G, a technology that will offer better connectivity, at high speed, capable of handling an unprecedented amount of data.”

Belgium: MNOs incentivised to cover white spots
Philippe De Backer, Belgian Telecom Minister, has revealed plans to reduce spectrum fees for MNOs who improve their coverage in grey and white spots in Belgium. The government aims to encourage MNOs to invest in 23 rural areas with poor coverage, incentivising them with discounts of 80% on spectrum fee.

Finland: EIB invests €90mn in DNA 5G infrastructure
DNA, a Finnish multi-service operator, has reached a funding agreement with the European Investment bank (EIB) for €90mn. The initial €50mn element was agreed on in Q318, with the second, €40mn installment secured in Q119. DNA intends to spend the loan on 5G rollout, as well as increasing the capacity of its 4G network.

France: Free Mobile case dismissed
Bouygues’ five-year case against competitor Free Mobile in the Commercial Court of Paris has been rejected. Bouygues was seeking damages of €718.5mn against Free Mobile for ‘misleading commercial practices’ in terms of Free’s 2G and 3G roaming agreement between the new French MNO and incumbent Orange, reducing roaming speeds in order to keep their costs lower. As the case was dismissed, Bouygues was ordered to pay €350,000 to Free Mobile for legal fees.

France: Altice finds investors for FTTH offering
Allianz Capital Partners, AXA Investment Managers-real Estate Assets and OMERS Infrastructure have agreed to buy 49.99% of Altice’s fibre SPV, SFRFTTH for €1.8bn, valuing the asset at €3.6bn in a transaction due to close in H119. Like SFR TowerCo, SFRFTTH has been created to consolidate Altice’s infrastructure assets in France, in particular in less densely-populated areas, encompassing five million fibre plugs and with an ambition to pass ‘at least one million’ new homes per annum over the next four years.
quad-play operator VodafoneZiggo has revealed that it is in preliminary discussions to find a buyer for its tower portfolio. With Cellnex looking to consolidate in the Dutch market, and Deutsche Funkturm already operational, there will no doubt be plenty of interest in these ~600 assets.

**Russia: New 5G venture goes ahead despite protests**
Rostelecom and Megafon have confirmed the launch of their 5G joint venture ‘Digital for Business’. The startup will focus on shared 5G infrastructure and the acquisition of 5G spectrum, initially in large cities and moving into wider national coverage. The venture will be headed by Vadom Semenov, a member of the Rostelecom board of directors.

**Russia: UFG buys out Macquarie stake in Russian Towers**
UFG announced this week that it has bought out a ‘large minority stake’ in Russian Towers from co-investor Macquarie Russia & CIS Investment Fund (MRIF). Russian Towers is the largest and most geographically diverse towerco in Russia and has worked hard to develop partnerships with localities and other infrastructure providers in the country.

Dominic Reed, Partner at UFG Private Equity remarked: ‘We are pleased that the UFG Asset Management platform increased its commitment to Russian Towers. This transaction re-enforces our interest in infrastructure as a distinctive asset class in our markets’.

Alexander Chub, CEO of Russian Towers commented: ‘We have had tremendous benefit from Macquarie’s expertise in similar businesses around the globe and we are grateful for MRIF’s important contribution to the success of Russian Towers during their time as shareholders’.

**Spain: Telefónica reacts to Elliott rumours**
Rumours that US investor Elliott is eyeing opportunities in Telefónica have been denied, but the news has put additional pressure on Telefónica Chairman Jose Maria Alvarez-Pallete. Elliott’s sacking of the Telecom Italia CEO in Q418 and plans for the rapid sell off of infrastructure are applying further pressure on Telefónica, Europe’s joint second most endebted MNO with KPN, to deleverage. At Vodafone and CK Huchison explore ways to exploit their towers to pay down debt, it remains to be seen what move Telefonia (which carved out its towers and subsea cable in to Telxius in 2016) will do next.

**Spain: Towerco for sale**
Regional Spanish towerco Telecom-CLM (Telecom Castilla-La Mancha), has recently launched a sale process, with TMT Finance reporting that Dutch bank ING is running the sale. Telecom-CLM owns and operates broadcasting towers available for telecoms colocation in Madrid and the central parts of Spain, and is currently owned by private equity investor GED Capital.

**Switzerland: 5G auction complete**
Swisscom, Sunrise and Salt, Switzerland’s mobile network operators, have spent CHF379mn (US$378mn) on 5G compatible spectrum in the latest wave of auctions in Europe. Swisscom paid CHF195.6mn, Salt deployed CHF94.5mn and Sunrise’s spectrum bands cost CHF89.2mn.

Sunrise CEO Olaf Swantee was quoted as saying: ‘We prepared meticulously for the auction, resulting in prudent use of our resources to secure valuable spectrum. This clever bidding strategy has secured the implementation of our 5G strategy as planned … We were able to acquire the strategically most important bands at a very favourable price per MHz, even better than the competition … We are therefore very satisfied with the outcome of the auction. Now it’s up to the Federal Council to amend mobile network radiation limits so the economy and entire population can really benefit from this positive starting point.’

**UK: CTIL plans moving ahead**
CTIL, the joint venture between Vodafone and O2 which manages 16,500 UK towers, will be subject to ‘potential monetisation’ as part of Vodafone’s plans to reduce debt through the sale of tower infrastructure in Europe. This could involve the restructuring and partial sale of the entity, as well as opening up the infrastructure to make it available to additional tenants on a commercial basis.

**UK: CityFibre and Arqiva partner up for London small cell trial**
As towers, fibre and other communications infrastructure increasingly converge, Arqiva and
CityFibre have announced the ‘largest pilot of wholesale, 5G-ready small cell infrastructure’ in the UK. Due to be rolled out in the London Borough of Hammersmith & Fulham, this multi-million pound project will involve creating a new 15km high density fibre ring with over 90 cabinets to enable the sharing of infrastructure and will be multi-operator capable to allow MNOs to ‘explore advanced technology including centralised C-Ran architecture and 5G.’ Arqiva already has an agreement with Hammersmith & Fulham to make use of the borough’s lampposts and other street assets, which are seen as an ‘integral part’ of the network rollout.

**UK: BT and EE to remove Huawei equipment from towers**
Following the move by governments in the US, Australia and New Zealand to block Huawei’s presence in critical national infrastructure, and the UK government’s current assessment of whether to do the same, BT has announced that it will strip Huawei equipment out of its core 4G network within the next two years.

A BT spokesperson said that Huawei remains an “important equipment provider and a valued innovation partner” to BT and a Huawei spokesman said the supplier continued to work with BT on 5G. “Huawei has been working with BT for almost 15 years,” the spokesman said. “Since the beginning of this partnership, BT has operated on a principle of different vendors for different network layers. This agreement remains in place today.”
In terms of deals, Phoenix Tower International is acquiring portfolios at a fast pace and recently made its move into new markets including Bolivia, Argentina and Nicaragua, in addition to its entrance in Mexico with a fibre deal. And while consolidation among towercos isn’t going as fast as originally predicted, MNOs are making the headlines with Telefónica divesting its Mexican and Central American units and Millicom and América Móvil strengthening their positions.

In this analysis, TowerXchange takes a close look at each country’s telecom infrastructure market, its characteristics and reports on the latest tower counts from across the region.

**Mexico**

The Mexican BTS market continues to expand with most towercos reporting tens of new towers in their portfolio. In the meantime, Phoenix Tower International entered Mexico where it now owns 974km (or 17 rings) of fibre. TowerXchange is currently starting its coverage of fibre news in CALA and we hope to have more details soon.

As of October 2018, ALTÁN Redes’ Red Compartida covers 40mn people across twelve Mexican cities. In a recent event held in Mexico, ALTÁN’s representatives stated that its current network includes 2,700 BTS as well as 20,000km of fibre. To date ALTÁN Redes hasn’t been able to sign deals with any of the country’s major carriers (Telefónica, AT&T and América Móvil) but Dish’s internet provider Internet On and GurúComm are already

The CALA infrastructure industry is undergoing considerable changes and 2019 is expected to be quite an exciting year across the region. Towercos (or should we call them infracos?) are finally eyeing opportunities beyond macro-towers and diversifying into two segments.

On one hand, fibre and edge data centres are being identified as new revenue streams with the likes of American Tower and Phoenix Tower International to name two scooping up existing fibre portfolios while starting to deploy dark fibre too. On the other hand, towercos across CALA are partnering with ESCOs or RESCOs to provide energy management solutions to their clients. A groundbreaking change in direction for a business model originally firmly set on steel and grass.

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### CALA top towercos - Q4 2018

<table>
<thead>
<tr>
<th>Towercos</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Tower</td>
<td>37,392*</td>
</tr>
<tr>
<td>SBA Communications</td>
<td>13,016**</td>
</tr>
<tr>
<td>Grupo TorreSur</td>
<td>6,500</td>
</tr>
<tr>
<td>Phoenix Tower International +</td>
<td>6,180</td>
</tr>
<tr>
<td>Phoenix Tower do Brasil</td>
<td></td>
</tr>
<tr>
<td>Telesites</td>
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</tr>
<tr>
<td>Mexico Tower Partners</td>
<td>2,100</td>
</tr>
<tr>
<td>Cell Site Solutions</td>
<td>2,000</td>
</tr>
<tr>
<td>QMC Telecom</td>
<td>1,400</td>
</tr>
<tr>
<td>Brazil Tower Company</td>
<td>1,000</td>
</tr>
<tr>
<td>Torrecom 800</td>
<td></td>
</tr>
<tr>
<td>Innovattel 993</td>
<td></td>
</tr>
<tr>
<td>IIMT 600</td>
<td></td>
</tr>
<tr>
<td>Uniti Towers 495***</td>
<td></td>
</tr>
<tr>
<td>Intelli Site Solutions 313</td>
<td></td>
</tr>
<tr>
<td>AlfaSite 254</td>
<td></td>
</tr>
<tr>
<td>BTS Towers 145</td>
<td></td>
</tr>
<tr>
<td>ATP Torres Unidas</td>
<td>2,300</td>
</tr>
<tr>
<td><strong>Assets being transferred to PTI</strong></td>
<td></td>
</tr>
</tbody>
</table>

* AMT global count 170,929  ** SBA global count 29,564  *** Assets being transferred to PTI

Source: TowerXchange
## Major tower transactions in Latin America 2011/2019

*1,000 urban wireless sites and 2,500km of fibre
**American Tower acquisition of 4,630 BR Towers includes 2,530 towers plus 2,100 exclusive rights

<table>
<thead>
<tr>
<th>Year</th>
<th>Country</th>
<th>Seller</th>
<th>Buyer</th>
<th>Tower count</th>
<th>Deal value US$</th>
<th>Cost per tower US$</th>
<th>Deal structure</th>
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<tr>
<td>2019</td>
<td>Bolivia</td>
<td>Trilogy</td>
<td>Phoenix Tower International</td>
<td>600</td>
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<td>166,666</td>
<td>SLB</td>
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<td>Mexico, Nicaragua, Colombia</td>
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<td>Phoenix Tower International</td>
<td>500</td>
<td>$100,000,000</td>
<td>200,000</td>
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<td>El Salvador</td>
<td>Tigo</td>
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<td>800</td>
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<td>SBA Communications</td>
<td>~350</td>
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<td></td>
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</tr>
<tr>
<td>2017</td>
<td>Brazil</td>
<td>Highline do Brasil</td>
<td>SBA Communications</td>
<td>1,200</td>
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<td></td>
<td>Company acquisition</td>
</tr>
<tr>
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<td>TIM</td>
<td>American Tower</td>
<td>5,873</td>
<td>$850,000,000</td>
<td>$144,730</td>
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<td>Axtel</td>
<td>American Tower</td>
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<td>$394,366</td>
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<td>Colombia/Peru</td>
<td>Undisclosed</td>
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<td>150</td>
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<td>2017</td>
<td>Colombia</td>
<td>Millicom/Tigo</td>
<td>American Tower</td>
<td>1,200</td>
<td>$147,000,000</td>
<td>$122,500</td>
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<td>2017</td>
<td>Paraguay</td>
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<td>1,400</td>
<td>$125,000,000</td>
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<td>2017</td>
<td>Panama</td>
<td>Torrecom</td>
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<td>25</td>
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<td>2017</td>
<td>Chile</td>
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<td>172</td>
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<td>Mexico, Colombia, Nicaragua</td>
<td>NMS</td>
<td>Uniti Towers</td>
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<td>CyCSA</td>
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<td>Telxius</td>
<td>900</td>
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<td>Telxius</td>
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<td>Telxius</td>
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<td>SBA Communications</td>
<td>130</td>
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<td>Amzak/Teletower</td>
<td>Phoenix Tower</td>
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<td>2015</td>
<td>Brazil</td>
<td>Algar Telecom</td>
<td>Highline do Brasil</td>
<td>125</td>
<td>$16,000,000</td>
<td>$128,000</td>
<td>SLB</td>
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<td>Phoenix Tower</td>
<td>529</td>
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<td>Company acquisition</td>
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<td>American Tower</td>
<td>Phoenix Tower</td>
<td>60</td>
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<tr>
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<td>Brazil</td>
<td>BR Towers**</td>
<td>American Tower</td>
<td>4630</td>
<td>$978,000,000</td>
<td>$211,231</td>
<td>Company acquisition</td>
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<th>Deal value US$</th>
<th>Cost per tower US$</th>
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<td>2011</td>
<td>Colombia</td>
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<tr>
<td>2011</td>
<td>Colombia</td>
<td>Millicom/Tigo</td>
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<td>666</td>
<td>$585,000,000</td>
<td>$878,378</td>
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</tr>
</tbody>
</table>
unless they are willing to buy “bad towers”... A no-go especially for public entities such as American Tower and Telesites, especially since Carlos Slim is reportedly considering the divestment of a minority portion of his 61% stake in the towerco.

Telefónica has been considering a potential sale of its Mexico unit but the company’s President José María Álvarez-Pallete has recently stated that the MNO is now exploring “agreements to share its network with other operators to improve capital return”, which could stop the company from exiting Mexico. Meanwhile, América Móvil has announced an investment of US$8.500mn to deploy fibre, towers and new technologies as the company is also getting ready to provide triple play services in the country.

The MNOs, that contract power through state-owned CFE, are now exploring the integration of renewables to cut down energy costs and looking to sign Power Purchase Agreements with the many international and local providers that are now offering affordable power solutions across the country.

Central America and the Caribbean

In Central America, the biggest news are coming from Telefónica as the Spanish telecom giant has

### Mexico - Estimated tower count 32,224

<table>
<thead>
<tr>
<th>Towerco</th>
<th>Estimated to buy</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telesites</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>American Tower</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Mexico Tower Partners</td>
<td>-</td>
<td></td>
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<tr>
<td>IIMT</td>
<td>-</td>
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</tr>
<tr>
<td>Torrecom</td>
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<tr>
<td>BTS Towers</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Uniti Towers</td>
<td>-</td>
<td>* Being acquired by PTI</td>
</tr>
<tr>
<td>Other independent towercos (QMC, Centennial, Conex et cetera)</td>
<td>-</td>
<td>Source: TowerXchange</td>
</tr>
<tr>
<td>Estimated MNO captive towers</td>
<td>-</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Source</th>
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</tr>
</thead>
<tbody>
<tr>
<td>GSMA Intelligence</td>
<td>TowerXchange</td>
</tr>
</tbody>
</table>

### Market highlights
- PTI seals deal with Uniti Towers and acquires fibre
- Telefónica assessing unit sale

### Mexico quick facts
- Towers: 32,224
- SIMs per tower: 3,535
- Mobile connections: 107.3mn (Q4 2017)
- Population: 130mn (Q4 2017)
- SIM penetration: 83% (Q4 2017)
- MNOs: Telcel, Movistar, AT&T
- Towercos: BTS Towers, Telesites, American Tower, Mexico Tower Partners, IIMT, Centennial, Torrecom, Intelli Site Solutions, Conex, MX Towers, Rent-A-Tower, Tower One, Phoenix Tower International, several other smaller local and new entrant towercos
- Source: GSMA Intelligence, TowerXchange

In the meantime though, ALTÁN Redes’ progresses are good news for Mexican towerco since build-to-suit activities have been stalling in the country for the past two years.

One might argue that this is the perfect scenario for towerco to start a consolidation process. But in reality, some of these new firms have built unsellable towers, on discounted lease rates and in remote areas and unlikely to attract multiple tenants or - even worse - unsuitable for being shared from an engineering standpoint. So larger towercos who might have an appetite to consolidate and rationalise the market are left empty-handed.

### Central America and the Caribbean

In Central America, the biggest news are coming from Telefónica as the Spanish telecom giant has

### Market highlights
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- Source: GSMA Intelligence, TowerXchange
Towercos have acquired the majority of towers from carriers
Towercos have acquired a significant proportion of towers from carriers, but the majority remain carrier-owned.
Significant BTS towerco activity also present
Less SLB activity, but plenty of BTS towerco activity
Early stage market for BTS and/or SLB
Negligible towerco activity

Source: TowerXchange
Who sold their towers in Central and South America?

<table>
<thead>
<tr>
<th>Country</th>
<th>Operator</th>
<th>Competition</th>
<th>Source</th>
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<tbody>
<tr>
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<td>Teléfonoica</td>
<td>AT&amp;T*</td>
</tr>
<tr>
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<tr>
<td>Brazil</td>
<td>América Móvil</td>
<td>Teléfonoica</td>
<td>TIM</td>
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</tbody>
</table>

*AT&T acquired Nextel and Lusacell, which had previously sold towers

Central America market highlights
- PTI enters agreement with Uniti Towers in Mexico, Nicaragua (and Colombia)
- Telefónica sells El Salvador and Guatemala units to América Móvil

signed an agreement with Millicom for the sale of partial and whole parts of Telefónica Costa Rica, Panama and Nicaragua for US$1.7bn. The MNO had previously announced the sale of its business units in Guatemala and El Salvador to América Móvil for US$500mn. The decision was based on the company’s goal of reducing its debt and strengthening its balance sheet.

Belize has 379.7K connections and 100% penetration rate as of Q4 2017 according to GSMA Intelligence. With two carriers, DigiCell and Smart, and no active towercos to date, the country is too small to attract much attention from the tower industry, and our estimates suggest there are approximately 70-80 towers in the national territory.

Following the spectrum auction held in Costa Rica last year, Claro and Movistar have finalised the acquisition of additional spectrum in the 1800MHz and 2100MHz bands. The announcement follows last year’s frequency auction, during which Claro paid US$19mn and Movistar US$24mn for available spectrum in the two bands.

Since telecoms were liberalised in 2008, Costa Rica has proved an increasingly fertile ground...
El Salvador - Estimated tower count 1,765

Source: TowerXchange

Selected estimated CALA tower counts

Source: TowerXchange

Costa Rica quick facts

Towers 3,814
SIMs per tower 2,565
Mobile connections 8.6mn (Q4 2017)
Population 4.9mn (Q4 2017)
SIM penetration 175% (Q4 2017)
MNOs Kölbi, Movistar, Claro
Towercos SBA Communications, American Tower, Continental Towers, Telesites, Phoenix Tower International, TOCSA

Source: GSMA Intelligence, TowerXchange

Cuba’s SIM penetration grew from 29% in Q4 2015 to just 40% in Q4 2018 according to the GSMA, but that isn’t enough to get anywhere near the regional average. With only one mobile network operator in the country, ETECSA, who share around 500-700 towers with radio companies and TV stations, it will take some time for international towercos to be able to enter the island. However, TowerXchange is keeping a close eye on Cuba in light of its untapped market and undisputed potential to become a target of international towercos should the telecom market liberalise.

for towercos. SBA Communications remains Costa Rica’s largest towerco with just nearly 800 sites, followed by American Tower and Telesites. PTI, Continental and a handful of local firms complete the roster of towercos, who own over half the country’s towers between them.
The only towercos active in the **Dominican Republic** are Phoenix Tower International, which runs a portfolio of almost 1,800 sites and Torrecom. PTI scaled its Dominican Republic's operations thanks to a string of acquisitions including Teletower Dominicana's 190 sites, Viva's 545 towers' portfolio and, lastly, the agreement to purchase the assets of Teletorres del Caribe, owned by Altice Europe (1,049 sites) for US$170mn.

Following a regional trend, market leader Claro, who owns around 1,400 towers in the Dominican Republic, is now integrating renewable energy in more than 40 sites across the country and plans to continue expanding its renewable energy use to power towers nationally.

In February, Tigo El Salvador sealed an agreement to sell up to 800 towers to SBA Communications for US$145mn. SBA Communications owns and operates 242 sites in **El Salvador** and this deal with exponentially grow the company's footprint.

**Guatemala** is a complex country with a very competitive tower industry. SBA Communications, Torrecom, Balesia and Continental all operate in the local market which is characterised by a fairly strong regulatory environment and the huge influence of local communities – Consejos Comunitarios de Desarrollo Urbano y Rural (COCODES) – in the approval of new deployments. In spite of these difficulties, Torrecom and SBA Communications have achieved good levels of organic growth in the country and have added a combined 300 towers since Q2 2015. In October, Phoenix Tower International entered the market with the acquisition (from an unknown seller) of twenty towers.

Local billionaire Mario Lopez owns substantial equity in market leaders Tigo, and also owns most
of the land under their towers, which makes the operator reluctant to participate in widespread infrastructure sharing. Could Tigo consider selling any of its assets following the sale and leaseback deals in Colombia and Paraguay?

According to TowerXchange’s research, **Honduras** is home to two towercos, Balesia and Continental Towers Corp. For now, there’s been little visibility on the local industry and its potential with around 20% towercos penetration and the two carriers – Tigo and Claro – still holding on to their tower portfolios.

In spite of being a high-risk market, **Nicaragua** presents interesting build-to-suit opportunities. In 2018, the market stalled due to security issues for nearly seven months but now towercos have resumed BTS activities.
Panama earned an entry in the regional tower transaction report through the acquisition by Phoenix Tower International of 60 sites from American Tower. SBA remain market leaders but lately the country has seen the entrance of another towerco, Torrecom, who has acquired 25 sites and made its debut on the market. Other portfolios are held by Continental Towers and Torres de Panama.

According to GSMA Intelligence, Panama is a fast grower market in Central America with four active carriers (Cable & Vision, Claro, Digicel and Movistar), 138% penetration rate and 5.7mn mobile connections (Q4 2017). TowerXchange estimates there are around 1,700 towers in Panama.

In 2018, Phoenix Tower International announced the acquisition of 215 towers from Digicel in the French Antilles. While no further details of the transaction have been shared, this deal solidifies PTI’s position as the first towerco in the Caribbean.
Paraguay - Estimated tower count: 4,250

- American Tower: 600
- Personal: 750
- Claro: 400
- Tigo: 1,100
- Vox: 1,276*

* 1,400 announced of which 1,276 transferred

Source: TowerXchange

Brazil

Brazil has faced three tough years as a result of a deep economic recession and political crisis but to date, the market finally seems in full recovery both towercos and MNOs are now focusing on efficiency, energy management, cost reduction and new technologies integration.

On the towerco front, Phoenix Tower do Brasil has been steadily growing and now runs over 1,500 sites across the country. The towerco recently spoke with TowerXchange and shared its plans to offer energy management services across certain sites by partnering with a RESCO. And while at MWC19, TowerXchange gathered that to date, every towerco in Brazil is equipped or getting ready to provide energy solutions to its clients - a real game changer after years of steel and grass operations.
Consolidation among towercos isn’t moving very fast but it’s been reported that certain portfolios might be up for sale, including CSS’ nearly 2,000 sites.

On the MNO front, Claro is developing the largest private renewable energy generation project in Brazil as the operators seeks to improve efficiency and cut down cost throughout its infrastructure. In the meantime, Oi has hired Bank of America Merrill Lynch to assist them with their sale of non-core assets, which will include the operator towers and data centres.

In Q4 2017, SBA Communications has sealed a deal for the acquisition of approximately 900 towers to its Brazilian portfolio from Highline do Brasil as well as solid build-to-suit pipeline. TowerXchange has recently interviewed the Senior Vice President of International for SBA Communications, David Porte, who said about Highline’s portfolio that it “included a set of solid BTS contracts with positive terms that were negotiated before a wave of mediocre contracts were signed by numerous towercos across the region.”

In recent news, the President of Anatel, Juarez Quadros has announced the Agency’s intention to re-auction the unused 700MHz spectrum licenses in its efforts to introduce 5G technology across Brazil.

Bolivia

After many years of failed attempts, Bolivia has finally welcomed the first independent towerco. In fact, earlier this year Phoenix Tower International sealed the sale and leaseback deal with Trilogy International Partners’ subsidiary NuevaTel and initiated the acquisition of 600 sites (400 of which have already been transferred) at a total price of US$100mn. While Bolivia has always been perceived as a “risky market”, TowerXchange looks forward to finding out more over the next few months.

Paraguay

Paraguay is one of the newest markets to open its doors to towercos, following the acquisition by American Tower of 1,400 Tigo’s towers at a value of US$125mn (of which 957 were transferred in Q3 2017). As anticipated, the valuation per tower in the Tigo/AMT deal is lower than the regional average (US$89,285 vs US$199,966). In fact, valuations are affected by the limitations on the length of land leases, currently capped at five years, as well as the rising real estate costs. Along with Millicom’s portfolio, Personal’s 1,100 towers could come to market soon and this would surely increase the interest of towercos in this new market.

In January 2018, the 700MHz spectrum auction took place and generated bids for US$84.5mn. Tigo, Claro
Peru - Estimated tower count 11,197

and Personal all scooped spectrum allocation while State-backed Vox didn’t enter the bidding process.

Colombia

In December 2017, the Colombian Ministry of IT and Communications (MinTIC) increased the spectrum caps to allow operators to increase the capacities of their networks. The move should allow the spectrum auction (of 700MHz and 1900MHz bands) to get back to track following two years of delays. In fact, one of the reasons why the local BTS market has been stagnant is the delay in the spectrum auction and the subsequent absence of strong deployment plans by the local operators.

In 2017, the country has delivered some interesting tower news with various deals having been completed over the past few of months. Tigo has announced the sale and leaseback of 1,200 sites to American Tower for US$147mn while Phoenix sealed several deals with two Colombian firms (and a Peruvian one) for a total of 150 sites. PTI’s deals are under confidentiality agreements and no further details have been disclosed. Lastly, SBA Communications acquired Torres Andinas’ portfolios in Colombia and Peru in yet another private deal.

With tens of towercos operating in the country and not enough business for everyone, local players report tough pricing and economic conditions which are putting small BTS firms under more pressure they can sometimes handle and TowerXchange expects more consolidation to take place among towercos, especially since some developers might decide to exit the market,
exemplified by one of PTI’s counterparts in the latest deals.

On the MNO front, the local government is currently selling its 32.5% stake in Movistar, following the fine imposed to Telefónica and Claro for a breach of their 1994 licensing contract. According to the terms of the original agreement, the operators were supposed to return all wireless network infrastructure to the State after ten years, a term then extended for a further ten years, but failed to. As detailed by Telegeography, the government was one of the co-owners of the operators and therefore “duly obliged to participate in a capital increase of approximately US$1.64bn to pre-pay all commitments in relation to PARAPAT, the consortium that owns the telecoms assets and manages the pension funds of the former companies that resulted in the creation of legacy operator ColTel (now Telefónica Colombia).”

The Ministerio de Tecnologías de Informacion y las Comunicaciones (MinTIC) has finally announced that the much awaited 700MHz spectrum auction should take place in October this year.

**Ecuador**

Ecuador is the quietest of all Andean States especially since its MNO landscape is less attractive for towercos. Claro enjoys a dominant position in the country, while CNT is the government-owned player holding the third spot after Telefónica’s Movistar.

On the towerco front, SBA Communications is reporting steady growth in Ecuador where it now runs a portfolio of 405 towers. The portfolio is made of sites acquired by Innovattel/Torresec as well as sites built via BTS. Local firm Aplicanet has confirmed good volumes of BTS activities too, having added 35 sites to its portfolio in Q1 2018.

**Peru**

Last year, Phoenix Tower International sealed a private deal with a Peruvian firm and added 49 sites to its portfolio, SBA Communications snatched Torres Andinas’ 100+ towers and Andean Tower Partners further contributed to consolidating the market by sealing the landmark acquisition of Torres Unidas. Telxius has more around 930 sites and the company plans to continue expanding its footprint in the country.

With only a handful of towercos now active in the country, Peru is one of the less penetrated and possibly more sustainable tower markets in CALA. To date, MNOs haven’t shown much appetite to divest their tower portfolios, resulting in the level of towerco penetration to remain low (approximately 25%).

**Peru quick facts**

| Towers | 11,197 |
| SIMs per tower | 3,531 |
| Mobile connections | 37.6mn (Q4 2017) |
| Population | 32.4mn (Q4 2017) |
| SIM penetration | 116% (Q4 2017) |
| MNOs | Movistar, Claro, Entel, Bitel |
| Towercos | American Tower, Andean Tower Partners, Innovattel, Balesia, BTS Towers, Telxius, Torrecom |

Source: GSMA Intelligence, TowerXchange

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The evolution of the CALA telecom tower industry 2013-2018 (Q4)

<table>
<thead>
<tr>
<th>Year</th>
<th>Est. total towers</th>
<th>Towers owned by towercos</th>
<th>Towerco penetration</th>
</tr>
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<tbody>
<tr>
<td>2013</td>
<td>140,000</td>
<td>46,011</td>
<td>32%</td>
</tr>
<tr>
<td>2014</td>
<td>148,000</td>
<td>61,729</td>
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<tr>
<td>2015</td>
<td>156,000</td>
<td>69,850</td>
<td>44%</td>
</tr>
<tr>
<td>2016</td>
<td>164,207</td>
<td>81,207</td>
<td>49%</td>
</tr>
<tr>
<td>2017</td>
<td>172,542</td>
<td>89,142</td>
<td>51.6%</td>
</tr>
<tr>
<td>2018</td>
<td>181,527</td>
<td>96,427</td>
<td>53.1%</td>
</tr>
</tbody>
</table>

Source: TowerXchange
However, Telefónica has recently announced a project that set an example and drive towerco penetration in the country. Alongside Facebook, the Inter-American Development Bank and the Development Bank of Latin America, the Spanish telecom group is launching Internet para todos (IpT), an open-access, wholesale broadband mobile internet service that aims to expand coverage in rural areas. The project aims to bring a new, open approach to network deployment that can be replicated across Latin America to deliver mobile broadband to remote areas.

Chile

Still affected by the infamous 2012 Antenna Law, Chile isn’t like any other CALA market yet the two main regional towercos both operate in the country in spite of its challenges.

As part of the Women in Towers initiative, TowerXchange talked with Priscila Oliva, Country Manager for Chile at American Tower, who recently described the country’s market as follows: “Most towers in Chile are still in the hands of operators and since 2012, there haven’t been significant divestments [...]. Chile is advanced in terms of its densifications and networks so we are working on a lot of alternative site typologies such as light poles and other low coverage solutions.”

In 2017, SBA Communications has entered the market thanks to a deal with CTR, a local cable and internet provider. In a previous interview with TowerXchange, SBA’s CEO Jeffrey Stoops noted that “entering Chile isn’t easy since companies need to be licensed and approved, and SBA has been through that process, which has been a barrier to entry for other towercos. In Chile, we’ll focus on new deployments and we’ll keep an eye if any portfolios of existing assets become available.”

Argentina

After a very tough socioeconomic year, Argentina is back in the spotlight as one of the most promising tower markets in CALA. The country needs to build around 50,000 towers in the next five years and the government, who is very aware of that need, is working very closely with MNOs, infrastructure providers and local government bodies to reduce the regulation barriers that have historically slow down infrastructure deployment in the country.

Market leader Telecom has set ambitious
deployment targets and both Claro and Movistar are expected to build a decent number of towers this year to continue their expansion and keep up with the current aggressively increasing demand.

To date, American Tower owns 40 towers in the country in addition to the assets acquired with the CyCSA deal, SBA 56, PTI 36, Torresec and ATIS Group both have around 100, planning to reach 250 by the end of the year. The only towerco that has reached a relative scale is Telxius, which owns 330 sites following the transfer from Telefónica. Telxius plans to build 40 more sites in 2019.

Although the country’s economy is slowly recovering and both central government and operators have started to understand the benefits of infrastructure sharing, the fee regime imposed by municipalities alongside the tedious permitting process for new builds are still posing considerable challenges to the expansion of the towerco model across Argentina.
Meetup Americas 2019

The sixth annual retreat of the top CALA telecom infrastructure elite

To discuss your participation, contact Annabelle on +44 7423 512588 or email amayhew@towerxchange.com
# TowerXchange Meetup Americas 2019 - Agenda at a glance

## Day one | Tuesday 9 July

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:00</td>
<td>Registration and welcome coffee</td>
</tr>
<tr>
<td>09:00</td>
<td>Presentation: TowerXchange analysis of the CALA telecom infrastructure industry</td>
</tr>
<tr>
<td>10:00</td>
<td>CXO towerco panel: Exploring the dynamic Latin American tower landscape</td>
</tr>
<tr>
<td>10:45</td>
<td>Networking coffee break and business card exchange session</td>
</tr>
<tr>
<td>11:15</td>
<td>Roundtable session I</td>
</tr>
<tr>
<td></td>
<td>Vendor briefing TBA</td>
</tr>
<tr>
<td></td>
<td>Investment Hub</td>
</tr>
<tr>
<td>12:30</td>
<td>Networking lunch sponsored by SBA</td>
</tr>
<tr>
<td>13:45</td>
<td>Case study: driving infrastructure deployment through collaboration between MNOs and towercos</td>
</tr>
<tr>
<td>14:10</td>
<td>MNO panel discussion: understanding operational challenges, requirements and potential partnerships</td>
</tr>
<tr>
<td>15:00</td>
<td>Live poll</td>
</tr>
<tr>
<td>15:20</td>
<td>Networking coffee break sponsored by accruent</td>
</tr>
<tr>
<td>15:50</td>
<td>Roundtable session II</td>
</tr>
<tr>
<td></td>
<td>Investment Hub</td>
</tr>
<tr>
<td>17:00</td>
<td>Close of day one followed by networking drinks reception</td>
</tr>
<tr>
<td>19:30</td>
<td>TowerXchange's networking dinner (separate booking required)</td>
</tr>
</tbody>
</table>
# TowerXchange Meetup Americas 2019 - Agenda at a glance

## Day two | Wednesday 10 July

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:30</td>
<td>Morning coffee</td>
</tr>
<tr>
<td>09:00</td>
<td>Investment hub panel discussion: CALA as an investable platform for private equity firms, commercial banks and pension funds</td>
</tr>
<tr>
<td>10:00</td>
<td>Roundtable session III</td>
</tr>
<tr>
<td>11:15</td>
<td>Networking coffee break sponsored by</td>
</tr>
<tr>
<td>11:45</td>
<td>Technology panel: what are towercos and MNOs buying across CALA? And what opportunities are there for solution providers in the mid-term?</td>
</tr>
<tr>
<td>12:45</td>
<td>Networking lunch sponsored by</td>
</tr>
<tr>
<td>14:00</td>
<td>Executive panel: the shift from towercos to infracos and the requirements of 5G in terms of infrastructure and network architecture</td>
</tr>
<tr>
<td>14:45</td>
<td>Live poll</td>
</tr>
<tr>
<td>15:10</td>
<td>Roundtable session IV</td>
</tr>
<tr>
<td>16:30</td>
<td>Coffee break and end of Meetup</td>
</tr>
</tbody>
</table>
Early confirmed speakers include:

- Gonzalo Arauz, Lead Investment Officer, IDB Invest, Inter-American Development Bank
- Manuel Aviles, President & CEO, Innovatel
- Edgar L. Cabanas, Investment Officer, IDB Invest, Inter-American Development Bank
- Chris Carraway, Head of Sales – LatAm, Phoenix Tower International
- Eduardo Concha, Gerente Departamento de Gestión Inmobiliaria Integral Sitios Técnicos, Gerencia Divisional Construcción Infraestructura, Entel Chile
- Gonzalo Cornejo, CEO, Mexico Tower Partners
- Jesus Eduardo Diez, Experto Eficiencias, Gerencia de Planificación y Eficiencias CAM, Telefónica Centroamérica
- Mariano Gomez, Vice President, Business Development, BTS Towers
- Dagan Kasavana, CEO, Phoenix Tower International
- Scott McBride, Vice President, Digital Bridge
- Shylesh Moras, SVP of Operations, Phoenix Tower International
- Alejandro Ochoa, CEO, Tower One Wireless
- Alex Ramirez, Managing Director, Global TMT Group, Citi
- Carlos Santiago Rodríguez Medina, Subdirector de Planificación y Control Económico, Eficiencias, Telefónica Centroamérica
- Daniel Seiner, CEO, Andean Tower Partners
- Maria Scotti, CEO, Torrecom
- Andres Tahta, Executive Vice President, Agencia Argentina de Inversiones y Comercio Internacional
- Don Van Splunteren, Global Vice President of Sales, Phoenix Tower International

...Plus experts from SBA Communications, Torrecom, Digital Bridge, American Tower and more to be announced soon!

New for 2019: closed door vendor briefings

These one-hour sessions offer unique insights into what top buyers from across CALA are currently purchasing, their future projects and requirements. Solution providers can take advantage of these briefings to make contact with senior executives with purchasing power, understand their needs and offer their products and services. Already confirmed for 2019: Telefónica’s executives will share details about their current projects and purchasing pipeline. Vendor briefings are by invitation only, contact us to request more information.
How can I join?

Early booking is strongly recommended

All previous Meetups have SOLD OUT

Register today to guarantee your involvement

www.towerxchange.com/meetup/meetup-americas/apply-to-attend/

amayhew@towerxchange.com

+44 (0) 7423 512588

Group bookings now available for towercos

For 2019, operational and technical managers are invited to join our regular C-level attendance and participate in dedicated roundtables and activities. Individual passes are US$2,350 - to register a team of four or more please contact Annabelle Mayhew on amayhew@towerxchange.com

Complimentary passes for MNOs

Whether responsible for M&A, strategy, network operations, procurement and supply chain, energy, site acquisition or operations - a limited number of complimentary passes exist for mobile network operators. Register online or contact Annabelle Mayhew for more information

Vendor participation limited

In order to maintain the ratio of buyers to sellers, vendors (excluding MSPs) are limited to two full access and two expo only access passes and attending representatives must be director level or higher.

TowerXchange Meetup Dinner

Tuesday 9 July, 7:30pm
Boca Raton Resort & Club
Valencia Ballroom, US$125

Join us on the evening of Tuesday 9 July for an exclusive networking dinner and make the most of your Meetup experience!

TowerXchange networking dinners are the perfect occasion to discuss business opportunities and share industry insights in an informal yet elegant setting. A fee is required to cover food and beverages for the evening, please select the dinner option when registering online. Prior registration is essential: please note the dinner will sell out and we are unable to take registrations on the day.
Interested in exposing your brand?
Raise your company profile at the TowerXchange Meetup Americas 2019

New for 2019: branded networking areas available!

For the sixth edition of the TowerXchange Meetup Americas, companies interested in branding opportunities can take advantage of a newly launched format of networking areas that completely replaces the traditional booths.

This initiative will ease the pre-Meetup preparation while maximising onsite interaction and networking opportunities. Companies booking a networking area will receive a turnkey basic package and can select a series of upgrades including coffee machine, TV screens, rounds of drinks and more.

By contracting a networking area, you will guarantee high visibility to your brand with less effort than ever before. To find out all the details, contact Annabelle Mayhew, Chief Commercial Officer at amayhew@towerxchange.com or call +44 (0) 7423 512588.
Introducing the TowerXchange Investment Hub

Bringing together investors looking to deploy funds in infrastructure with neutral host operators and cleantech solutions providers seeking to raise capital

TowerXchange will leverage our unique contacts in the communications infrastructure community, and those of our parent company Euromoney Institutional Investor, one of the world's leading publishers of investment journals and data, to create a pool of qualified investors.

The Investment Hub will expose those investors to four groups of potential investments:

1. Large listed / near IPO tower companies
2. Startup to medium sized tower companies
3. Other communications infrastructure innovations such as edge data centres, neutral host network operators (small cell and IBS), and smart poles
4. Cleantech for communications infrastructure power

Under the guidance of an expert moderator, the Investment Hub will showcase to potential investors 4-6 innovative businesses in each of the above categories through succinct pitches and Q&As, to be followed by private conversations in 1:1 meeting rooms and at presenting companies' booths (subject to the presenters availing themselves of such facilities).

Participation in Investment Hub is strictly invitation only. To participate either as an investor or a presenter, please contact Annabelle Mayhew amayhew@towerxchange.com

TowerXchange is delighted to have welcomed some of the biggest and most influential infrastructure investors in the world to our Meetups across the globe. Previous attendees of TowerXchange Meetups Americas:

- AMP Capital
- 1848 Capital Partners LLC
- Albright Capital Management
- Alcazar Capital
- Amzak Capital Management
- Astra Capital Management
- Bank of America Merrill Lynch
- Barclays Capital
- Berkshire Partners
- Blackstone
- Brookfield Asset Management
- Cartesian Capital
- Citi
- Cook Children’s Health Care System
- Credit Suisse
- Equity International
- Gavea Investimentos
- General Communications Inc
- Goldman Sachs
- GP Investimentos
- Grain Management LLC
- Industrial and Commercial
- Bank of China (Argentina)
- Inter-American Development Bank (IADB)
- Inter-American Investment Corporation (IIC)
- International Finance Corporation (IFC)
- Invus
- IP Capital Partners
- Kohlberg Kravis Roberts & Co
- Macquarie Group
- Madison Dearborn Partners
- Maple-Brown Abbott
- Morgan Stanley UK Limited
- Nau Securities
- Peppertree Capital
- Providence Equity
- RBC Capital Markets
- Santander
- Scotiabank
- Silver Swan Capital
- Sojitz Corporation
- Soroban Capital Partners LP
- Southern Cross Group
- SPO Partners
- Standard Bank
- Sycale Advisors
- The Carlyle Group
- Tillman Global Holdings
- UBS
- UFG Asset Management
- Wells Fargo Bank
TowerXchange Investment Hub: engagement options

**Moderation of a session during the Investment Hub Theatre Americas 2019**
Position as thought leaders in the TowerXchange Investment Hub Theatre - moderate a plenary investment panel session to present your knowledge and expertise of investible platforms in the communication and infrastructure market. We will also raise your brand around a coffee break during the morning or afternoon of either day 1 or day 2. Open to all 200 attendees your brand will be further reinforced through signage and branded napkins, whilst delegates network and relax over their coffee.

**Host of the Investment Hub Theatre Americas 2019**
Be seen as the host of the TowerXchange Investment Hub Theatre - We will raise your brand in the Investment Hub Theatre to position you as Hosts of the theatre and thought leaders in advising on investible platforms in the communications and infrastructure market.

**Breakfast Briefing Americas 2019**
Sponsor a breakfast on Day 1 or Day 2 of the meetup giving you an opportunity to address the audience on your take on the state of the telecom infrastructure investment market whilst your company brand is emblazoned on signage supporting your message of being thought leaders and the advisor of choice in the market.

**Investor pre-event briefing call Americas 2019**
Join the pre-event briefing call where TowerXchange researchers will talk you through the attending delegates outlining innovative, disruptive new market entrants as well as proven established players in the CALA Communications Infrastructure market.

**Advisory firm pre-event briefing call Americas 2019**
Join the pre-event briefing call where TowerXchange researchers will talk you through the attending investors delegates and investment opportunities in innovative, disruptive new market entrants as well as proven established players in the CALA Communications Infrastructure market.
Our sponsors and exhibitors

SBA Communications

SBA Communications Corporation is a first choice provider and leading owner and operator of wireless communications infrastructure in North, Central and South America. By “Building Better Wireless,” SBA generates revenue from two primary businesses – site leasing and site development services.

In our site leasing business, SBA leases antenna space on our multi-tenant towers to a variety of wireless service providers under long-term lease contracts. SBA owns and operates over 28,000 towers across North, Central and South America. We build our towers at the request of wireless carriers, leveraging our in-house experience in site acquisition, zoning and construction. Our ability to offer carriers a comprehensive portfolio of communication sites is complementary to our tower ownership business. Currently, SBA manages approximately 5,000 communication site locations on behalf of third-party landlords.

Through our site development services, SBA offers wireless service providers assistance in developing their own networks. Our services include site identification and acquisition as well as obtaining zoning approvals and permitting for networks representing all technologies. SBA also provides a broad range of cell site equipment installation, optimization and integration services. Our extensive site development experience includes participation in the development of more than 120,000 communication sites.

www.sbasite.com or call 800.487.SITE

DIAMOND SPONSOR:
Accruent

Siterra, an Accruent Product, addresses the software needs of tower companies to sell co-locations, upgrade capacity, build-to-suit, maintain accurate asset registers, manage maintenance, and collaborate with vendors operationally as well as consolidate and integrate tower-related software technically. Sixteen of the towercos and infracos that TowerXchange tracks are current Siterra customers, spanning 18 countries and five continents. The first version of the Siterra site management platform was released in 2001. 100,000 users later, Siterra has become the industry standard, must-have operating software for tower companies today. Accruent works with its leading towerco customers to jointly develop new features that are deployed regularly through the SaaS platform to constantly improve customer value. Accruent has developed global process standards with local flexibility to pair with best-in-class software functionality.

Accruent’s telecommunications division serves some of the world’s largest mobile network operators and service providers in addition to tower companies, helping link employees from different organizations in the industry to collaborate to projects. Accruent is the largest independent provider of commercial property management software, serving the telecom, retail, education, healthcare, and corporate markets with over 7,000 customers in 149 countries.

Acsys International Ltd.

Acsys International is a global technology company specialized in security and access management of critical infrastructure through the emerging field of remote access management solution. Instigated in 1999 from the technologies of two French defense contractors, Acsys International provides remote access control using both smart-key and keyless solutions. The signature Intelligent Access Management System (iAMS) is a platform that brings together smart-padlocks, smart-keys and management software to provide a powerful means to control who goes where and when, indoors and outdoors.

Our highly specialized and international team of engineers develops world-unique and patented solutions—from the Code Generation System (CGS) and Keypad Key to remote staff management via the mobile App. This modular, and solution-oriented approach sets Acsys International apart from other security solution provider in the market. With presence in 64 countries, our clients are global leaders from different industries, including telecommunications, power, mining, logistics and more.

Continental Towers

Continental Towers is a regional telecommunications infrastructure provider dedicated to understanding and exceeding carrier requirements and managing the largest private portfolio of sites throughout Central America, Colombia and Peru. With more than a decade of experience across the various markets, the company has consistently demonstrated an undisputed track record of providing solutions to the needs of carriers, communities and neighbors in all the market in which we operate. Combining
Our sponsors

Our international scope, individual market presences and strong collaborative approach with local partners and providers, the company has emerged as one of the most important and versatile towercos in Latin America.

www.continentaltowerscorp.com

BRONZE SPONSOR:

KLEOS

KLEOS specializes in designing and building advanced wireless communication systems. It provides the world’s most powerful LTE/4G+ base station, PEGASUS. PEGASUS is a platform that empowers operators and enable them to achieve higher profitability by providing a more ubiquitous coverage, higher capacity, an exceptional performance in combating interference and an unprecedented simplicity and flexibility in deployment. This wireless superiority coupled with our unique IoT platform capabilities and smart Virtual EPC, position our solution as the ultimate path for both, Commercial and Public Safety operators, in their evolution towards the new era of 5G.

www.kleos.net

BRONZE SPONSOR:

Phoenix Tower International

Phoenix Tower International (“PTI”) own and operate towers and other wireless infrastructure and related sites throughout the United States, including Puerto Rico and the US Virgin Islands, Costa Rica, Panama, El Salvador, Guatemala, Colombia, Peru, Mexico, the Dominican Republic, French West Indies, Jamaica, Argentina, Ecuador, and Bolivia.

https://phoenixintnl.com/

BRONZE SPONSOR:

Sitetracker

Sitetracker, Inc. powers the successful deployment of critical infrastructure. As the global standard for managing high-volume projects, the Sitetracker Platform enables growth-focused innovators to optimize the entire asset lifecycle. From the field to the C-suite, Sitetracker enables stakeholders to perfect how they plan, deploy, maintain, and grow their asset portfolios from towers to small cells.

Before a tower is in the ground, every step of planning from the prospective site evaluations to site development, construction bids, and total budgeting is located in Sitetracker. During deployment, maintain organization and empower field workers with Sitetracker Mobile. Once the tower is built, Sitetracker makes it easy to maintain sites, and make data-driven decisions for the future. Market leaders in the telecommunications industry — such as Tillman, Vertical Bridge, Verizon, Nokia, and Panasonic — rely on Sitetracker to manage millions of sites and projects representing over $19 billion of portfolio holdings globally. For more information, visit our website.

www.sitetracker.com

BRONZE SPONSOR:

Torrecom

Founded in 2010, Torrecom is a leading developer, owner and operator of wireless communication sites in Latin America having secured over 2,000 sites through Sale Leasebacks (SLB) and Build-to-Suit Agreements (BTS) in the region over the past four years. Torrecom currently has over 800 sites in operation and continues to expand its portfolio through BTS and SLB’s in Mexico, Guatemala and Nicaragua.

Torrecom is your most complete resource for wireless telecommunications sites. Carriers in all countries that Torrecom operates rely on Torrecom to identify and deliver the right site. Including Towers, Building Rooftops, DAS, Indoor Solutions and alternate site locations to help carriers provide full coverage to their customers.

Our background gives us the unmatched ability to determine a sites true potential to serve as a viable and effective wireless telecommunications location. Torrecom is intimately familiar with the technical complexities of today’s modern networks, as well as the maze of regulations that apply to telecommunication sites in each market that we participate. No other company is as qualified to guide you through the complicated process of identifying and activating a wireless telecommunications site.

The time has come to make Torrecom your partner in identifying, developing and deploying wireless telecommunications sites.

www.torrecom.com
Our sponsors and exhibitors

BRONZE SPONSOR:

Vinson & Elkins RLLP

Vinson & Elkins is one of the oldest and largest international law firms, with approximately 700 lawyers located in 15 offices around the world. Our global telecommunications team has extensive experience advising on international telecoms and telecoms infrastructure M&A transactions, including in respect of towers, data centres, fibre, wireless and wireline technology.

We have significant industry experience, advising on telecoms transactions in numerous countries, including across Europe, Africa, Asia, the Americas and the Middle East and our team is well recognised for such transactions worldwide. Our telecommunications advice includes acquisitions and disposals, debt and equity financing, infrastructure development, operational arrangements, regulatory matters and dispute resolution. We also have significant experience in the negotiation and drafting of sale and purchase, debt and equity financing, master lease, build-to-suit, site management, site marketing and service level arrangements, fibre IRUs and other complex commercial contracts.

www.velaw.com

EXHIBITOR:

Crowd SiteIntel by M2Catalyst, LLC

M2Catalyst is a big data/business analytics licensor that crowdsources trillions of cell tower, mobile network, device, and application data points from millions of mobile devices.

Our data scientists then utilize proprietary algorithms to generate invaluable actionable intelligence for members of the wireless ecosystem, i.e., infrastructure providers, tower owners, wireless carriers, mobile device manufacturers, and app developers.

http://www.m2mobileinsights.com/blog/a-revolution-in-how-towers-are-valued-and-how-co-locations-are-sold/

EXHIBITOR:

Generac

Generac is a world leader in designing and manufacturing backup power generation equipment. Generac has the widest range of backup power products in the market, standing out in diesel and gas gensets manufacture with ranges up to 100 MW.

The Generac’s main objective is to provide reliable energy solutions 24/7, anytime, anywhere. For more information, visit our website.

www.generac.com

EXHIBITOR:

Chengdu Hizima Technology Co., Ltd.

We provide service and product for secure and efficient telecom outdoor assets management which includes management platform, smart phone APP and smart locks. Our flexible technical architecture allows us not only satisfying the major needs of the telecom industry, but also providing specific solution with our customizable software.

We offer a range of smart locks, with or without keys or the combination of the both which are secure and flexible for many different applications. Our solution satisfied several telecom customers in the past years and we are confident that we can offer you even better product and service in the near future. Always remember HIZIMA when you have a need for Smart Locks.

www.hizima.com

EXHIBITOR:

Abloy

ABLOY secures business operations on land, at sea, and in the air – in all circumstances. ABLOY has a proven history of telecommunication business for decades. Along with the new technology in telecom business ABLOY has introduced new methods and systems to create value and fast pay-back time to telecom customers. ABLOY provides a complete solution including project management. Combining mechanical and electromechanical features PROTEC2 CLIQ™ offers double security with wide internationally tested and approved product range.

Remotely controlled PROTEC2 CLIQ™ system enables to control sub-contractors activities on sites reducing management costs and providing traceability. Several telecom customers have chosen ABLOY solutions to be leaders in fast developing telecommunication world.

www.abloy.com

EXHIBITOR:

Vincent & Elkins RLLP

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The Generac’s main objective is to provide reliable energy solutions 24/7, anytime, anywhere. For more information, visit our website.

www.generac.com
Polar Power Inc

Polar Power, Inc. (POLA), designs, manufactures and sells direct current, or DC, power systems, lithium battery powered hybrid solar systems for applications primarily in the telecommunications market. Polar’s systems provide reliable and low-cost energy for applications for off-grid and bad-grid applications with critical power needs that cannot be without power in the event of utility grid failure. Our systems integrate DC Generators, Solar PV, DC Air-conditioning, and batteries. Our Hybrid Solar Systems provide reliable power with very low maintenance and operational costs. Our Prime Power DC Generators provide very low fuel consumption, low maintenance with 3,000-hour oil change interval and long generator life. Our Backup DC Generators provide compact, lightweight, minimum fuel storage providing long reserve.

www.polarpower.com

Sabre Industries, Inc.

Sabre Industries, Inc. is the leading manufacturer of communications towers. As one of the largest tower providers in the world, Sabre engineers and manufactures guyed towers, self-supporting towers, monopoles, concealment products, Small Cell/DAS products and tower components. Sabre’s custom-engineered structures are designed to carry light to heavy accessory loads for the towerco industry. Sabre has experience in shipping to countries throughout the world. Our guyed and self-supporting towers come in welded or knock down sections and are perfect for international shipments. We also offer camouflaged monopoles in a variety of options, such as palm trees, Elm trees and flag poles.

www.sabreindustries.com

STULZ GmbH

Since 1947, the STULZ company has evolved into one of the world’s leading suppliers of air conditioning technology. With focus on precision air conditioning units, chillers, humidifying systems, service and facility management, this division of the STULZ Group achieved sales of around 450 million € in 2016. Since 1974 the Group has seen continual international expansion of its business, specializing in air conditioning for data centers and telecommunications installations. STULZ employs 2,400 workers at ten production sites and 21 sales companies worldwide and cooperates with sales and service partners in over 140 other countries. Current annual sales are around 1,300 million euros.

www.stulz.com

Asentria

Asentria provides solutions for mobile network and tower operators to manage power, security, and environmental issues at remote cell sites from their network operations center. Telecom sites are evolving to include many new intelligent subsystem controllers for DC rectifiers, generators, cameras, access controllers, and HVAC. Asentria securely integrates these sub-systems into our hardware based site controller to present a single interface for management of power, security and environment at remote sites. Beyond simple alarming, Asentria generates data for comparative site analysis and provides remote access to the underlying systems for OPEX reducing cell site optimization.

www.asentria.com

Capitel

Capitel is a specialist transaction advisory firm with a focus on addressing the most complex techno-commercial issues for our clients, especially for major transactions and investments. Our primary focus area is techno-commercial due diligence and planning to support transactions and investment decisions for TMT infrastructure such as wireless towers, fiber, data centers as well as TMT networks such as fixed broadband, wireless broadband and media distribution networks. Capitel is headquartered in Singapore with offices in New Delhi and New York, and the recently opened branch office in London for EMEA markets.

Capitel advises global infrastructure funds, private equity funds, public market investors as well as towercos, fibercos and telecom operators, and has advised on 25+ transactions and investment decisions with a cumulative investment value of $40bn+ in the last six years.

http://capitelpartners.com
A roundup of tower news across Central and Latin America

Regional: Liberty-Millicom’s merger talks fall apart
The two regional MNOs briefly negotiated a merger deal that was later scrapped due to Millicom’s concerns regarding the cash involved in the bid (US$7.6bn). Millicom operates in Guatemala, El Salvador, Honduras, Bolivia, Colombia and Paraguay while Liberty (established in 2017 following the split from Liberty Global) is active in over twenty markets across CALA.

Argentina: ARSAT to release frequencies in favour of telecom players
ENACOM is looking at repurposing some frequencies that were exclusively reserved to ARSAT to promote the competition among telecom players. The new Decree 58/2019 will require ENACOM to ensure ARSAT still holds enough frequencies to fulfil its purposes.

Bolivia: Phoenix Tower International acquires Trilogy International Partners’ towers
PTI has agreed to purchase 600 towers from Trilogy’s subsidiary NuevaTel. 400 sites have already been transferred and the total value of the transaction is US$100mn.

Brazil: Oi looking at divesting more non-core assets
The troubled Brazilian MNO hired Bank of America Merrill Lynch (BAML) to divest more telecom towers and data centres. The company looks at raising between US$404-538mn to finance improvements across its mobile and broadband operations.

Brazil: Oi to partner with Nokia to increase FTTH connectivity
Brazilian operator Oi has signed a long-term technology partnership with Nokia that will enable the MNO to meet increasing demand for fibre-to-the-home (FTTH) in the country. The agreement will also expand Oi’s mobile broadband coverage and capacity ahead of 5G implementation. The Finish vendor will extend Oi’s FTTH network to cover ten million homes by 2021 as well as deploy its AirScale single RAN solution to support 2G, 3G and 4G services, while preparing for the delivery of 5G.

Brazil: Surf’s up! starts LTE rollout in Sao Paulo
Mobile virtual network enabler EUTV (Surf Telecom) has started the deployment of its 4G LTE network in Sao Paulo. Surf Telecom, which has held a 15MHz block of 2.5GHz spectrum since 2016, aims for its network to be operational in the next few months, starting in the municipalities of Diadema and Maua Maua. Connectivity will not be offered to end-users but will be used to support Surf’s existing MVNO clients.

Surf’s CEO Yon Moreira da Silva confirmed to a local media outlet that 20,000 antennas will be installed on cell sites owned by American Tower and Phoenix Tower International between now and the end of 2020.

Central America: Telefónica sells CAM units
Telefónica has announced the sale of the entire share capital of Telefónica Moviles Panama, Telefónica de Costa Rica and Telefonia Celular de Nicaragua to Millicom for a combined enterprise value of US$1.7bn. The MNO had previously announced the sale of its business units in Guatemala and El Salvador to América Móvil for US$500mn. The Spanish giant is still assessing the future of its Mexican operations.

Chile: Regulator announces 5G auction plans
Chilean regulator Subcetaria de Telecomunicaciones (Subtel) has announced plans for a 5G spectrum auction, with a total of 60MHz in the 700MHz and 3.5GHz bands available to potential bidders.
During MWC, Subtel stated that several global operators had already shown an interest in entering the market through the contest and the initial public consultation documents for the auction will be made available by the end of March.

**Colombia: MinTIC announces long-delayed 700MHz auction**
The Ministerio de Tecnologías de Informacion y las Comunicaciones (MinTIC) has announced that the much awaited 700MHz spectrum auction should take place in October this year.

**Colombia: ETB sale blocked by court**
An administrative court has prohibited the Capital District of Bogota from selling its 88.4% stake in local MNO Empresa de Telecomunicaciones de Bogotá (ETB), which reaffirmed an initial decision handed down by the country’s Fourth Administrative Court in July 2017.

**Cuba: ETECSA launches 3G**
Cuban state-owned operator Empresa de Telecomunicaciones de Cuba (ETECSA) has officially launched 3G mobile internet access for pre-paid customers. The network utilises the 900MHz frequency band and is accessible for subscribers with compatible handsets.

**Cuba: Telefónica offers to connect Cuba**
Telefónica has offered to connect Cuba to its international cable system, aiming to improve the country’s internet access. The company has made the announcement during an official visit to the country by Spain’s president Pedro Sanchez, who was accompanied by a delegation of Spanish companies interested in expanding their businesses in the island. The Spanish multi-country operator offered to connect Cuba via branch line to its submarine cable network.

**Honduras, Paraguay: Millicom to partner with Ericsson for network upgrades**
Millicom International Cellular (MIC) has selected Ericsson to modernise Tigo’s RAN infrastructure in Paraguay and Honduras. MIC has signed a multi-year deal with the Swedish vendor, who will implement its Ericsson Radio System portfolio into approximately 1,000 cell sites across the two countries.

Additionally, Ericsson will expand Tigo’s existing networks on both markets, modernising the existing 2G, 3G and 4G sites, as MIC prepares for the future implementation of IoT and 5G. The upgrade will also improve indoor coverage by deploying Ericsson’s Radio Dot System as well as enable full 4×4 MIMO capabilities.

**Mexico: Movistar sells fibre assets in Mexico**
Movistar Mexico has sold off certain non-core fibre-optic assets at the end of last year. According to an article on Spanish newspaper El Economista, Movistar’s subsidiary Pegaso PCS has transferred unspecified network assets to Even Telecom and Neutral Networks, companies owned by Latin American private equity firm Southern Cross Group.

**Mexico: Televisa buys Axtel’s fibre business**
Mexican broadcaster and cable TV provider Grupo Televisa has acquired some of Axtel’s fibre assets for US$234mn, adding 4,432 km of fibre and 227, 802 commercial and residential clients to its portfolio.

Axtel is selling its fibre assets in Monterrey, San Luis Potosí, Aguascalientes, Ciudad de México, Ciudad Juárez and Zapopan, as the company will keep looking for potential buyers for its remaining fibre portfolio in the country.

**Mexico, Nicaragua, Colombia: Uniti Towers sells assets to Phoenix Tower International**
PTI has agreed to purchase Uniti Towers’ LatAm business, including around 500 towers across Mexico, Nicaragua and Colombia, for US$100mn.

**Peru: Telefónica launches “Internet para todos”**
The Spanish telecom group is launching an open-access, wholesale broadband mobile internet service in Peru that aims to expand coverage in rural areas. The project, Internet para todos (IPT), is supported by Facebook, the Inter-American Development Bank and the Development Bank of Latin America and aims to bring a new, open approach to network deployment that can be replicated across Latin America to deliver mobile broadband to remote areas.

**Venezuela: Movistar won’t leave the country**
Movistar’s President in Venezuela, José Luis Rodríguez Zarco, confirmed last December that the Spanish MNO will continue operating the 2,700 sites that the company owns in Venezuela despite the country’s difficult social and political situation. During the current power crisis, the MNO has granted free SMS service to all subscribers.
Over 30 tower transactions of scale have been completed in the Sub-Saharan African market and towercos now own 61,224 (41%) of the region’s estimated 155,538 towers. The vast majority of the region’s towercos owned towers are owned by four players, American Tower, Eaton Towers, Helios Towers and IHS Towers (figure one) although a number of build to suit players, led by the prolific Atlas Tower, continue to show steady organic growth with a handful demonstrating an appetite to acquire tower portfolios that their larger competitors have shied away from.

The most recent tower transaction of scale was the sale and leaseback of 715 towers by Telkom Kenya with American Tower, closed at the end of 2018. Al Karama’s acquisition of 525 Expresso Telecom sites in Senegal is still pending, and was paused while Senegal’s election played out. One small acquisition with big consequences that should close imminently is Helios Towers’ acquisition of SA Towers. Although SA Towers has a small portfolio of towers (a tower count from Helios Towers is expected next month) the acquisition marks Helios Towers’ entry into South Africa, their fifth market.

One African trend you will read more about in TowerXchange is the convergence of fibreco and towercos. Fibre is becoming an increasingly important focus for the continent’s towercos with American Tower signing a partnership with Frogfoot Networks in South Africa, IHS formulating its fibre strategy in Nigeria, Helios Towers forming a joint venture with Vulatel as part of their South African strategy, and Eaton also having expressed an interest in diversifying their business model. For that reason we are pleased to announce the TowerXchange Meetup Africa 2019 will be co-located with the FTTX Council Africa’s annual conference in Johannesburg on the 8th and 9th of October. The FTTX Council Africa’s event is the continent’s premier meeting place for the fibre industry, with a 1,000 fibre-focused attendees at the linked event.

Besides fibre, one can expect that there will be further partnerships and potential M&A between infracos in Sub-Saharan Africa as the trend towards converged infrastructure models continues; whilst fibre looks the most imminent add-on, the industry is studying how DAS and small cells, edge data centres and satellite backhaul could present additional revenue streams. As MNOs diversify their outsourcing strategies, the region’s towercos are also starting to look at options to diversify their business models. A number of DAS and IBS systems...
have been deployed by towercos in the region, and at least one African towerco is quietly building a small cell centre of excellence. Outside of the four major towercos there is a wealth of experimentation and expertise in the middle-market towerco market in Africa. Over the next few months, TowerXchange will be compiling a ‘who’s who’ of the continent’s middle-market towercos, profiling the leaders of these smaller, but critical players in the African tower ecosystem. Some are slowly acquiring substantial tower portfolios, others are bringing new expertise to build-to-suit, and a few are pioneers delivering connectivity in difficult markets.

Some of the region’s MNOs who have yet to divest their tower portfolios continue to learn from their towerco counterparts, creating dedicated teams to proactively secure co-locations on their towers (such as in the case of South Africa’s Vodacom and Kenya’s Safaricom) or even going so far as to carve out their tower business into a separate unit (such as Telkom’s Gyro Towers). Airtel Africa has appointed advisors in advance of a prospective IPO, but rumours abound about the possibilities of a few more substantial tower sales in Chad, Gabon, Madagascar, Malawi and Tanzania. One telco to watch in 2019 is Ethio Telecom – its privatisation is a priority for government, and TowerXchange has heard of credible proposals for the carve-out of its ~8,000 towers, with a sale or partnership arrangement being considered.

Significant growth opportunities exist across the entire continent, from new build and co-location to site optimisation. TowerXchange provide a country by country analysis of tower ownership and market dynamics across 23 of the more active tower markets in sub-Saharan Africa.

**Country Overviews**

**Angola**

- **Subscribers:** 14.0mn*
- **Towers:** 2,600
- **MNOs:** Two (plus entrance of Angola Telecom and another MNO imminent)
- **Towerco:** ANTOSC

* Source: GSMA Intelligence

Angola has two MNOs, Unitel and Movitel with Unitel having around about two thirds of the market share in terms of subscribers and Movitel the other third. Unitel has the larger portfolio of towers, possessing 1,700 sites and Movitel is a relatively young network with just 800 sites.

In order to reach the level of coverage they are targeting, Unitel needs to add a further 1,000 sites and Movitel a further 2,000. Unitel’s dominance and thus lack of sizeable competition in the market means that it hasn’t had the impetus to invest in its networks but change is on its way.

In late 2017, fixed incumbent, Angola Telecom was awarded a Unified Global’ communications license (covering all mobile, fixed voice, data and TV services) with the company expected to launch mobile services imminently. In addition, talks around the entry of a fourth operator into the Angolan market are hotting up with news expected in Q4 2018. Whilst firm details of interest parties are yet to emerge, Vodacom has been one name strongly linked with the new license.

Whilst infrastructure sharing to date has been limited, a new law came into force in 2016, prohibiting the construction of a new site in close proximity to an existing one. Such legislation will necessitate infrastructure sharing going forward. ANTOSC are Angola’s first independent towerco in the process of building 30 sites with a further 70 sites planned for 2019. The towerco expects to have around 400 sites within three years.

Grid infrastructure in the country is poor with 85% of sites understood to be operating on diesel generators. Unitel in particular have put a lot of focus on renewables, looking at solar hybrid systems on a number of their sites whilst ANTOSC have deployed DG battery hybrids on the first wave of towers they have rolled out.

**Burkina Faso**

- **Subscribers:** 20.1mn*
- **Tower count:** 1,700
- **MNOs:** Three
- **Towerco activity:** Eaton Towers
- **ESCOs:** Aktivco

* Source: GSMA Intelligence

There are three MNOs in Burkina Faso; with Onatel (part of the Maroc Telecom group) and Orange (which acquired Airtel’s opco in the country) having just over 40% market share each and third placed,
Telecel with 16% (Source ARCEP August 2017). 3G was launched in the country in 2013 and 4G trials were begun by Onatel and Orange following the introduction of a new licencing region. However, mobile broadband penetration still sits at only 27%, however the overall mobile penetration rate recently hit 100%.

Prior to their opco being acquired by Orange, Airtel sold their towers to Eaton Towers which now possesses a portfolio of 700 sites in the country on which Orange is the anchor tenant. Orange also reports that it leases space on just over 100 towers owned by the other MNOs whilst retaining a portfolio of around 100 sites.

In July 2018, Orange signed a ten-year ESCO agreement with Camusat's Aktivco, and whilst the number of sites this covers has not been disclosed, TowerXchange estimate this to be around 300 (with only a third of those being telecom towers).

Cameroon

**Subscribers:** 19.3mn*  
**Tower count:** 3,200  
**MNOs:** Four  
**Towerco activity:** IHS Towers  
* Source: GSMA Intelligence

There are four MNOs in Cameroon; MTN, Orange, state-owned CamTel and Viettel-owned Nexttel. In September 2017, Afrimax (which traded as Vodafone Cameroon) had its license revoked and ceased operations in the country. IHS Towers owns or manages a portfolio of 2,284 sites having acquired towers from MTN and entered into a management with license to lease (MLL) contract with Orange. Orange manage 100 sites outside of their arrangement with IHS.

Chad

**Subscribers:** 5.7mn*  
**Tower count:** 2,000  
**MNOs:** Three  
**Towerco activity:** None  
**ESCOs:** Aktivco  
* Source: GSMA Intelligence

There are three MNOs (Airtel, Tigo and Sotel) and an estimated 2,000 towers in Chad, a country where electrification sits at just 4%.

Airtel had previously agreed the sale of their towers to Helios prior to the transaction being cancelled because of an unfavourable regulatory environment.

To address power issues, Millicom’s Tigo has signed an ESCO contract in the country with Camusat’s Aktivco. Millicom are looking to exit the African market, with Econet reported to have expressed an interest in acquiring their remaining opcos in Chad and Tanzania.

Congo Brazzaville

**Subscribers:** 5.1mn*  
**Tower count:** 800  
**MNOs:** Three  
**Towerco activity:** Helios Towers  
* Source: GSMA Intelligence

There are three mobile network operators in Congo Brazzaville, all of which are backed by regional players. MTN Congo and Airtel Congo compete with the much smaller Bintel-owned Equateur Télécom (trading as Azur Congo). Airtel had a 3G monopoly for nearly two years until MTN launched its own 3G service in August 2013 and 4G in December 2016.

Negotiations to sell Airtel’s Congolese opco to Orange lapsed, but MNO consolidation is not a new phenomenon in Congo, Airtel having acquired Warid’s operation in the country in 2014 vaulting them over MTN to become market leaders.

Helios Towers Africa is the sole towerco in Congo Brazzaville, having closed a deal to acquire Airtel’s 384 towers, representing 49% of the country’s towers. Around half of Helios’ sites are reported to be off-grid, with power availability of on-grid sites averaging 15 hours a day.

Cote d’Ivoire

**Subscribers:** 32.5mn  
**Tower count:** 4,142  
**MNOs:** Three  
**Towerco activity:** IHS Towers  
**ESCO activity:** Aktivco  
* Source: GSMA Intelligence

IHS own or manage a portfolio of 2,518 towers, having acquired sites from MTN and entered into an MLL arrangement with Orange. Number three MNO, Moov still retains their tower portfolio which numbers about 1,000 sites.
**Figure 2: MEA’s biggest tower transactions to date**

Source: TowerXchange

<table>
<thead>
<tr>
<th>Year</th>
<th>Country</th>
<th>Seller</th>
<th>Buyer</th>
<th>Tower count</th>
<th>Deal value US$</th>
<th>Cost per tower US$</th>
<th>Deal structure</th>
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<tbody>
<tr>
<td>2018</td>
<td>Kenya</td>
<td>Telkom Kenya</td>
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<td>715</td>
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<td>American Tower</td>
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<td></td>
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<td>Portfolio Acquisition</td>
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<td>2016</td>
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<td>Company Acquisition***</td>
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<td>Ghana, Burkina Faso, Kenya &amp; Uganda</td>
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<td>Joint venture (IHS 49%, MTN 51%)* ****</td>
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<td>1,149</td>
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<td>SLB with direct investment in HTT+</td>
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<td>Kenya</td>
<td>Telkom Kenya</td>
<td>Eaton</td>
<td>1,000</td>
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<td>MLL (Contract since cancelled, towers currently for sale)</td>
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<tr>
<td>2013</td>
<td>Cameroon &amp; Cote d’Ivoire</td>
<td>Orange</td>
<td>IHS</td>
<td>2,000</td>
<td></td>
<td></td>
<td>MLL</td>
</tr>
</tbody>
</table>

* announced, not yet closed  ** 101 closed as of 31 Dec 2017  *** Deal included 368 SWAP sites under MLL; agreement since cancelled  **** MTN’s equity since restructured for additional shareholding at IHS group level  + Vodacom acquired a 24.5% stake in HTT, which Helios has since purchased for $58.5mn
## Figure 2: MEA’s biggest tower transactions to date

<table>
<thead>
<tr>
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<th>Cost per tower US$</th>
<th>Deal structure</th>
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<td>2012</td>
<td>Cote d’Ivoire</td>
<td>MTN</td>
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<td>911</td>
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<td>2012</td>
<td>Uganda</td>
<td>Warid</td>
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<td>2012</td>
<td>Uganda</td>
<td>Orange</td>
<td>Eaton</td>
<td>300</td>
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<td>2011</td>
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<td>American Tower</td>
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<td>HTA</td>
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<td>521</td>
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<td>American Tower</td>
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<td>218,500,000</td>
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<td>Joint venture (AMT 51%, MTN 49%)</td>
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<td>Cell C</td>
<td>American Tower</td>
<td>1,400</td>
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<td>SLB with BTS+++</td>
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<td>Joint venture (HTA 60%, Millicom 40%)++</td>
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<td>Millicom/Tigo</td>
<td>HTA</td>
<td>750</td>
<td>54,000,000</td>
<td>120,000</td>
<td>Joint venture (HTA 60%, Millicom 40%)</td>
</tr>
</tbody>
</table>

* Totals / average 41,248 4,726,950,000 187,486

* announced, not yet closed  ++ Millicom restructured their equity into Helios’ operations into a 24% stake at group level (since reduced to 22.83%) which Millicom is now looking to monetise  +++ Cell C deal included 1,400 existing towers plus 1800 to be constructed. Total acquisition cost of US$430mn excluded here because the BTS component distorts the average
The regulator had previously revoked the operating licenses of smaller operators Comium, Cafe Mobile and GreenN in the market before awarding and then subsequently revoking a license from LPTIC (GreenN’s backer). There are understood to be about 400-500 sites which were previously owned by the different parties, with a significant degree of parallel infrastructure.

Overall estimations suggest that the market needs a further 2,000 towers to be added between all operators within the next three years. With regards power, Orange has recently signed an ESCO agreement with Camusat’s Aktivco whilst IHS has invested heavily in upgrading energy equipment, with over 70% of its sites now equipped with solar hybrid solutions.

Since Orange acquired Tigo in 2016, there are five MNOs in the DRC; Vodacom, Airtel, Orange, Supercell and Africell, with Smile planning to launch 4G services.

Helios are the country’s only towerco having acquired first Millicom’s and then Airtel’s towers. The Millicom deal involved the operator retaining a 40% stake in Helios Tower DRC which they then restructured to a 24% stake at group level (a stake which they are now looking to monetise). Helios’ acquisition of Airtel’s 950 sites spurred a major decommissioning program, involving the removal of 150 duplicated sites. Helios have also built well over 100 new sites in the country and recently announced plans to upgrade and build backbone sites, covering 1800km in the country. The towers, each to be 80-100m tall and 40km apart, will add significant capacity to existing satellite connectivity in the area. A further backbone of 500km, for a third MNO, is also in the works.

With around 4,293 towers serving 40.6mn connections, DRC has one of the highest number of SIMs per tower in the world, and with only 25% of the population having a mobile phone and 50% of the population living in an area with mobile coverage, the potential for growth is huge.

Grid power is reasonably reliable in Kinshasa, but less reliable in Lubumbashi and Goma. Almost all sites outside these three cities are off-grid and the delivered cost of diesel can be 2.5x more expensive in rural areas, with Helios’ average cost of diesel per tower over double that in its other markets. 55% of Helios’ towers are off-grid and with such high cost of fuel, the case for solar is strong. Helios has deployed solar at 430 sites in the DRC, with solar investments generally delivering a three to four year payback.
management of 280 sites, deploying solar-hybrid solutions with their partners Sagemcom.

**Ethiopia**

**Subscribers:** 68.3mn*  
**Tower count:** ~8,000  
**MNOs:** One  
**Towercos:** None  
* Source: GSMA Intelligence

The reforming government of Abiy Ahmed has announced a privatisation of Ethio Telecom, one of the world’s last monopoly telecoms operators. Further expansion of the network stalled due to a lack of debt capacity by the Ethiopian state to finance further investment. Ethiopia’s grid is unreliable and many sites are off-grid, so there is significant demand for energy management for cell sites within the country. Any tower sale would be the first step in a substantial programme of build-to-suit to infill the network and expand geographic coverage.

A number of African and Middle Eastern carriers are said to be showing an active interest and some have small offices already established in Addis Ababa. Independent towercos have also previously

TowerXchange understands that the carve-out of its ~8,000 towers is being considered, with a sale and leaseback or partnership arrangement possible. A likely first step will see Ethio Telecom split into an infrastructure division and a services division, before a further two telco licenses are issued in the country of 105mn. An independent telecoms regulator has already been established to oversee the issuance of the licences, with a further mandate to encourage infrastructure sharing.

Although long a telecoms laggard, a surge in investment from 2013 onwards saw coverage expand from below 30% to around 60% today.

**Figure 4: Estimated tower counts for selected countries in SSA**

Source: TowerXchange
had a small presence in the country but none are known now to be officially active.

Gabon

Subscribers: 3.0mn*
Towers: 1,000
MNOs: Three
Towercos: None
ESCOs: Energy Vision
* Source: GSMA Intelligence

There are two MNOs in the market since Gabon Telecom merged with Moov to create the country’s largest operator ahead of Airtel. However, financial pressures may soon force the total closure of Bintel’s Azur. Airtel is deploying LTE, but mobile broadband penetration is still only 24% at the end of 2018, with cities well covered but rural areas still underdeveloped.

Airtel’s efforts to monetise their towers in Gabon never made much headway, so all the country’s towers remain MNO captive for the time being. Whilst the electricity grid in the main cities is okay, the grid is much less extensive in more rural areas leading to 30-35% of the country’s ~1,000 sites being off-grid. Energy Vision signed the first real ESCO contract in Africa with Airtel, offering power on a fixed monthly price with no upfront capex. The project encompasses a full solar hybrid system with CDC batteries and has been extended to cover 280 sites (of which 40% are off grid, 10% are on unreliable grid and 50% are on grid). Energy Vision has also been awarded responsibility for all passive elements of the sites, with a view to extend this to sites on unreliable grid.

Ghana

Subscribers: 39.1mn*
Towers: 6,314
MNOs: Eight
* Source: GSMA Intelligence

Ghana has a crowded MNO landscape with eight MNOs since 2017’s merger of Airtel and Tigo. MTN leads the market, followed by AirtelTigo and third placed Vodafone. The NCA has formally notified Expresso of its intent to terminate the company’s license, with the authority also issuing a similar threat to Glo (both operators having less than 3% market share). The MNOs are joined by three LTE only players – Surfline, Blu and Busy.
There are three major towercos active in Ghana after a series of four tower transactions. In 2010, Helios Towers set up a joint venture with Tigo as minority partners into which 831 towers were transferred (Tigo has since restructured their stake in the joint venture to a shareholding at Helios’ group level, a stake which it is currently looking to monetise).

Shortly afterward Eaton Towers closed their deal with Vodafone Ghana, then American Tower set up another joint venture with MTN to which 1,856 towers were transferred. The latest transaction in the market was the sale of Airtel’s towers to Eaton which was finalised in 2015. In addition to the three large towercos, towercos Pan African Towers has 300 sites in the country and African Towers has also built a portfolio of 150 macro sites as well as has installed DAS at around 50 different sites including major airports.

Whilst grid coverage and availability is good by African standards (with one towercos reporting over 95% of sites to be on-grid and availability trending towards 20 hours a day), electricity prices have skyrocketed in the past year meaning that the business case for solar and hybrid is strengthened and the use of deep cycle batteries is growing.

Whilst strict permitting and environmental policies had dampened new build in the market, 2018 has seen the amount of new towers being built pick up with 200-250 expected to be added this year (versus around 100 in 2017).
There are three MNOs in the Kenyan market, Safaricom, Airtel and Telkom Kenya. Market leader Safaricom, which has 64.2% market share, owns 5,256 of Kenya’s 7,571 towers. Eaton Towers entered the market following the acquisition of Airtel’s sites and currently have a portfolio of 1,300 sites in the country after some build-to-suit additions. Telkom Kenya sold 715 towers to American Tower in a sale and leaseback deal which closed at the end of 2018.

TowerXchange have also been made aware of a new towerco, SEALTowers a start-up focussed on low cost compact tower site solutions and hybrid power innovations, and which expects to have 500 sites built by Q3 2018.

Extensive new build is required, with Telkom stating their intent to add 500 new sites; towercos have proven the most cost effective way to add new sites MNOs. Safaricom carried out extensive 4G rollout in 2017, Airtel’s 4G rollout has recently commenced after obtaining a license in early 2018. Telkom Kenya has announced plans for 800 4G sites. Around 500 buildings are suitable for DAS with a hundred or so covered already; Safaricom are currently operating shared DAS networks.

The grid is relatively robust in Kenya with Safaricom reporting that 60% of sites are on good grid connections, 25% on bad grid and 15% off-grid. Safaricom’s internal towerco, which offers co-location on around 800 of the MNO’s sites, is starting to offer power as a service. The majority of Safaricom’s sites are DG plus battery hybrids, with some solar in the mix.

### Madagascar

Telma, Orange and Airtel operate in the Madagascan market with Blueline the country’s newest MNO. Telma launched 4G operations in 2015, with Orange and Airtel following in 2017; 4G rollout is still under way to extend coverage across the country. Towerco of Madagascar (TOM), initially spun out of Telma but now an independent towerco in its own right and operates a portfolio of 1,200 sites in the country, 55% of Madagascar’s total towers.

Towerco of Madagascar (TOM), initially spun out of TELMA but now an independent towerco in its own right and operates a portfolio of 1,030 sites in the country, just under half of Madagascar’s total towers.

Madagascar represents one of the few markets where Airtel still retains its towers, with the MNO owning a portfolio of 500 sites in the country. There had been rumoured interest in an acquisition...
of Airtel’s towers, followed by reports that the MNO had signed an ESCO contract, although TowerXchange understands that the opco has decided not to pursue this, instead favouring a review of its managed services contract to bring down costs.

Orange has issued an ESCO RFP in the Madagascan market.

The operational challenge of operating a distributed tower network, particularly during the rainy season is not for the feint hearted, and with significant energy challenges in the country, (Airtel report that 50% of its sites are off-grid) TOM has been extensively evaluating a number of different energy options including a pilot of a wind project in the country.

**Malawi**

**Subscribers:** 8.6mn*
**Tower count:** 1,000
**MNOs:** Two
**Towercos:** None
* Source: GSMA Intelligence

There are two MNOs in the Malawian market – Airtel and TNM. Airtel reached an agreement to sell their towers to Eaton back in 2015 but the deal was cancelled with no signs of returning.

TNM is currently undergoing a project to rollout over 200 towers across the country. TNM launched 4G services in 2016 with Airtel launching in early 2018.

**Mozambique**

**Subscribers:** 14.5mn*
**Tower count:** 4,400
**MNOs:** Three
**Towercos:** None
* Source: GSMA Intelligence

There are three MNOs in Mozambique, mCel, Vodacom and Viettel’s Movitel. The entrance of a third MNO Movitel back in 2012 caused a radical shakeup of the telecoms sector with the Vietnamese-owned operator rapidly deploying their network and securing 49% of the mobile subscriber market share by the end of 2015.

The country has an estimated 3,000 foundation-based towers, supplemented by an additional 1,800 guyed masts (primarily owned by Movitel). Fibre rollout to the tower has been relatively extensive, resulting in microwave backhaul dishes being removed from sites, thus freeing them up for further active equipment.

Infrastructure sharing in the country has been limited, with a just an estimated 50 towers being shared between mCel and Vodacom. The government passed a first reading of a bill mandating infrastructure sharing in November 2015, however talks have stalled. The government has however been putting pressure on operators to share infrastructure in rural areas to meet the country’s universal service access goals, in a country where 68% of the population lives in rural areas.

State-owned mCel has long standing debts and appointed Barclays to oversee the sale of its ~1,000 towers in order to reduce leverage. In July 2016, it was announced that mCel would be merged with...
fixed line incumbent TDM to create a single more sustainable entity and discussion around a tower sale seemed to fall by the wayside.

There had also been speculation of a potential tower sale at Movitel although a formal process was never announced. Rumour has it that the entrance of Movitel into the market was part of a government plan to expand network infrastructure and then sell the assets. If this were the case, the decision to sell may be more likely to come from FRElimo than Viettel.

As to who the likely bidders would be in a Mozambique tower sale from either mCel or Movitel, it is not yet clear – mCel's earlier tower sale announcement didn't appear to have attracted the interest of the continent's leading towercos.

In late 2013, a domestic company, TowerCo Mozambique, tried and failed to set up towercos operations in the country. It is thought that the company was unable to reach an agreement on lease rates with mCel and Vodacom and as such, talks were disbanded. We have yet to hear rumours of any other domestic players forming in.

Namibia

Subscribers: 2.8mn*  
Towers: 749  
MNOs: Three  
Towercos: Powercom  

* Source: GSMA Intelligence

The Namibian mobile market has been dominated by two government owned MNOs: MTC and Telecom Namibia, although the entrance of privately held Paratus following an overhaul of the country's telecoms regulation has introduced a new level of competition.

PowerCom, owned by MNO Telecom Namibia, is Namibia's first dedicated infrastructure player. Managing a portfolio of 311 towers, the company has ambitions to integrate further assets into its portfolio. The company has tenancies from all three operators in the market as well as a number of non-traditional tenants. South Africa's fastest growing towercos, Atlas Tower, has also recently entered the Namibian market.

The Communications Regulatory Authority of Namibia has proposed a new regulation mandating infrastructure sharing and prohibiting operators from setting up new infrastructure where there are existing sites. An announcement from the regulator is expected imminently regarding the legislation. The government have also introduced a network facility license category to regulate a designated infrastructure provider in the country.

MTC has announced plans to roll out over 524 rural towers in 2018, with 40 contractors and 17 different suppliers selected for the process.

In terms of power, the country's electricity grid is extensive and as such, most sites only need rectifiers and battery banks, with back up DGs only on critical sites. Powercom report that only two of their 311 sites is off-grid.

Niger

Subscribers: 9.9mn*  
Towers: 1,800  
MNOs: Four  
Towercos: Eaton Towers  
ESCOs: Aktivco  

* Source: GSMA Intelligence

There are four MNOs in Niger; Airtel, Moov, Orange and Sahelcom. Airtel sold their portfolio of 600 sites to Eaton, with the transaction closing in 2017.

Over 50% of the country's towers are off-grid with Eaton examining renewable energy options (including the repair/ replacement of 200 solar sites the company has inherited).

Orange recently signed an ESCO contract with Camusat's Aktivco covering around 500 sites. Whilst new build in the market has been fairly modest, Airtel's recent turnaround in profitability in the African market, coupled with them obtaining a 4G license means that Eaton expects build-to-suit activity to pick up.

Nigeria

Subscribers: 156.6mn*  
Towers: 29,653  
MNOs: Four GSM players (accounting for over 99% of the market share), two CDMA operators and host of LTE-only players  
Towercos: IHS Towers, American Tower, BCTek Engineering, Communication Towers Nigeria, Pan African Towers (plus a handful of smaller players)  

* Source: GSMA Intelligence

The Nigerian mobile market has been dominated by four MNOs – MTN, Glo, Airtel and Ntel, with Glo acquiring a majority stake in Ntel in 2015. Historically, the government has encouraged competition in the sector and in recent years a number of new MNO players have entered the market including 9Mobile, which declared bankruptcy in 2017.

In terms of power, Nigeria's electricity grid is extensive and as such, most sites only need rectifiers and battery banks, with back up DGs on critical sites. Powercom report that only two of their 311 sites is off-grid.
There are four GSM mobile network operators in the Nigerian market, namely MTN, Glo, Airtel and 9mobile (formerly Etisalat Nigeria). In addition to the four GSM players there are two CDMA operators and a host of LTE-only players.

Nigeria is a benchmark tower market for many reasons. It’s the largest mobile market in SSA, with 156.6mn connections among a population of 198.4mn*. It’s the oldest growth independent towerco market in Africa; towercos have been building towers in Nigeria since 2006. Almost half of SSA’s towerco-owned towers are in Nigeria, and over US$2.5bn has been spent by towercos to acquire 79% of Nigeria’s towers. Towercos have proved their ability to deliver 99.9% uptime in challenging grid conditions in Nigeria. Nigeria is not just a benchmark for African towers, it’s proof of the efficacy of the independent towerco model in any emerging market.

American Tower entered the Nigerian market in 2014 following an acquisition of Airtel’s 4,700 towers, whilst IHS acquired the portfolios of Etisalat and MTN in the same year. IHS has further consolidated its position in the market, acquiring HTN Towers portfolio of 1,211 sites as well as sites from Hotspot Network. IHS’ acquisition of HTN Towers also included a MLL contract for SWAP’s 368 towers, IHS has however since terminated the agreement. Pan African Towers has around 1,000 towers in the country.

A deep recession and the devaluation of the Naira had a major impact on Nigeria’s MNOs with knock on effects for their towerco partners. Unable to service a loan, Etisalat’s opco in the country was taken over by its creditors and rebranded to 9mobile; at the time of going to press, 9mobile is in the process of being acquired by Teleology Holdings. Towercos continue to recover lease payments owed by the operator.

MTN, whose NGN330bn fine for a failure to disconnect unregistered SIMs compounded their financial challenges, also struggled to make lease payments to towercos, with the operator recently renegotiating their contract with IHS. According to a statement from the operator, the new terms have “facilitated certain network volume commitments and provided more attractive terms for MTN Nigeria’s future network roll-out applicable from 2018 onwards”.

In spite of challenging macroeconomic conditions in Nigeria, IHS report strong growth, with the towerco having completed 4000+ technology upgrades for the year to date in Nigeria, on top of 2000 upgrades in 2017 and having built 1700 new sites in the same period.

IHS has invested heavily in upgrading power systems through their ‘Big Five’ initiative in the country, replacing diesel generators with solar hybrid solutions on over 10,000 towers through five different contractors (now four). The towerco is continuing to explore further green and energy efficiency solutions and are looking now at options to supply power beyond the tower which may ultimately require a tripling of the energy generation capacity of some of their sites.
IHS has a license to deploy fibre in Nigeria and they are starting to formulate their fibre strategy, having identified about a third of their towers which they think have a good business case to deploy fibre to. Four other companies hold infraco licenses in the country which enable them to deploy fibre.

**Rwanda**

**Subscribers:** 9.7mn*  
**Towers:** 1,300  
**MNOs:** Two  
**Towercos:** IHS Towers  
* Source: GSMA Intelligence

There are now two MNOs in the Rwandan market following Airtel's acquisition of their larger rival, Tigo in early 2018. The new unit moved ahead of their competitors, MTN, in terms of market share. IHS has acquired both Airtel's and MTN's Rwandan towers and, after having added build-to-suit towers and undertaking decommissioning work, now owns a portfolio of 841 sites. As a small market, new build is limited and decommissioning is still required.

IHS have announced that they are assessing solar farm opportunities in Rwanda that could potentially supply power to the national grid in the first ‘energy swap’ model to be used in Africa.

Of all the SSA regions, Rwanda is showing some of the strongest promise in small cells and DAS making it a key target for such companies looking to enter Africa; IHS have explored shared DAS.

**Senegal**

**Subscribers:** 16.7mn*  
**Towers:** 3,159  
**MNOs:** Three  
**Towercos:** Al Karama Towers (pending closure of Expresso deal)  
* Source: GSMA Intelligence

There are three MNOs in Senegal – Orange owned Sonatel leads the market, followed by Tigo and Expresso. Millicom is selling its opco, Tigo, to a consortium involving NJJ, Sofiman and Teyliom Group after having abandoned the sale to Wari.

Expresso Telecom has agreed the sale of their towers to newly formed towerco, Al Karama Towers. The sale and leaseback transaction also includes first right of refusal on new build for Expresso, with the operator planning to add an additional 200-250 sites in the next twelve months as part of the regulatory mandate for MNOs to increase coverage to underserved areas of the country. The transaction is expected to close imminently.

Sonatel (in which Orange has a controlling stake) had reportedly looked into a sale of its towers previously but talks failed, reportedly due to workforce resistance. Speculation has arisen as to whether the change in ownership of Tigo could precipitate the sale of towers, a portfolio likely to prove attractive to Al Karama Towers.

Sonatel is the only operator to possess a 4G license in the country but Tigo and Expresso had expressed a strong interest in securing licenses, with the sale of Expresso’s towers designed to raise capital for such a license. In February 2017, the Senegalese regulator, ARTP granted three new ISP licenses to locally owned entities, following in the footsteps of Hayo which is providing coverage in the Matam region. The introduction of the new ISPs is hoped to reduce consumer prices and improve the quality of service; it also presents additional tenants for Senegal’s new towerco.

There have been reports that a joint venture
between South Korea’s SK Telecom and Middle Eastern firm CKG Group has applied for a fourth MNO license in the country, in a bid to access Senegal’s nascent LTE market.

**South Africa**

**Subscribers:** 97.4mn*

**Towers:** 28,977

**MNOs:** Four, plus new market entrant, Rain

**Towercos:** American Tower, Atlas Tower, Helios Towers, Sentech, International Tower Corp, Eagle Towers, Coast to Coast, Blue Sky Towers, Pro High Site Communications, SA Towers and Comco plus Telkom’s Gyro Towers

* Source: GSMA Intelligence

There are four MNOs in the South African market – MTN, Vodacom, Telkom and Cell C, with new data focussed MNO, Rain, having recently launched.

Towercos have struggled to get a foothold in the South African market since Cell C sold their portfolio to American Tower back in 2010; with Cell C currently rebuilding their own tower portfolio. Telkom has carved out their tower business into a separate unit, Gyro Towers in order to better commercialise its 6,500 towers. Vodacom has developed a successful commercial towerco business model in house, including a platform on which other frequency holders can view available space on Vodacom sites. Towercos have long been eyeing up MTN’s portfolio of 10,500 sites with the operator having previously hinted at its appetite to divest the assets, there are however no signs of an imminent tower deal.

A long tail of build to suit towercos have emerged in South Africa, headed by the rapidly growing Atlas Tower which now has a portfolio of 701 sites in the country. Broadcast towerco, Sentech has 340 sites which it promotes for co-location. Eaton Towers had built a portfolio of 300 towers in the country before being acquired by American Tower back in 2016. With disagreements over lease rates, three of South Africa’s four MNOs have issued a moratorium on the use of American Tower sites and new build is being given to some of the country’s smaller players, whilst also supporting managed service companies to retain tower portfolios.

Helios Towers South Africa launched in early 2019 as a joint venture between Helios Towers and local fibre-player Vulatel.

The power grid is robust and widespread in South Africa, with MTN reporting that all but 53 of their 10,500 sites are on-grid, however the reliability has recently suffered with Eskom forced to use rolling blackouts to manage demand. Unlike the majority of their sub-Saharan African counterparts, South Africa’s towercos tend to operate a steel and grass model more akin to the developed markets of Europe and the U.S. with power managed as a pass through. Towercos have begun to eye up the fibre market in South Africa, with American Tower signing a partnership with fibreco, Frogfoot, and Helios Towers partnering with Vulatel.

The ECA bill was making its way through parliament with a proposed introduction of a Wholesale Open Access Network, but this has been
 shelved, possibly permanently. Spectrum is in short supply in the South African market with an auction long overdue; ICASA is expected to stage a new spectrum auction in 2019.

**Tanzania**

**Subscribers**: 43.4mn*

**Towers**: 8,278

**MNOs**: Seven

**Towercos**: Helios Towers

* Source: GSMA Intelligence

Helios own 3,519 towers in Tanzania having acquired both Vodacom and Millicom’s portfolios in the country as well as Zantel’s mainland sites. In the Vodacom transaction, Vodacom sold 100% equity in the towers but obtained a 24% stake in Helios Towers Tanzania, a stake which Helios has since purchased. In the Millicom deal, Millicom and Helios formed a joint venture in which Millicom held a 40% stake, the 40% stake was then restructured into a shareholding at Helios’ group level, a stake which the operator is now looking to monetise. Millicom is in the process of consolidating Zantel.

In 2016, Airtel agreed the sale of the 1,350 sites to American Tower, but the deal was cancelled. One of the biggest contributing factors to the calling off of the deal was the introduction of a new legal requirement for telecom companies to list a 25% stake on the Dar Es Salaam stock exchange; a ruling which was introduced after the deal was announced and a ruling which applies to towercos as well as operators. Vodacom have been the first company to issue their IPO prospectus but with limited liquidity in the local market, the process has had to be opened up to international investors.

In addition to Tigo, Vodacom, Airtel and Zantel, Smart, Halotel and TTCL are present in the market, with each of the main MNOs dominant in a different part of the country. Halotel has been particularly aggressive in their national rollout, driving significant additional tenancies to Helios. Azam Telecom became the newest MNO to be awarded an operating license and expects to start rolling out its network imminently.

Millicom has commenced proceedings to sell its opco in the country with the operator having received non-binding offers from several parties. Operators rumoured to have expressed an interest in the opco include Econet, MTN, Airtel and Vodacom (with the latter two companies already having a presence in the market).

Helios report that approximately 80% of their towers in the country are on-grid, with grid availability currently around 20 hours per day. In July 2016, it was announced that each of the three main MNOs have entered into a RANsharing agreement to improve coverage in rural areas.

**Uganda**

**Subscribers**: 24.9mn*

**Towers**: 3,554

**MNOs**: Five

**Towercos**: American Tower and Eaton Towers

* Source: GSMA Intelligence

There are 5 MNOs in the Ugandan market; MTN, Airtel, Africell, Smile and UTL. A sale of UTL to Teleology Holdings fell through in early 2019.
leaving the future of the state-owned operator and its 400 towers in doubt. Smart, i-Tel, Afrimax have all recently exited the market. Lycamobile, the international calling specialists and previously MVNO-only operator, is partnering with local ISP Tangerine to launch a MNO into Uganda and is in talks with local towercos about their tower requirements. Eaton Towers has completed three tower transactions in Uganda, acquiring the towers of Orange, Warid and Airtel. Airtel has since acquired Warid whilst Orange has sold out to Africell. Eaton Towers now has a portfolio of 1,300 towers in the country.

American Tower entered into a joint venture in the country with MTN (with American Tower having a 51% controlling stake in the joint venture). American Tower now has a portfolio of 1,462 towers in the country.

Around 150 new towers are expected to be added by the two towercos in the next 12 months. Around 27% of sites are off-grid, with about half of new build being off-grid. Grid outages are common, even in Kampala, meaning that lots of investment is going into hybrid solutions. Eaton currently have a pilot study underway to assess hybrid solutions under both capex and opex models.

**Zambia**

**Subscribers**: 14.9mn*

**Towers**: 2,300

**MNOs**: Four

**Towercos**: IHS Towers

* Source: GSMA Intelligence

There are now four MNOs in the Zambian market, with UZI Zambia (a unit of MNO Unitel which has operations in Angola, Sao Tome and Principe, Cape Verde and Portugal) being awarded a license in March 2018. UZI Zambia joins Airtel, MTN and Afrimax (which trades under the Vodafone brand). IHS Towers have acquired the portfolios of both MTN and Airtel and now have a portfolio of 1,714 sites in the country which has an estimated 2,300

---

**Figure 14: Ownership of Uganda’s 3,550 towers**

<table>
<thead>
<tr>
<th>Towerco</th>
<th>Number of Towers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eaton Towers</td>
<td>1,300</td>
</tr>
<tr>
<td>American Tower</td>
<td>1,590</td>
</tr>
<tr>
<td>MNOs</td>
<td>800</td>
</tr>
</tbody>
</table>

Source: TowerXchange

**Figure 15: Ownership of Zimbabwe’s 2,700 towers**

<table>
<thead>
<tr>
<th>Operator</th>
<th>Number of Towers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Econet</td>
<td>1,500</td>
</tr>
<tr>
<td>Telecel</td>
<td>600</td>
</tr>
<tr>
<td>NetOne</td>
<td>600</td>
</tr>
</tbody>
</table>

Source: TowerXchange
towers. IHS has been investing heavily in solar hybrid solutions in the country with around 20% of sites hybridised as of Q2 2017.

**Zimbabwe**

**Subscribers:** 13.0mn*
**Towers:** 2,700
**MNOs:** Three
**Towercos:** Eighty Four Dynamics
**ESCOs:** Distributed Power Africa

* Source: GSMA Intelligence

There are three MNOs in Zimbabwe, market leaders Econet Wireless alongside NetOne and Telecel (with the government having a stake in the latter two). POTRAZ, the Zimbabwean telecoms regulator has proposed a revamp of existing legislation. The regulator had previously announced its appetite to promote infrastructure sharing in the country.

Econet owns the largest tower portfolio in the country with around 1,500 towers; the operator had initially planned to carve out the towers into a separate business unit, Ecotowers, but plans appear to be on hold. Telecel and NetOne own around 600 towers each. Econet reports that it currently uses around 60 third party towers.

With regards to the power situation, Econet reports that just 46 of its towers are off-grid, running on solar battery hybrids. Grid availability for on-grid sites in Zimbabwe is good, currently sitting around 95%. Econet’s in-house ESCO, Distributed Power Africa manages power across its tower portfolio, whilst also providing power to other commercial and industrial customers.

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**Figure 16: TowerXchange SSA towerco activity and tower transaction heatmap**

![Map of SSA countries with tower activity and transaction heatmap legend](source: TowerXchange)

Legend:
- **Green square with a tick:** Towercos active
- **Red square:** New tower deal announced
- **White square:** No known towerco activity

Source: TowerXchange
Figure 17: TowerXchange SSA ESCO heatmap

Burkina Faso: Aktivco
Côte d'Ivoire: Aktivco
Chad: Aktivco
DRC: GreenWish+Sagemcom
Gabon: Energy Vision
Niger: Aktivco
Nigeria: IHS ‘Big Five’: IPT, Makasa Sun, M-P Infrastructure, Biswal
Lebanon: IPT
Sudan: Ascot
Zimbabwe: Distributed Power Africa

Source: TowerXchange
Regional: Airtel Africa appoints banks for IPO plans; tower sale on hold?
Airtel Africa has kicked off its IPO plans, appointing eight banks (Goldman Sachs, JP Morgan, Citigroup, BofA Merrill Lynch, Absa Group, Barclays, BNP Paribas and Standard Bank) to run the process. The move is part of Airtel Africa's plans to reduce its debt which currently stands around US$5bn whilst also providing funds to support its operations in an increasingly competitive market. Airtel had previously commenced plans to sell towers in five markets in which it is yet to divest tower portfolios, reportedly having received bids from multiple towercos and beginning the process to narrow down the offers to 2-3 shortlisted bidders. With IPO plans looking to move forward, observers feel that the tower sale may be delayed until after the listing is finalised although at the time of going to press we await further news.

Regional: MTN annual report moots potential disposal of towerco equity stakes
MTN's recently released annual report hints that some or all of the equity stakes it has built up in African towercos may be sold off. The report states: “We also reviewed our non-mobile assets, including our existing investments in tower companies and e-commerce ventures. While these are important and material investments where we need a tight commercial and operational integration with our mobile assets wherever possible, they are not viewed as long-term strategic holdings of the group. As a result of this review, we plan to realise at least R15 billion in asset realisations over the next three years excluding any proceeds from IHS. Proceeds will be used to reduce holding company debt.” TowerXchange understands MTN owns a substantial minority stake in IHS Towers as well as 49% stakes in ATC Ghana and ATC Uganda. The telecom giant also plans to pull back from its marginal telecoms markets and has already sold its 53% shareholding in Mascom Wireless Botswana to Zimbabwe’s Econet for around US$300 million.

Angola: MTN withdraws from fourth license tender
MTN has reportedly withdrawn its interest in acquiring Angola’s fourth MNO license, claiming that the tender is flawed. Angola currently has two operational MNOs, market leaders Unitel who dominate the market and Movitel, whilst Angola Telecom holds the country’s third MNO license. Reports suggest that MTN’s withdrawal leaves just one player in the running for Angola’s fourth operating license, a local start-up called Telstar Telecomunicacoes.

Burkina Faso: 4G rollout on the horizon as government approves technology neutral licenses
The government of Burkina Faso has approved technology neutral licenses, enabling the country’s...
MNOs to use 2G and 3G spectrum for 4G networks. Onatel (owned by Maroc Telecom) launched 4G trials in December, with Orange having trialled 4G in November, suggesting that the operators are ramping up for a launch.

**Ethiopia: New regulator to enable telecoms competition in Africa’s second largest country**

Ethiopia announced the creation of an independent telecoms regulator to oversee and manage the communications sector. Establishing an independent regulator is one of the key steps towards privatising Ethio Telecom and the issuance of licences enabling international MNOs to enter the country, ending one of the few remaining state monopolies in Africa. A surge in investment from 2013 onwards saw coverage expand from below 30% to around 60% today, but further expansion has stalled due to a lack of debt capacity by the Ethiopian state. The announcement of an independent regulator follows last month’s announces investment in a new fibre-optic backbone for the East African state, and the broader liberalisation programme championed by Prime Minister Abiy Ahmed.

**Ghana: AirtelTigo completes network integration**

After having merged operations in October 2017, AirtelTigo has announced that it has completed the integration of Airtel and Tigo’s respective networks. The operator is now Ghana’s third largest operators by subscribers.

**Ghana: Vodafone starts 4G roll-out, go-live expected in March or April**

Following a successful acquisition of two 5MHz of 800Mhz bands for US$30mn in January, Vodafone Ghana have announced the imminent launch of 4G services. They announced 200 LTE sites have already been deployed with more expected.

**Kenya: After merger announcement, Airtel expands 3G and 4G coverage**

Following the announcement of a merger between Airtel Kenya and Telkom Kenya, Airtel Kenya has announced plans to roll-out over 800 3G and 4G sites across 40 locations to improve the reach and quality of its data services. The announcements follow Saraficom’s half year results announcement that its 4G coverage had grown 21ppts year on year to 53%, and its 3G coverage to 91%.

**Kenya: Airtel Kenya and Telkom Kenya to merge**

Following abandoning talks in June of last year, this week it was announced that Airtel Kenya and Telkom Kenya have agreed to a merger. The new company will operate as Airtel-Telkom and will seek efficiencies of scale and improvements to operations to propel the combined entity into profitability. Both brands will survive independently but it is hoped the merged company will be better able to compete with Safaricom, which currently holds 69% of the Kenyan market.

It is unclear where this leaves the KES1 billion (USD9.8 million) fibre, 3G and 4G investment announced by Telkom Kenya last month. Telkom is 60% owned by Helios Investment Partners, with the rest held by the Kenyan government. Airtel Kenya’s sole shareholder is India’s Bharti Airtel. Eaton Towers acquired Airtel’s Kenyan portfolio of 1,285 towers when Airtel Africa divested most of its African towers. Last year American Tower acquired 715 towers from Telkom Kenya. Only a limited number of towers overlap, and so it is unclear to what extent this merger will lead to decommissioning over the short term.

**Ethiopia: Ethiopian tower sale mooted as Ethio Telecom privatization heats up**

ToweXchange can reveal that discussions on how to privatise Ethio Telecom’s towers are also taking place. Ethiopia Prime Minister Abiy Ahmed confirmed the Ethio Telecom privatisation was going ahead in the Financial Times and that the telco was the number one priority for privatisation. TowerXchange understands there are ambitions to finalise the privatisation by the end of the year and to issue up to two further operator licences. A number of African and Middle Eastern carriers are said to be showing an active interest. TowerXchange further understands that ownership of the country’s 7-8,000 existing towers remains undecided, with multiple options being explored, including management within Ethio Telecom, a partnership with an independent towerco or a comprehensive sale and leaseback. Plans on how to manage the country’s substantial build-to-suit requirements are also ongoing. Infrastructure coverage of Ethiopia is at about 85 percent and there are 60 million mobile subscribers in a population of 105mn.
Niger: Government orders closure of Airtel and Orange offices over unpaid taxes
The Niger government has ordered the closure of Airtel’s operations in the country over reportedly unpaid taxes accounting to 62mn CFA francs. Airtel, Niger’s largest operator disputes the claim which accounts to approximately 70% of its annual revenues from the market. The news follows on from recent steps taken by Niger’s tax authorities on Orange’s opco in the country, with the government demanding 22bn CFA francs, a figure disputed by the operator.

Nigeria: MTN and Central Bank of Nigeria reach agreement over repatriation dispute
After an ongoing dispute regarding the alleged inappropriate repatriation of US$8.1bn by MTN Nigeria, the operator has submitted documentation to the Central Bank of Nigeria which has satisfied the bank that historical dividend payments to MTN Nigeria’s shareholders do not need to be reversed. The bank has however maintained that private placements of around US$1bn in 2008 were irregular and a such MTN and the CBN have reached a resolution that MTN will pay the notional reversal amount of US$52.6mn without admission of liability.

South Africa: Helios Towers forms South African JV and announces deal for SA Towers
Helios Towers South Africa (HTSA) was formed earlier this year. It is 66% owner by Helios Towers and 34% owned by local full-service fibre and mobile network construction provider Vulatel. Helios Towers owns over 6,500 towers in Tanzania, Democratic Republic of Congo, Ghana and Congo Brazzaville, and is now entering South Africa to build greenfield mobile tower infrastructure and fibre-optic infrastructure. Shortly after its announced formation, it was also announced that HTSA was acquiring a controlling stake in SA Towers for an undisclosed sum. The acquisition of SA Towers will come with a small portfolio of towers, a pipeline of build-to-suit tower opportunities and a management team with extensive local planning and permitting experience.

South Africa: Electronic Communications Amendment (ECA) Bill withdrawn, wholesale open-access network (WOAN) in doubt
South Africa’s new communications minister Stella Ndabeni-Abrahams has withdrawn the Electronic Communications Amendment (ECA) Bill. Among other changes to telecoms regulation, the ECA Bill had proposed the creation of a wholesale open-access network (WOAN) which would have been handed high-demand spectrum and tasked with creating a carrier neutral network of shared wireless infrastructure. The ECA Bill and its proposed wholesale network and forced infrastructure sharing had been widely opposed by the South African telecoms sector. It is unclear if the ECA Bill will be reintroduced in its current form or if plans for the WOAN have been shelved permanently.

South Africa: Rain and Nokia launch 5G-ready network in Cape Town
South African operator Rain and Nokia have announced the first 5G-ready network in South Africa. The deployment is set to start in the first quarter of 2019 with services launching mid-2019 when 5G ready handsets become available. The deployment uses 3600MHz spectrum because rain already owns the 5G-capable frequencies, the system uses Massive MIMO technology. The roll-out will continue through 2020 and extend coverage to more areas.

Tanzania: Airtel Tanzania resolves ownership brouhaha with Tanzanian government
Bharti Airtel’s stake in Airtel Tanzania is to be reduced from 60% to 51% following a settlement with the government which sees the state’s share increase from 40% to 49%. The value of the deal was not announced. The deal was made necessary by claims from Tanzania’s President John Magufuli that Bharti Airtel illegally acquired its Tanzania subsidiary from Tanzania Telecommunications Company Ltd (TTCL) and that the state had been cheated out of shares. Bharti Airtel had disputed this saying it had followed all necessary protocols and acquired all necessary approvals. However, the resolution of the dispute clears one hurdle in the way of an Airtel Africa IPO, which would have been difficult were ownership of its Tanzania subsidiary not clarified.
TowerXchange’s analysis of the independent tower market in Asia

Selected Asian tower market size comparisons, Q4 2018

Asian tower markets with <5,000 assets

Towerco penetration across Asia is not as high as one might think and the market still presents considerable opportunities for growth. From the positive moves towards infrastructure sharing in Bangladesh and the Philippines, to a new phase of deals and BTS activities in Myanmar, the region is ripe with changes and excitement. TowerXchange is once again offering its readers an exclusive and updated analysis of the dynamics of each key market across Asia, with enhanced coverage of up and coming ones such as Bangladesh, the Philippines, Myanmar and Vietnam, while keeping a close eye on maturing and yet evolving landscapes such as India and Indonesia.

Afghanistan

Afghanistan has five MNOs, Afghan Wireless (AWCC) which is the country's fastest growing MNO, Roshan which is funded by the Aga Khan Development Fund and is the country's largest MNO, multinational players MTN (which has hinted at exiting the market) and Etisalat, and newcomer Afghan Telecom which is part of the Ministry of Communications and Information Technology.

Telecommunications remains an important sector for the Afghan government, with Afghan Wireless understood to be the largest tax payer in the country.

Each of the operators own pretty much of all of their sites, with the MNOs understood to have between 1000-1500 towers each. The Telecom Regulatory Authority of Afghanistan (ATRA) states that there are 6,645 base stations in the country, and with limited infrastructure sharing one can assume that a rough proxy for the number of towers. Around 100 of those sites are said to be owned by Asia Consulting Group.

Networks are better established in Northern and Central regions, although Afghan Wireless is still investing in Southern regions of the country. Since the MNOs entered the market in the early 2000s, the security situation has deteriorated significantly. The Taliban demanded the shutdown of a significant number of sites to avoid surveillance by national and international security forces; where these demands were not met many sites were blown up. MNOs have been reluctant to invest and so
there has been little activity in terms of new tower build or co-location. Frontier Tower Solutions had operated in the market in the earlier days, building, operating and maintaining sites for Afghan Wireless but the towerco has since wound up operations in the country.

99% of sites run on gensets - even in cities - and the biggest challenge is getting fuel delivered to sites. Solar solutions had been examined but the payback period means that MNOs have been reluctant to invest. There are few to no major international contractors operating in the market outside of the military (with foreign troops also having massively reduced their presence, a factor which caused a drop in subscriber numbers) although TowerXchange has heard rumour about one multinational MSP offering ESCO-like services in the market.

In spite of the challenging conditions, coverage in the market has been described as “fairly okay”. There are 30.4mn subscribers with mobile penetration sitting at 89% (source: ATRA) and 4G coverage is available in major urban areas, where data usage continues to grow faster than expected. In early 2018, the ATRA agreed to provide US$32.1mn of funding to deploy 250 base stations in rural and remote areas. Roshan will deploy 137 sites, Afghan Wireless 84 sites and Afghan Telecom a total of 29.

Australia

In 2018, Telstra made the headlines when the operator announced the carve-out of its non-mobile-related assets including data centres, fibre, copper, subsea cables, poles and more into a separate infraco as part of a restructuring plan called Telstra2022 that aims at streamlining the company’s operations and reduce its opex.

The plan will result in 8,000 net jobs being cut over the next three years, including 25% of executive and middle management roles.

This year, it is all about 5G. Last December, Dense Air, Mobile JV (a joint venture between TPG Telecom and Vodafone), Optus Mobile and Telstra paid over US$ 600mn for the 350 slots offered in the 5G spectrum auction in the 3.8GHz band, and all operators have now started the transition to 5G. Telstra, Ericsson and the Commonwealth Bank are reportedly working together and exploring the different possibilities for 5G deployment. The market leader has been switching on its 5G technology since August and has enabled around 200 5G sites, using its early access license previously issued by the Australian Communications and Media Authority.

Optus has now two live 5G sites and is partnering with technology leader Ericsson to build at least 60 more in the upcoming months.

Both towercos and MNOs will need to work together to raise the necessary investment for 5G networks deployment while exploring further collaboration and sharing initiatives on small cells, base stations, hotels and fibre. Leading towerco Axicom is
<table>
<thead>
<tr>
<th>Year</th>
<th>Country</th>
<th>Seller</th>
<th>Buyer</th>
<th>Tower count</th>
<th>Deal value US$</th>
<th>Cost per tower US$</th>
<th>Deal structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019</td>
<td>Laos</td>
<td>Mekong Tower Company Ltd. (MTCL)</td>
<td>edotco</td>
<td></td>
<td></td>
<td></td>
<td>Acquiring 80% stake</td>
</tr>
<tr>
<td>2018</td>
<td>Myanmar</td>
<td>PAMEL</td>
<td>TPG</td>
<td>1,300</td>
<td></td>
<td></td>
<td>Company acquisition</td>
</tr>
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<td>2018</td>
<td>India</td>
<td>Idea Cellular</td>
<td>American Tower</td>
<td>9,900</td>
<td>$592,700,000</td>
<td>$59,868</td>
<td>SLB</td>
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<tr>
<td>2018</td>
<td>Indonesia</td>
<td>Komet Infra Nusantara (KIN)</td>
<td>Sarana Menara Nusantara (SMN)</td>
<td>1,400</td>
<td>N/A</td>
<td>N/A</td>
<td>Company acquisition</td>
</tr>
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<td>2018</td>
<td>India</td>
<td>Vodafone India</td>
<td>American Tower</td>
<td>10,200</td>
<td>$592,900,000</td>
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<td>2018</td>
<td>Indonesia</td>
<td>Providence (KIN)</td>
<td>Protelindo</td>
<td>1,400</td>
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<td></td>
<td>Company acquisition</td>
</tr>
<tr>
<td>2018</td>
<td>India</td>
<td>Reliance Communications</td>
<td>Reliance Jio</td>
<td>43,000</td>
<td>$3,750,000,000</td>
<td></td>
<td>Asset acquisition; still to close**</td>
</tr>
<tr>
<td>2017</td>
<td>Indonesia</td>
<td>PT Sampoerna Telekomunikasi Indonesia (STI)</td>
<td>PT Inti Bangun Sejahtera (IBS)</td>
<td>371</td>
<td>$31,000,000</td>
<td>$83,557.95</td>
<td>SLB</td>
</tr>
<tr>
<td>2017</td>
<td>India</td>
<td>Nettle Infrastructure (Bharti Infratel)</td>
<td>Secondary share sale on BSE and NSE</td>
<td>39,211</td>
<td>$402,000,000</td>
<td></td>
<td>Sold 3.65% (6.75 crore shares)</td>
</tr>
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<td>2017</td>
<td>Pakistan</td>
<td>Towershare (Tazanite Tower)</td>
<td>edotco</td>
<td>700</td>
<td>$88,900,000</td>
<td>$127,000</td>
<td>Company acquisition</td>
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<td>2017</td>
<td>India</td>
<td>Ascend Telecom Infrastructure</td>
<td>IDFC Alternatives</td>
<td>5,222</td>
<td>$91,200,000</td>
<td></td>
<td>Acquiring 33% stake</td>
</tr>
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<td>2017</td>
<td>India</td>
<td>Bharti Airtel (Infratel)</td>
<td>Nettle Infrastructure Investments (Bharti)</td>
<td>90,255</td>
<td>$1,061,500,000</td>
<td></td>
<td>Acquiring 11.32% stake</td>
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<tr>
<td>2017</td>
<td>India</td>
<td>Bharti Airtel (Infratel)</td>
<td>KKR/CPPIB consortium</td>
<td>90,255</td>
<td>$951,600,000</td>
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<td>Acquiring 10.3% stake</td>
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<td>2017</td>
<td>Australia</td>
<td>Southern Cross Austereo</td>
<td>Axicom</td>
<td>56</td>
<td>$9,500,000</td>
<td>$169,643</td>
<td>SLB</td>
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<td>2017</td>
<td>Malaysia</td>
<td>edotco Group</td>
<td>Kumpulan Wang Persaraan</td>
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<td>$100,000,000</td>
<td></td>
<td>Acquiring 5.4% stake</td>
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<td>2016</td>
<td>Malaysia</td>
<td>edotco Group</td>
<td>Innovation Network Corporation of Japan</td>
<td></td>
<td>$400,000,000</td>
<td></td>
<td>Acquiring 21.5% stake</td>
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<td>2016</td>
<td>Malaysia</td>
<td>edotco Group</td>
<td>Khazanah Nasional Berhad</td>
<td></td>
<td>$200,000,000</td>
<td></td>
<td>Acquiring 10.7% stake</td>
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<tr>
<td>2016</td>
<td>Vietnam</td>
<td>VNI (SEATH)</td>
<td>OCK Group</td>
<td>1,972</td>
<td>$50,000,000</td>
<td>$25,355</td>
<td>Company acquisition</td>
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<td>2016</td>
<td>Indonesia</td>
<td>XL Axiata</td>
<td>Protelindo</td>
<td>2,500</td>
<td>$250,000,000</td>
<td>$100,000</td>
<td>SLB</td>
</tr>
</tbody>
</table>
## Key tower deals in Asia 2008-2019 (excluding carve-outs)

<table>
<thead>
<tr>
<th>Year</th>
<th>Country</th>
<th>Seller</th>
<th>Buyer</th>
<th>Tower count</th>
<th>Deal value US$</th>
<th>Cost per tower US$</th>
<th>Deal structure</th>
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<tbody>
<tr>
<td>2016</td>
<td>India</td>
<td>Viom Networks</td>
<td>American Tower</td>
<td>42,200</td>
<td>$1,180,000,000</td>
<td></td>
<td>Acquiring 51% controlling stake</td>
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<td>2015</td>
<td>Myanmar</td>
<td>Digicel MTC</td>
<td>edotco</td>
<td>1,250</td>
<td>$221,000,000</td>
<td></td>
<td>Acquiring 75% controlling stake</td>
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<td>2015*</td>
<td>Australia</td>
<td>Crown Castle</td>
<td>MIRA-led consortium</td>
<td>1,772</td>
<td>$1,600,000,000</td>
<td>$902,934</td>
<td>Company acquisition</td>
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<td>2015</td>
<td>India</td>
<td>KEC International</td>
<td>American Tower</td>
<td>381</td>
<td>$13,000,000</td>
<td>$34,121</td>
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<td>2014</td>
<td>Malaysia</td>
<td>KJS</td>
<td>YTL Power Int'l</td>
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<td>$48,544</td>
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<td>STP</td>
<td>3500</td>
<td>$460,000,000</td>
<td>$131,429</td>
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<td>2013</td>
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<td>Hutchison</td>
<td>STP</td>
<td>300</td>
<td>$68,000,000</td>
<td>$226,667</td>
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<td>Protelindo</td>
<td>503</td>
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<td>SLB</td>
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<td>2012</td>
<td>Indonesia</td>
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<td>Protelindo</td>
<td>152</td>
<td></td>
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<td>Company acquisition</td>
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<td>2012</td>
<td>Indonesia</td>
<td>Indosat</td>
<td>Tower Bersama</td>
<td>2500</td>
<td>$519,000,000</td>
<td>$207,600</td>
<td>SLB</td>
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<tr>
<td>2011</td>
<td>Indonesia</td>
<td>Infratel</td>
<td>Tower Bersama</td>
<td>595</td>
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<td></td>
<td>Company acquisition</td>
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<tr>
<td>2010</td>
<td>India</td>
<td>Essar Telecom Infrastructure</td>
<td>American Tower</td>
<td>4450</td>
<td>$432,000,000</td>
<td>$97,079</td>
<td>SLB</td>
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<td>2010</td>
<td>Indonesia</td>
<td>Hutchison</td>
<td>Protelindo</td>
<td>1482</td>
<td>$165,900,000</td>
<td>$111,943</td>
<td>SLB</td>
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<tr>
<td>2010</td>
<td>India</td>
<td>Aircel</td>
<td>GTL Infrastructure</td>
<td>17500</td>
<td>$1,800,000,000</td>
<td>$102,857</td>
<td>SLB</td>
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<td>2009</td>
<td>India</td>
<td>Viom Networks</td>
<td>QTIL</td>
<td>18000</td>
<td>$2,407,000,000</td>
<td>$133,722</td>
<td>Company acquisition</td>
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<td>2009</td>
<td>India</td>
<td>Transcend Infrastructure</td>
<td>American Tower</td>
<td>327</td>
<td>$23,000,000</td>
<td>$70,336</td>
<td>Company acquisition</td>
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<tr>
<td>2009</td>
<td>India</td>
<td>XCEL Telecom</td>
<td>American Tower</td>
<td>1730</td>
<td>$170,000,000</td>
<td>$98,266</td>
<td>Company acquisition</td>
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<td>2008</td>
<td>Indonesia</td>
<td>Bakrie</td>
<td>STP</td>
<td>543</td>
<td>$34,000,000</td>
<td>$62,667</td>
<td>SLB</td>
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<td>2008</td>
<td>Indonesia</td>
<td>Hutchison</td>
<td>Protelindo</td>
<td>3692</td>
<td>$500,000,000</td>
<td>$135,428</td>
<td>SLB</td>
</tr>
</tbody>
</table>

*Crown Castle Australia (now Axicom) transaction excluded from totals and averages as it not a natural comp for the other S and SE Asian transactions

**Also includes ~178,000km of optic fiber cable, 4G spectrum and 248 media convergence nodes
explore new technologies and its CEO Graeme Barclay has publicly confirmed that the company is already increasing capacity in existing sites while investing in small cells and new solutions such as power, fibre, cabins, and BTS on a shared access and shared cost model.

The “traditional” tower landscape remains pretty much unchanged with Axicom (formerly Crown Castle), Broadcast Australia and a handful of smaller independent towercos owning around 2,600 towers and a further 1,800 towers having been recently erected by nbn, the Government-owned new broadband network.

**Bangladesh**

In 2018, two major events marked the Bangladesh infrastructure market. On one hand, the licensing of four towercos - edotco Bangladesh, iSON Tower (now renamed Kirtonkhola Tower), AB Hightech Consortium and TASC Summit Towers – which are now entitled to operate in the country as commercial organisations and, on the other hand, the near-stop of any new builds. Two events one might argue are in stark contrast with each other but also a sign of the changes currently happening across Bangladesh.

In fact, while the Bangladesh Telecommunication Regulatory Commission (BTRC) proceeded with the towerco licenses in an attempt to rationalise the market as well as prohibiting MNOs from building their own sites, towercos struggle to start building new sites while understanding the dynamics of the new regime.

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**Estimated tower count for Bangladesh**

<table>
<thead>
<tr>
<th>Operator</th>
<th>Estimated Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grameenphone</td>
<td>7,800</td>
</tr>
<tr>
<td>Banglalink</td>
<td>6,000</td>
</tr>
<tr>
<td>edotco</td>
<td>9,821</td>
</tr>
<tr>
<td>Airtel</td>
<td>3,800</td>
</tr>
<tr>
<td>Teletalk, CityCell and non-traditional MNOs</td>
<td>4,100</td>
</tr>
</tbody>
</table>

**Revenue market share of MNO in infra-sharing in Bangladesh**

<table>
<thead>
<tr>
<th>Operator</th>
<th>Revenue Market Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grameenphone</td>
<td>45%</td>
</tr>
<tr>
<td>edotco</td>
<td>36%</td>
</tr>
<tr>
<td>Banglalink</td>
<td>12%</td>
</tr>
<tr>
<td>Airtel-Robi</td>
<td>7%</td>
</tr>
</tbody>
</table>

Source: TowerXchange research, edotco, Hardiman Telecommunications
As of now, local sources seem positive about the pipeline of new builds for 2019 and towercos are now in the process of negotiating MLAs and MSAs with MNOs while awaiting the natural lag between permit application, securing permits and breaking ground. Permitting a new site takes several months in Bangladesh, with longer periods required for sites on the border.

A new challenge is now affecting the market though, as the BTRC is possibly considering actions against Grameenphone and its dominant position. In fact, the MNO owns around 7,800 towers across Bangladesh and has been leasing them up on a commercial basis, hence functioning as the largest towerco in the country.

This could represent an interesting opportunity for a sale and leaseback deal, combined with 6,000 sites Banglalink is said to be looking at monetising. However, in recent conversations with local sources, TowerXchange discovered further complexities which might hinder tower divestments. Read more in the latest editorial “Unleashing the potential of towerco investment in Bangladesh”.

Cambodia

With a crowded mobile market consisting of six operators serving a population of 15.5mn, and a regulator that supports infrastructure sharing, there is continued potential for the 9,200 site tower market in Cambodia to grow.

There has been an influx of Chinese operators and vendors prepared to invest heavily in this ‘one belt, one road’ market. While on the operational front, challenges still remain including 20% of sites being off-grid and the risk of landmines in the more remote areas.

The country’s mobile penetration is over 110% to date and that is driving the Government to push for 100% coverage in urban areas and 70% in rural areas by 2020.

Of the 9,200 sites in the country, edotco operates more than 3,100 sites and provides managed services to an additional 1,000. The towerco has recently shared with TowerXchange its plans to build around 200-250 sites per year for the next three years as well as engaging in small cells, IBS and poles deployments.

Local tower builder Camtowerlink also has a modest footprint in Cambodia.

India

With the merger now finalised, Vodafone Idea is in talks with Bharti Airtel to create a joint venture for their fibre infrastructure. In a recent Economic Times article, Airtel’s Chairman Sunit Mittal was quoted stating ‘We have asked Vodafone Idea to come and join the fibre company... We are starting with our own fibre company and if Vodafone Idea brings its fibre assets, then they will get appropriate shares.’ A combined fibreco could be beneficial for both MNOs to improve capacity, create more efficiency and avoid future overlaps.
Talking about fibre, Reliance Jio is demerging its fibre assets and tower portfolios and creating two new entities, Jio Digital Fibre and Reliance Jio Infratel, with the latter owning and managing the tower assets. Once fully operational, Jio Digital Fibre is said to be valued around US$6-8bn and could be monetised via a sale and leaseback or infrastructure investment trust (InvIT). Interested investors, according to local sources, include Canada Pension Plan Investment Board (CPPIB), Caisse de Dépôt et Placement du Québec (CDPQ), Abu Dhabi Investment Authority, Qatar Investment Authority, Kuwait Investment Authority, Kingdom Holdings, Khazanah, Allianz and Macquarie among others.

Having reached various settlements with its creditors, Reliance Communications (RCom) is still in negotiations to sell its assets to Reliance Jio (RJio). RCom will divest its 43,000 towers, fibre and spectrum rights to RJio while the sale of its real estate portfolio in New Delhi and Chennai to Brookfield is uncertain.

Bharti Infratel and Indus Towers are still in the process of merging and creating a pan-Asian towerco with over 164,000 towers. The Competition Commission of India granted its approval to the merger which should be completed within the year.

The merger between the two entities is set to counteract the negative impact that MNOs consolidations is having on towercos’ revenues, growth and tenancy ratios. In their Q318 results, both Bharti Infratel and Indus Towers reported a considerable decrease in their tenancy ratios, with Indus’ going from 2.43 to 1.84 and Bharti’s from 2.41 to 1.96 in the last year.

In terms of the state-owned MNOs, BSNL has received the green light for the carve out of its 66,000 towers into a separate infrastructure unit while the other State-run MNO, MTNL, is considering divesting its 10,000 tower portfolio in an attempt to reduce its debts. BSNL’s carve out could be valued up to US$3bn and analysts are excited by the potential of these towers coming to market as many are in prime locations with considerable tenancy ratio growth potential, having not been proactively marketed before.

Rational MNO consolidation is welcomed by towercos who would prefer to see spectrum holdings consolidated into four or five companies with the capital and appetite to rollout. With India’s 3G overlay around half finished and expected to reach 95% coverage in the next 18-24 months, the 4G rollout has already started in tier one and

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**Estimated tower count for Indonesia**

<table>
<thead>
<tr>
<th>Towerco-owned</th>
<th>Operator-captive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mitratel</td>
<td>Telkom + Telkomsel</td>
</tr>
<tr>
<td>Tower Bersama</td>
<td>XL</td>
</tr>
<tr>
<td>Protelindo</td>
<td>Indosat</td>
</tr>
<tr>
<td>STP</td>
<td></td>
</tr>
<tr>
<td>IBS Tower</td>
<td></td>
</tr>
<tr>
<td>Persadasokka Tama</td>
<td></td>
</tr>
<tr>
<td>Centratama Menara</td>
<td></td>
</tr>
<tr>
<td>Balitower</td>
<td></td>
</tr>
<tr>
<td>Gihon</td>
<td></td>
</tr>
<tr>
<td>PEKAPE</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td></td>
</tr>
</tbody>
</table>

Source: TowerXchange
tier two cities. In the near term, the 4G rollout is expected to have a marginal impact on the profitability of Indian towercos, whilst the majority of BTS are added through ‘loading’ - the addition of a second set of antenna by an existing tenant – but when 4G rollout progresses to adding infill sites for densification, expect to see a significant increase in tower cash flow.

**Indonesia**

Last year, Protelindo’s holding company, Sarana Menara Nusantara (SMN) finalised the acquisition of Komet Infra Nusantara (KIN), which added 1,400 towers and 2,000 tenancies to the company’s portfolio and contributed to further consolidate the towerco leading position in the country. Moreover, Protelindo acquired around 300 km of fibre infrastructure on six islands that will improve the company’s FTTT capabilities. For now, there are no further news with regards to the planned sale of STP, with sources suggesting the process had stalled due to differences in valuation. Indonesia’s towercos build 3,000-5,000 towers, rooftops and infill sites per year and tenancy ratio growth compares favourably to many other global tower markets, with around 0.13 tenants added per tower per year.

Being one of the most mature tower markets in the world, it comes as no surprise that towercos are gearing up to fiberise Indonesia, with both Protelindo and STP at the forefront of fibre and small cell projects.

The country’s third largest MNO, who recently issued a bond of US$706.5mn for its network...
expansion, is now rumoured to be exploring a sell of its towers in a deal that could be valued at more than US$1bn.

**Japan**

Japan is one of the most sophisticated mobile markets in the world. Yet towers are still seen as a source of competitive differentiation, which perhaps explains why initial interest in carving out a towerco a few years ago seems to have tailed off, and why tower count data is so hard to find – readers should consider our estimate a very rough guide. Japan is famous for having the fewest number of subscribers per tower in the world – reportedly around 500 – suggesting a staggering tower count of around 220,000 for a nation of 127mn people and a landmass of just 378,000sq km.

LTE was launched as early as 2011 by former State-owned monopoly NTT DOCOMO and in 2012 by the other MNOs, SoftBank and KDDI (au). DOCOMO has already started rolling out LTE-A. Japan’s three leading MNOs are believed to have each added up to 30,000 microcells and small cells as infill sites. TowerXchange understand several tower companies are trying to establish themselves in the Japanese market, but to date their penetration remains negligible.

**Laos**

Over the past six months, Laos has officially opened up to towercos. The first news came in August with the national government and local firm Click Lao Marketing and Consultancy signing an agreement with China Tower Corporation (CTC) to establish the Southeast Asia Tower company. According to local news sources “the Southeast Asia Tower Company will mainly be engaged in the construction, maintenance and operation of communication towers, base stations, power supplies and other supporting facilities, as well as that of indoor distribution systems and transmission systems in Laos.”

In February this year, edotco presented a filing at the Bursa Malaysia announcing its entrance into Laos via the purchase of an 80% stake in local entity Mekong Tower Company Ltd. (MTCL). The filing stated that “…the Laos tower market is expected to undergo intense growth in tandem with a national drive towards 4G adoption, with an estimated demand of no less than 5,000 towers over the next 3 years.”

The country is home to four MNOs and approximately 8,000 towers but we are likely to see an increase in tower counts as a result of the newly launched towerco activities.

**Malaysia**

Towercos own roughly 64% of Malaysia’s towers, led by edotco’s 4,000 towers carved out of Celcom/Axiata. A further 3,200 towers are owned by 14 different State-backed and other independent towercos, while turnkey infrastructure provider OCK Group owns around 240 sites with plans to build an estimated 70 to 100 more sites in the

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**Myanmar market share (subscribers)**

<table>
<thead>
<tr>
<th>Provider</th>
<th>Market Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPT</td>
<td>25mn</td>
</tr>
<tr>
<td>Telenor</td>
<td>19mn</td>
</tr>
<tr>
<td>Ooredoo</td>
<td>9.4mn</td>
</tr>
<tr>
<td>Mytel</td>
<td>2.6mn</td>
</tr>
</tbody>
</table>

Source: TowerXchange Research plus Company Reports

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**Notes:**

- MPT: Myanmar Post Telecom
- Telenor
- Ooredoo
- Mytel
country. YTL, Naza Communications and Omnix Malaysia are also active.

There are an estimated 22,682 towers now in Malaysia, representing almost 2,000 mobile subscribers per tower. A new ground based tower in Malaysia costs around RM300,000 (US$69K).

Later last year, the government launched its National Fibre Connectivity Plan, which could push Malaysian towercos to further explore fibre integration. Meanwhile, some operators have started looking at 5G rollout and MNO Maxis has inked an MoU with Huawei to accelerate 5G deployment. It has been estimated that an additional 8,000 structures may be needed in Malaysia for 4G and with operators exploring 5G, much of the new demand will be met by microcells, lamp-poles, DAS and IBS.

**Mongolia**

In 2013 the government separated telecom service providers from infrastructure providers in the challenging 3mn population, 1.5mn sq km Mongolian market. The infrastructure providers, including State-owned ICNC, Mobi Network and Sky Network, run towers, active equipment, fibre and microwave backhaul. More than half Mongolia’s ~1,000 towers are shared.

**Myanmar**

With around 62% of sites in the country owned by towercos, Myanmar remains an exciting market in which to do business for entrepreneurial towercos.
To date, there are around 15,827 sites in Myanmar.

Latest entrant MyTel sealed a build-to-suit deal with MNTI – one of the latest towercos to enter Myanmar – for 400 sites of which 371 have already been built. The operator has already invested more than US$1bn in infrastructure, including the rollout of 30,000km of fibre-optic cable.

In the meantime, edotco has taken over the provision of energy services for 1,250 Ooredoo sites. The deal, which has been discussed in a separate interview in this Journal with Vijendran Watson, edotco Myanmar’s MD, marks a change in the way the towercos operate in the country offer a tower + power model. IGT overpassed 3,000 towers and will continue its organic growth.

The country is definitely moving towards consolidation and last year TPG finally announced the acquisition of Pan Asia Majestic Eagle (PAMEL). The American investor added PAMEL’s 1,300 towers to its existing portfolio of 1,800 Apollo-owned sites, with an enterprise value of approximately US$1bn. KPR TOWERS also announced the acquisition of Myanmar Infrastructure Group (MIG) and their 100 towers from majority owners Singapore Myanmar Investco for US$10.8mn.

Stimulated by the network investment commitments of MyTel, TowerXchange has learned of several new towercos now launching in the marketplace including New Tower Development (NTD), Myanmar Technology Gateway (MTG), MNTH, DLRE, CommBiz, ITMB, MAPCO, MNTI, along with potentially a handful more others.

On average, most of the mature towers that are two-plus years old have a tenancy ratio around 2.0x.

Grid power is still unreliable even in major cities and power remains the main issue for the industry, with towercos and MNOS relying on gensets and batteries while exploring the benefits of hybrid systems, renewables and lithium-ion batteries to power and cover their operations.

In recent news, it was announced that Yoma Micro Power has raised US$28mn from the IFC, Norfund and Yoma Strategic Holdings for a micro-power plant and mini-grids project that should contribute to powering towers in rural areas through solar-based plants while the mini-grids will provide electricity to local communities. The first ESCO contract was signed in 2018, between new towercos MNTI and Voltalia, an international renewable energy player. The agreement covers an initial batch of 171 telecom towers, of which 80% are not connected to the national electricity grid. The contract is for 10 years, with Voltalia responsible for power supply to the sites at 2kW each, located in the Bao and Ayeyarwaddy regions of Myanmar.

**Nepal**

Axiata Group has closed the acquisition of a majority stake in Nepalese market leader Ncell from TeliaSonera, in a deal believed to be worth US$1.365bn. There have been no tower deals in Nepal to date, but this move by the Axiata Group may pave the way for edotco to enter the market in the near future.

Almost two years ago, the Nepal Telecommunications Authority (NTA) published a draft Infrastructure Development and Sharing Regulation, seeking request for proposal from towercos to provide telecom infrastructure services. Although at least eight international firms were interested, the Ministry of Communications and Information Technology (MoCIT) has not issued any license yet.

A NTA representative has recently stated that the issue is under discussion at the board of NTA, while the Ministry of Communications and Information Technology (MoCIT) is now working on a plan to form a separate infrastructure company inviting shares of different telecom companies operating in the country. Some infrastructure sharing appears to be underway, as Nepal Telecom (NT) had indicated in June it will extend coverage to 175 locations within a year, with 138 with “base transceiver stations (BTS) or network extension platforms that will be shared with other phone companies.” The State-owned operator is said to be at the final stage of inviting bids for the procurement of equipment including BTS towers.

TowerXchange will be looking to undertake further market studies for a dedicated report on Nepal’s telecom infrastructure landscape.

**New Zealand**

There are early signs of a nascent tower industry emerging in New Zealand, where Spark and Vodafone New Zealand have substantial but ageing tower networks, newer entrants 2degrees
have leveraged co-location where possible while building a few hundred towers. 2degrees may have an appetite to sell their towers and partner with a towerco on BTS. Parallel infrastructure is substantial, while the need for improved rural coverage, particularly on the South Island where tourist and agribusiness drive demand, has prompted the government's Rural Broadband Initiative to invest in over 100 towers. A total of around 4,000 macro-towers are supplemented by around 7,000 rooftop sites, primarily used in the larger cities.

Pakistan

Pakistan has four MNOs; Jazz (formed through the acquisition of Warid by VEON’s Mobilink) leads the market, followed by Telenor, China Mobile’s Zong and Ufone (in which Etisalat has a stake). With a relatively low mobile penetration rate of ~73% and a data penetration rate of ~24%, there is significant opportunity for long-term growth in the market.

Towercos have been licensed in Pakistan since 2006 but MNO attitudes towards infrastructure sharing only started to thaw in 2011, initially seeing their networks as a source of competitive advantage. Towershare-owned Tanzanite built a portfolio of 700 sites in the market, built largely from acquisitions, with the majority of towers coming from previous WiTribe assets. The Tanzanite portfolio, 40% of which were ground based towers, secured tenancies from all major operators, reaching a tenancy ratio of 1.6x before being acquired by pan-Asian towerco, edotco Group for US$88.9mn in 2017.

Subsequently, edotco subsequently joined forces with Dawood Hercules, a listed Pakistani holding company conglomerate to acquire the 13,000 Jazz towers which had been carved out into a subsidiary, Deodar. However, the deal with scrapped this past September.

Whilst several local companies are also licensed as towercos, only AWAL Telecom appears to be trading as such. MNOs Telenor, Zong and Ufone each retain their tower portfolios. Ufone has been exploring the potential sale and leaseback of their towers in Pakistan for some time. The process was stalled by the de facto merger of PTCL and Ufone, and associated management changes, but Ufone could yet contribute over 6,000 further assets to the pool of commercially shared towers.

China Mobile’s Pakistan opco, which trades under the brand name Zong, has around 9,100 sites, of which around 2,000 are co-locations. Telenor is a keen advocate of all forms of network sharing; towers (sharing primarily with Jazz), fibre (sharing with Zong), and has taken a lead role in exploring active infrastructure sharing. Telenor and Zong undertook Pakistan’s first RANsharing trials across around 30 sites, while the Norwegian-owned MNO has also shared IBS, both under the MORAN model where spectrum is not shared.

There has been extensive infrastructure sharing between operators but significant parallel infrastructure exists, especially in urban areas.
implying that decommissioning is likely to be a key part of edotco’s strategy in the future. TowerXchange estimate the prevailing tenancy ratio (the average number of tenants across all towers in the country) to be around 1.25 in Pakistan, with a clear pathway to 1.5. Of around 10,000 colocations in the country, most originate from barter arrangements, with some application of commercial lease rates, but more often offset against one another so no cash changes hands.

Pakistan’s MNOs cite power as the number one operational challenge in the market, followed by security and landlord issues. While Pakistan’s electricity grid remains unstable, and outages can last eight or more hours, the situation has improved notably in recent years. Backup diesel genset runtime is being reduced at sites on the country’s better grid connections, with DGs increasingly being removed from such sites. edotco will offer a full tower+power service in Pakistan, meaning they will lease tower and ground space as well as providing DC energy.

Philippines

Formerly a sleeper market characterised by the cosy duopoly between Globe Telecom and Smart (PLDT), things became interesting in the Philippines in late 2017 when President Rodrigo Duterte decided to open up the country’s telecommunications. This was followed by a proposal for a common tower policy that is now about to become a reality after the Department of Information and Communications Technology (DICT) signed MoUs with 12 local and international tower providers that aim to obtain a license to deploy the 50,000 estimated towers that the Philippines need. Rumors and announcements of Globe’s and PLDT interest to divest their tower further fuelled excitement.

Moreover, after several delays DICT finally appointed Mislatel—a consortium led by local businessman Dennis A. Uy and state-owned China Telecom Corp—as the country’s third operator. Mislatel committed to provide 37% coverage at an average internet speed of 27Mbps in its first year, with an initial investment of more than US$2.5bn and will go up to US$4.88bn within five years.

Last year, the guidelines of the draft common tower policy stated that a maximum of two towercos would be accredited by the DICT, but after signing agreements with 12 different players, the regulator might consider issuing more than two licenses and has declared that only big players who are capable of delivering hundreds of towers will be considered.

As it stands, all towers remain in the hands of the operators but probably not for long. Globe is on the record as having over 8,000 towers to date and Smart-PLDT reported 9,850 sites, while industry experts estimate that the country requires a total of 70,000 sites.

Last August, Globe secured the approval from the Securities and Exchange Commission to establish a separate tower holding company, which will operationalize the divestment of all or part of its tower assets through a separate entity. The company has confirmed to TowerXchange that they are deeply involved in this process.

Operating are set to keep investing in 4G and 5G deployment as well as modernising existing 3G networks. The big jump in frequency that 5G requires will also drive the deployment of new antenna technologies and urban typologies. In order to deliver a better customer experience using 5G, Philippines MNOs will have to put up more cell towers, antennas, and base stations across the nation, especially in cities where line-of-sight transmissions are more difficult.

Moreover, fibre will present great opportunities for the industry. PDLT’s ongoing nationwide fibre-optic rollout program has already set up a number of so-called ‘PLDT Smart City’ areas. A consortium of Filipino-Chinese developers is working on an extensive smart city project that will give rise to a mixed-use development off the coast of Manila. By next year, Smart aims to double the number of LTE base stations to about 17,700 and raise the number of LTE-equipped cell sites to over 6,800.

The imminent entry of a third operator and the tower sharing mandate make the Philippines the must-watch Asian tower market of the moment. There is plenty of potential here, especially if the government is able to come through with significant improvements to permitting approvals.

South Korea

According to GSMA Intelligence, SIM penetration was at 113% among a population of 50.4mn in Q4 2015. South Korea boasts one of the most sophisticated telecommunications infrastructures in
the world, cultivating an insatiable demand for high speed mobile broadband among its citizens.

Mobile broadband penetration in South Korea is above 99% and fibre has been widely deployed. South Korea is a three-operator market featuring SK Telecom, KT and LG Uplus. The Ministry of Science, ICT and Future Planning (MSIP) has tried multiple times over the years to license a fourth MNO, however, failed again in February 2017 as none of the three applicants (Sejong Telecom, K Mobile, and Quantum Mobile) met the criteria.

South Korea was the first market in the world to migrate the majority of users to LTE, with LTE-A rollout now well under way. SK Telecom recently noted it will invest KRW 6tn in infrastructure for network leadership in 2017, while maintaining overall capex similar to 2016. Meanwhile, KT is looking to make the 5G experience available at the 2018 Winter Olympics.

TowerXchange is starting to pick up the first faint signals that towerco activity may be emerging in South Korea.

**Sri Lanka**

As of the end of 2017, edotco managed ~3,375 towers in the country. High levels of bilateral sharing means tenancy ratios are closer to two than one all over the country. Sri Lanka is now mostly covered with 3G, and 4G is driving need for cell site densification. Dialog and Mobitel hold all of the 4G spectrum, and any other players that want to offer this will need to engage in RANsharing. There are around 7,500 towers in the country.

Bharti Airtel had been rumoured to be looking at selling its 2,500 towers but seems to have cooled on the idea.

**Thailand**

With five operators and over 50,000 towers, Thailand could be the perfect tower market but to date, only one company (DIF) acts in the infrastructure industry as a fund with around 13,000 towers and over 1mn km of fibre.

Ownership of towers is in dispute as a function of BOT (Build-Operate-Transfer) concessions that are now expiring. Thailand’s three commercial MNOs were due to transfer 2G infrastructure back to SOEs CAT and TOT. The 2G equipment has little value, but of course the towers do. CAT, which ran the concessions for the 850 and 1800MHz bands, failed to reach an agreement with majority stakeholder DTAC to create a 49-51% JV towerco, into which 11,000 disputed towers were to be injected. Negotiations to create a prospective 12,000 tower JV towerco between AIS and TOT, which ran the 900MHz concession, were called off late in 2015, but the process has resumed with the recent creation of a committee to pave the way for the creation of the joint venture.

In August 2018, an auction of spectrum in the 4G-suitable 1800MHz band took place. However, in spite of much buzz around it, only two operators bid and were awarded just one block each.

#1 and #2 MNOs AIS and DTAC took part in the
auction and only two of the nine available blocks were sold. Telecom regulator NBTC is planning an auction for the unsold blocks later this year with some critical amends to the terms of the auction.

Vietnam

According to the Ministry of Information and Communications (MIC), Vietnam has now 128mn mobile phone subscribers. Although the market is quite mature and saturated, its telecom industry still generated around US$16.8bn in 2017 (a 7.3% growth YoY) and the local Government is actively promoting the development of telecom technologies and IT initiatives to meet the objectives of sustainable economic growth and international integration.

Viettel undoubtedly dominates the game and has around 50% market share with 63mn subscribers. State-owned MobiFone serves approximately 34.8mn customers, followed by VNPT-Vinaphone with 20.5mn. Smaller players Gmobile, with 6mn and Vietnamobile with 3.7mn are trying to increase their piece of the pie and compete with the three giants.

Currently there are an estimated 90,000 towers in Vietnam, and the majority of them remain in the hands of the operators. The towerco ecosystem is still fragmented and there are dozens of very small tower companies owning portfolios of less than 100 sites.

With ~2,000 towers, we can consider Malaysia-based OCK the market leader. OCK is not planning to build more assets due to mobile market constraints but they are very keen on consolidating its portfolio and TowerXchange has learned that they are currently negotiating some acquisitions.

Golden Towers and Nisco are the other known towercos of some scale with 350 and 300 towers respectively. The former is now building 100 more towers after closing a BTS deal with MobiFone.

Tenancy ratios is around 1.5 and MNOs do not have plans to sell and leaseback any tower assets and infrastructure sharing among operators is still limited, but there is still much room for growth and positive expectations. Lease rates, which are all denominated in local currency, have grown recently due to inflation and an increase in rental fees. The average cost is VND15mn per month (US$640 per month), notably lower than Myanmar (US$900-1500) but still higher than India (US$550) and China (US$350).

The market has almost reached its peak in terms of subscribers but everybody across the value chain can find a role in this challenging context. While the government still needs to grasp the benefits of infrastructure sharing, operators can improve their efficiency and relieve their balance sheets by modernising their networks and transferring some responsibilities to towercos. Infrastructure providers can find great opportunities in urban areas, where fibre, 4G and the future deployment of 5G will require significant network investment. Ultimately, vendors can also play a substantial role in this modernisation process by providing more sophisticated monitoring systems and helping both towercos and operators in optimising their assets.
Asia heatmap

Legend

- TowerXchange research has not revealed any infracos or towercos to date
- Towercos or infracos active in the market. No recent transactions have taken place and none rumoured to take place soon
- Towercos or infracos active in the market. No current transactions taking place but an attempted tower sale has taken place in the last 3 years or there are unconfirmed rumours of a deal in this market.
- Towercos or infracos active in the market. Rumours of deals confirmed in the market.
- Towercos or infracos active in the market. Deals of significant size have taken place in the last 5 years.
- Towercos or infracos active in the market. Deals have taken place in the last year and more imminent deals rumoured

Note: Russia is covered under Europe; we estimate it to have a 5% towerco penetration and we expect it to be a growth market.

Source: TowerXchange
Regional: Axiata reignites edotco’s IPO talks
Various news outlets including Bloomberg announced that Axiata is re-evaluating a potential IPO of edotco. According to Bloomberg: “Axiata aims to list the unit in Kuala Lumpur as soon as this year and may seek a valuation of around US$2.5bn for the company.”

Regional: Telenor being pushed to spin off its towers
Constructive Capital, an activist investor in Telenor, is pushing the MNO to spin off its telecom tower portfolio. According to the investor, the move would increase the MNO’s share price by as much as 84% as well as reduce its debt.

Australia: 5G auction obtains US$616mn
The four Australian MNOs have collectively paid A$853 million (US$616.02 million) for 3.6-GHz 5G spectrum in the country’s latest auction. The Australian Communication and Media Authority (ACMA) has confirmed the successful completion of the auction, with all 350 available lots sold. The licenses will commence in March 2020 and run until December 2030.

Market leader Telstra led the bidding and secured 143 lots, while Optus obtained 47. A joint venture established between Vodafone Australia and TPG won 131 lots and the final successful bidder was UK operator Dense Air Australia, which has revealed plans to offer carrier neutral 5G densification services.

Australia: TPG suspends network rollout due to Huawei ban
TPG Telecom is stopping its planned mobile network rollout following Australia’s ban on MNO infrastructure partner Huawei. In August 2018, the federal government blocked the telecoms supplier from rolling out Australia’s 5G network saying the involvement of any companies “likely to be subject to extrajudicial directions from a foreign government that conflict with Australian law” presented too much of a risk. Previously, TPG had selected the Chinese vendor as its supplier for the network, as the company believed doing so would allow for a simple upgrade path from 4G to 5G technology.

Australia: Telstra enables 5G in Sydney and Melbourne
Right after Australia’s 3.6GHz spectrum auction in December, Telstra has enabled 5G for the first time at its cell sites in Melbourne and Sydney. The MNO started switching to 5G technology at its towers back in August, and it has now become the first Australian MNO to have 5G-enabled sites in all major cities. The company has enabled 5G at a total of 187 mobile base stations.

Cambodia: edotco buys 325 towers
Regional infrastructure leader edotco has recently announced the acquisition of 325 towers in Cambodia. The assets were acquired from South East Asia Telecom (Cambodia) Co Ltd, in line with edotco’s expansion strategy. The deal, which was approved by the Telecommunication Regulator of Cambodia in late December, strengthens edotco’s position as the leading independent tower company in the country.

India: Jio creates fibre and tower units
Reliance Jio is considering a spin off its tower and fibre portfolios to reduce its debt. The Economic Times have reported that the MNO is demerging its towers and fibre assets as part of a company-wide
modernisation plan and to reduce its capex while getting closer to completing its network rollout. The newly formed entities are being created and called Jio Digital Fibre and, for the tower unit, Reliance Jio Infratel. Jio owns and operates over 300,000km of fibre and around 220,000 towers.

**India: Vodafone Idea in talks to create fibre JV with Bharti Airtel**

Vodafone Idea is in talks with Bharti Airtel to create a joint venture for their fibre infrastructure. In a recent Economic Times article, Airtel’s Chairman Sunit Mittal was quoted stating “We have asked Vodafone Idea to come and join the fibre company... We are starting with our own fibre company and if Vodafone Idea brings its fibre assets, then they will get appropriate shares.”

**Indonesia: Indosat evaluates tower sale**

The Wall Street Journal reports that Indosat could be assessing additional tower sales following the 2012 sale of 2,500 sites to Tower Bersama. The operator owns a portfolio of over 8,500 sites in the country.

**Indonesia: Tri is building more than 8,000 4G and 4.5G BTS**

PT Hutchison 3 Indonesia (Tri), who aims to become the leading MNO in the country, is massively investing in its infrastructure improvement. At the end of 2018, the operator started an aggressive expansion initiative and is now building more than 8,000 4G and 4.5G-enabled base transceiver stations. Tri’s CEO Cliff Woo stated that the operator’s 4G and 4.5G networks has connected more than 7,900 villages, in 281 cities and districts across the country and the company’s CEO also mentioned that its BTS infrastructure is ready to adopt 5G technology.

**Indonesia: Indosat Ooredoo expands it LTE-A network**

Ooredoo’s Indonesian subsidiary has announced its plan to expand its LTE-A network (branded ‘4G Plus’) in North Sumatra. The operator has already deployed 586 new cell sites in the region and is now set to deploy 244 sites by February 2019.

**Indonesia: Smartfren will take over Bolt!’s 4G operations**

Indonesian MNO PT Smartfren Telecom is taking over the operations of 4G LTE mobile internet provider Bolt PT Internux, whose frequency permit was recently terminated by the Ministry of Communications and Information Technology (MCIT) after the company failed to pay the fees to operate for more than two years.

**Laos: edotco enters Laos**

edotco has filed an announcement with the Bursa Malaysia (the national Stock Exchange) regarding its entrance into Laos in light of the growth potential of the market over the next three years. edotco has acquired an 80% stake in local company Mekong Tower Company Limited (MTCL) as part of its entrance strategy.

**Myanmar: Ooredoo and Nokia set up a 5G centre for Myanmar University**

Myanmar’s Ooredoo has partnered with Nokia to set up the first 5G-ready Technology Centre in Myanmar. The Centre is the result of a joint project with Yangon Technological University (YTU), which will be utilised by the students of Myanmar’s first diploma program in telecommunications.

**Myanmar: edotco keeps pushing sustainable solutions**

edotco is developing two renewable energy initiatives in Myanmar that aim to increase operational and energy efficiencies as well as reduce opex while reinforcing the company’s environmental commitment.

The Malaysian infrastructure innovator has recently launched the first hybrid solar-wind turbine energy solution in the country, a home-grown innovation that provides complete off-grid reliability, serving as an efficient way to power up towers located in remote areas with low electricity access.

Additionally, edotco Myanmar has collaborated with local solar provider Mandalay Yoma on an initiative that is connecting towers with mini solar grids to reduce diesel generators dependence, carbon emissions and noise pollution.

**Pakistan: PTCL and SCO to start fibre roll out in FATA**

Pakistan Telecommunications Company Limited (PTCL) and the Special Communications Organisation (SCO) are partnering to deploy 600km of fibre-optic infrastructure in the Federally Administered Tribal Areas (FATA). The deployment is part of the government’s universal service
A programme that aims at facilitating access to basic telephone and data services in the area.

**Sri Lanka: Dialog Axiata completes 5G pilot**
Sri Lanka’s Dialog Axiata has successfully completed South Asia’s first fully functional 5G pilot transmission over commercial grade base stations and end-user devices.

The pre-commercial 5G trial was conducted alongside the Telecommunications Regulatory Commission of Sri Lanka (TRCSL), using spectrum in the 3.5-GHz band that was assigned by the regulator for 5G trials. The trial achieved pilot speeds of over 2Gbps.

In August 2017, Dialog Axiata conducted a 5G demonstration in a laboratory environment, in conjunction with Huawei and Ericsson. The company said that 20% of its base stations are now 5G ready due to the deployment of Massive MIMO technology.

**Thailand: NBTC will shut down 2G by October 2019**
The National Broadcasting and Telecommunications Commission (NBTC) is set to shut down the existing 2G networks by 31 October 2019 to give mobile operators more efficient network capacity and pave the way to 5G wireless broadband service by 2020.

**Thailand: NBTC will auction 2.6GHz spectrum next year**
Thailand’s National Broadcasting and Telecommunications Commission (NBTC) is planning to auction spectrum in the 2600MHz band in the second half of 2019.

**The Philippines: Telecommuting Act pushes MNOs to improve service**
The national government has approved a new law to allow telecommuting to ease the congestion in metropolitan areas. The Department of Information and Communications Technology (DICT) acting secretary Eliseo M. Rio highlighted that “The ball is now on the telcos’ court to gear up for the possible increase of demand for faster and more reliable internet connection. The government is upping the ante when it comes to investing on ICT projects, but if we wish for impact to be felt by the people sooner, we expect the telcos to do the same.”

**The Philippines: Five new towercos enter the market**
DICT has added five towercos to its common tower provider programme. IHS Towers, edotco Group, China Energy Engineering Group, RT Telecom and Aboitiz InfraCapital have joined ISOC Infrastructure and ISON ECP Tower as the seven entities allowed to operate in the country. Eliseo M. Rio, DICT acting secretary, was cited by local news outlets stating that “We will welcome more parties in this venture as it will address the country’s backlog on telecommunication towers, [...] as with less than 20,000 towers, the Philippines has the least amount of mobile infrastructure compared to its neighbours.”

**The Philippines: Mislatel to start operating in 2020**
Newly licensed Mislatel has announced its plan to launch commercial service in late 2020 - pending various required approvals - and cover at least 17 key cities within the first two years of operations. The MNO will target 37% population coverage after one year of operations and 84% after five years.

**The Philippines: PLDT, Globe rumoured to sell off their towers**
Earlier this week, House Representative Luis Campos Jr. suggested that the country’s incumbent MNO’s PLDT and Globe will likely end up selling off their tower assets to any one of the seven independent tower companies currently involved in the country’s common tower initiative. ‘We see both PLDT and Globe eventually assigning their 16,000 towers to any or all of the non-aligned firms providing shared towers, now that the government has permitted at least seven of them to operate,” Campos Jr. stated.

**The Philippines: Globe to invest in data centres**
Through its ICT division Globe Business, Philippines’ operators Globe Telecom has entered a new joint venture with TechZone Philippines to provide data center services to local IT gaming enterprises.

TechGlobal Data Center will provide services from TechGlobal’s carrier-neutral data centre in the Philippines, which is currently being operated and maintained by Globe Telecom’s Data Centre Operations team.
**The Philippines:** Globe gets US$40mn loan from BPI

Globe Telecom Inc. has recently signed a US$40mn loan facility with the Bank of the Philippines Islands (BPI). “The loan shall be used to partially finance the company’s maturing obligations, capital expenditures, and general corporate requirements,” Globe said in a regulatory filing submitted by its director Jose Mari Fajardo.

**Vietnam:** Viettel considering North Korea expansion

Vietnamese telecoms giant Viettel is reportedly exploring an entrance into North Korea. The operator initially requested permission to build its network in the county back in 2010 and it’s now waiting for some sanctions to be lifted while expecting the country to be opened to foreign investors. After successfully launching operations in Myanmar last year, the global operator is also in talks to buy stakes in existing MNOs in Malaysia and Indonesia.

**Vietnam:** Viettel to start testing 5G

The Ministry of Information and Communications (MIC) has granted Viettel with the country’s first license to test 5G mobile communication services. The trial period is valid for one year until 21 January 2020 and allows the military-owned operator to test the technology in Hanoi and Ho Chi Minh City, the country’s two major cities. Viettel is permitted to test 5G at up to 73 locations but they can’t charge users testing its service.
TowerXchange’s analysis of the tower market in the Middle East & North Africa

The Middle East and North Africa is the region the least penetrated by the towerco business model globally. With the exception of Pakistan (which TowerXchange has grouped into our regional coverage), there have been no tower transactions of scale, and whilst a handful of build-to suit towercos have emerged, fewer than 1% of the region’s 275,104 towers sit in independent towerco hands.

In North Africa, some operators have embraced infrastructure sharing more readily than their counterparts in the Middle East, with an active sharing agreements in place in Tunisia and approximately one third of towers in Egypt being shared, but on the whole infrastructure sharing between MENA MNOs has been limited.

Yet the winds of change are upon us.

In Kuwait, IHS Towers have reached a deal to acquire Zain’s 1,700 sites (with the deal expected to close imminently) and on 28 November it was announced that Zain had reached an agreement for the sale and leaseback of their 8,100 Saudi Arabian towers to the towerco. In Oman, Omantel are expected to announce a tower sale imminently, with approximately 2,900 macro towers and 5,000 rooftop towers up for grabs.

Further MNOs in the region are also understood to be studying tower sales closely, attracting the interest of towercos and investors in this virgin territory. Rumours have circulated that Tunisie Telecom may consider a sale of their tower portfolio, Djezzy (in which VEON are major shareholders) is known to have previously explored a tower divestment and is rumoured to retain that appetite to sell, and should Zain Group’s transactions go ahead successfully in Kuwait and Saudi Arabia, one can expect their tower divestment strategy to spread to other markets.

Some operators have explored different paths. In Iran, number one and number three MNO MCI and Rightel have opted to form a towerco venture – Iranian Towers – in partnership with domestic towerco, Fanasia. In Saudi Arabia, Saudi Telecom Company which had previously looked at both a joint venture and a tower sale has now set its sights on carving out an internal towerco to better manage its portfolio of 16,400 towers, establishing Communications Towers Co Ltd in early 2018. The entity is yet to start commercial operations, with regulatory approvals still pending but observers expect this to be resolved by early 2019. The operator invited bids for a management contract in its new tower venture, although their reluctance
to hand over any equity has deterred most of the major towercos from participating.

The ESCO model is also gaining traction in MENA as an alternative outsourcing strategy. In Lebanon, Alfa has signed an ESCO contract with IPT PowerTech, whilst in Egypt, Orange (which in 2016 under the MobiNil brand had reached an agreement to sell 2,000 towers to Eaton Towers; a deal which didn’t obtain regulatory approvals) has issued an ESCO RFP. TowerXchange has also been made aware of further MNOs on the cusp of announcing ESCO RFPs.

In markets where new build is required, operators who may not necessarily be considering a tower divestment, are opening up to the idea of working with independent towercos in a bid to rollout new sites in a less capital intensive manner. Several major towerco names have been linked to the Egyptian market, where new build requirements are particularly high, both for established operators and new market entrant, Telecom Egypt. New build to suit players are also starting to emerge across the region, some of which have an appetite for tower acquisitions, should towers come to market.

As the region begins to open up to the independent towerco model and infrastructure sharing, there is a pressing requirement for governments and regulators to create supportive legislation. In this regard, progress in many markets has been slow and continued support and education on the merits of shared infrastructure and towercos remains key. Whilst a small market, with just 1500 towers, Bahrain’s regulator has been one of the most proactive. In early 2018, the country’s Telecommunications Regulatory introduced the Public Radio Communications Stations Regulation, designed to regulate the deployment of new towers and encourage infrastructure sharing in the country.

The advent of 5G and the move towards smart cities is necessitating major investment in densifying telecom networks in many of the most developed countries in the MENA region. How to achieve such densification, whilst often contending with declining ARPU and increased taxation, is causing operators to consider new business models and potential infrastructure sharing strategies.
Whilst the MENA region has a number of common threads including a number of operators active in multiple markets, a central role of government in business, a strong Arabic influence and similar climates and geographies, it is also important to note the stark differences across different markets; from the highly developed GCC countries pushing towards 5G and decommissioning of parallel infrastructure, through to the war torn countries of Iraq, Afghanistan and Syria where network rollout, restoration and power remain top concerns in operationally challenging markets.

TowerXchange examine the dynamics at play in 16 countries across the MENA region, exploring key MNOs and their tower portfolios, the level of infrastructure sharing and presence of towercos, network expansion required and operational challenges present.

On 29-30 January 2019, in response to the momentum in the market, TowerXchange will bring one of their world renowned Meetups to Dubai for the first time; assembling the who’s who in the MENA tower market. If you would like to get involved, please contact Laura Graves, Managing Director, EMEA at lgraves@towerxchange.com

### Country analyses

<table>
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<th>Country</th>
<th>Subscribers</th>
<th>Tower count</th>
<th>MNOs</th>
<th>Towerco activity</th>
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<td>6,645</td>
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<td>Asia Consultancy Group</td>
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Afghanistan has five MNOs, Afghan Wireless (AWCC) which is the country’s fastest growing MNO, Roshan which is funded by the Aga Khan Development Fund and is the country’s largest MNO, multi-national players MTN (which has hinted at exiting the market) and Etisalat, and newcomer Afghan Telecom which is part of the Ministry of Communications and Information Technology. Telecommunications remains an important sector for the Afghan government, with Afghan Wireless understood to be the largest tax payer in the country.

### Figure two: Footprints of MENA’s major MNOs

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n.b. Lighter colours indicate the company owning a stake in an MNO in the country

Source: TowerXchange
Each of the operators own pretty much of all of their sites, with the MNOs understood to have between 1000-1500 towers each. The Telecom Regulatory Authority of Afghanistan (ATRA) states that there are 6,645 base stations in the country, and with limited infrastructure sharing one can assume that a rough proxy for the number of towers. As the country’s newest player with just 5% market share, Afghan Telecom’s network is smaller than that of its competitors and the operator has recently inked a network sharing deal with Etisalat. Afghan Telecom currently uses around 60-70 of Etisalat’s towers, with plans to extend this tower sharing arrangement. Networks are better established in Northern and Central regions, although Afghan Wireless is still investing in Southern regions of the country.

Since the MNOs entered the market in the early 2000s, the security situation has deteriorated significantly. The Taliban demanded the shutdown of a significant number of sites to avoid surveillance by national and international security forces; where these demands were not met many sites were blown up. MNOs have been reluctant to invest and so there has been little activity in terms of new tower build or co-location. Frontier Tower Solutions had operated in the market in the earlier days, building, operating and maintaining sites for Afghan Wireless but the towerco has since wound up operations in the country. Afghan managed service provider, Asia Consultancy Group, owns ~100 towers which it makes available for co-location and RANsharing services.

Figure three: Heatmap of tower deals and towerco activity in MENA

Source: TowerXchange

Figure four: Tower ownership in Algeria

Source: TowerXchange
99% of sites run on gensets – even in cities – and the biggest challenge is getting fuel delivered to sites. Solar solutions had been examined but the payback period means that MNOs have been reluctant to invest. There are few to no major international contractors operating in the market outside of the military (with foreign troops also having massively reduced their presence, a factor which caused a drop in subscriber numbers) although TowerXchange has heard rumour about one multinational MSP offering ESCO-like services in the market.

In spite of the challenging conditions, coverage in the market has been described as “fairly okay”. There are 33.5mn subscribers with mobile penetration sitting at 89% (source: ATRA) and 4G coverage is available in major urban areas, where data usage continues to grow faster than expected.

In early 2018, the ATRA agreed to provide US$32.1mn of funding to deploy 250 base stations in rural and remote areas. Roshan will deploy 137 sites, Afghan Wireless 84 sites and Afghan Telecom a total of 29.

### Algeria

**Subscribers:** 47.0mn  
**Tower count:** 19,000  
**MNOs:** Three  
**Towerco activity:** Some colocations on towers belonging to national broadcaster Télédiffusion d’Algerie (TDA); Infrashare registered as a towerco in the country

Algeria has three MNOs, Mobilis (Algerie Telecom) with 41% market share, Djezzy (Optimum Telecom Algerie) with 31% and Ooredoo (Wataniya Telecom Algerie) with 27%. There are 47mn mobile connections in the country, growing at a rate of 8% YoY and mobile penetration sits at 113% (Source: ARPCE – L’Autorite de Regulation de la Poste et des Communications Electroniques). Each of the MNOs obtained a 4G license in 2016 and rollout is well underway with around one quarter of the population covered as of Q1 2018.

There are an estimated 19,000 towers in the country of which 20% are ground based and the rest are rooftop or alternative site typologies. Mobilis has the largest portfolio with around 7500 sites, followed by Djezzy with 6,500 and Ooredoo with 5,000. State owned broadcaster, Télédiffusion d’Algerie (TDA) has approximately 350 towers. The country needs an additional 2,000-3,000 new sites to be added in the next 18-24 months, and what’s more, a significant proportion of existing sites need to be dismantled and replaced. Mobilis has long had plans to deploy 1,200 to 1,400 sites but repeated changes in management have stalled rollout plans in recent years.

Less than 2% of sites are currently shared, with many lacking the structural capacity for additional tenants and MNOs failing to agree what constitutes a fair swap. In late 2016, the regulator introduced plans for active sharing and in a short period of time, Ooredoo and Djezzy started sharing around 1,000 sites. In mid 2017 however, the regulator did a u-turn, prohibiting active sharing although provisions for active sharing are however laid out in the 4G license conditions.

No tower transactions have been carried out in the Algerian market, although Djezzy, in which VEON are major shared holders, carried out an exploratory study into a potential tower sale (VEON, formerly VimpelCom, has experience in...
tower divestments having previously sold their Italian towers to Cellnex and looked at the sale of their assets in Russia, Pakistan, Bangladesh and the CIS). Limits on foreign direct investment in Algeria (limiting international players to a 49% stake) however meant that there was a lack of appetite from most international towercos to enter the market. Newly established Algerian towercos, Infrashare (headed up by the former CTO of Ooredoo Algerie) keeps a keen interest in tower portfolios in the market and has financing options that enable it to abide by the FDI rules.

In terms of site operations, 99% of sites are on grid with generators used for backup on core sites. With comparably cheap fuel prices the case for hybrid solutions is reduced.

### Bahrain

**Subscribers:** 2.2mn  
**Tower count:** 1,500  
**MNOs:** Three  
**Towerco activity:** None

The Kingdom of Bahrain has three mobile network operators; Batelco, Saudi Telecom Company owned Viva and Zain serving a subscriber base of 2.2mn (source: TRA Q2 2018).

In spite of its small landmass, Bahrain has a total of 1,500 sites of which around 12% are currently shared, leading to significant parallel infrastructure. In 2016, the Telecommunications Regulatory Authority of Bahrain (TRA) commissioned a study to examine the rationalisation of the Kingdom’s total tower count down to a core network of 400 sites. In early 2018, the TRA introduced the new Public Radio Communications Stations Regulation (PRS Regulation) to regulate the deployment of new towers and “rectify existing ones in accordance with best practice”. The new detailed legislation lays out key specifications for new and existing towers, specifying everything from the type of concrete used in the foundations to key health and safety requirements. The rectification plan is to take place over the next 15 years, with more than 90% of the towers requiring modification and the TRA setting out a goal of increasing the percentage of sites being shared from 12% to 40% in the country.

When questioned by TowerXchange on different business models to reach the targets set in place, the TRA stated “Currently there are three operators who are licenced to deploy masts and towers in Bahrain. As a result there are three different mast and towers networks, i.e. one for each operator. The Authority considers there is room for improvement by merging these different networks into one or at least two. This could be done either by introducing a towercos company, a joint venture between existing operators or other feasible business models.”

### Egypt

**Subscribers:** 103.2mn  
**Tower count:** 22,704  
**MNOs:** Four  
**Towerco activity:** HOI-MEA (plus interest expressed from a number of other towercos)

Egypt now has four MNOs (each with 4G licenses) with Telecom Egypt joining Vodafone, Etisalat and Orange after having obtained a license in 2017. With 103.2mn subscribers (source: GSMA intelligence, Q4 2017) and just over 22,000 towers,
Egypt has over 4,500 subscribers per tower, the highest in the MENA region.

Tower ownership is fairly evenly split amongst the three established MNOs with new market entrant, Telecom Egypt lagging behind with just 2000 towers. Four infraco licenses also having been awarded to Alkan, Mobiserve, EEC and HOI-MEA to enable them to own towers, although only HOI-MEA has built and retained a portfolio of towers with their current site count sitting at 38. Rumours had circulated that HOI-MEA were looking for a buyer for their towers.

There have been no tower transactions of scale in the market. MobiNil (now Orange) reached a deal back in 2016 to sell 2,000 of their sites to Eaton Towers for $131mn although the deal was cancelled and does not look like it will return to the table any time soon. Infrastructure sharing between the MNOs is relatively widespread, with Orange reporting that over a third of the towers they use are shared with other operators. In early 2018, Telecom Egypt reached a wholesale agreement with Vodafone to utilise its transmission and infrastructure services for a three year period whilst it establishes it network.

Each of the four MNOs were awarded an 4G license in 2016, and whilst 4G coverage is relatively extensive in Cairo, major rollout is still required elsewhere. Collectively, Orange, Vodafone and Etisalat are understood to be adding 300-500 new towers per year, whilst Telecom Egypt has initiated the next phase of their network rollout, requiring the addition of 1,000 new sites (GBTs, rooftops and IBS). Such high requirements for new build and co-locations has attracted the interest of international towercos, with American Tower, TASC Towers, Digital Bridge and Eaton Tower all being linked to potential opportunities in the market.

Grid connection for tower sites is slow and expensive and so generators are widely used, often two per site due to the high loads. Fuel remains cheap by international standards and so the case for hybrid solutions is reduced; although fuel subsidies are gradually being phased out. Orange has issued an RFP for an ESCO to take over power for a portion of their towers in the market, with a goal of improving energy efficiency at sites. At least one of the other MNOs is expected to follow in Orange’s footsteps.

Iran

Subscribers: 118mn
Tower count: 37,106
MNOs: Three national plus FCP and WiMAX players
Towerco activity: Iranian Towers and Fanasia

Iran is the Middle East’s largest mobile market with 118mn subscribers. There are three national operators in the country of which MCI (Mobile Communication Company of Iran) is the largest with 61.3mn subscribers and 43% of the market share. MTN-Irancell, a joint venture in which MTN holds a 49% stake, is Iran’s second largest operator with 45.5mn subscribers and 40% of the market share; and RighTel is the third largest operator with 9.5mn subscribers and around 8-9% market share. In addition to this there are a number of FCP players and WiMAX operators who make up the balance of the market share.

There are currently around 37,000 towers in the Iranian market and with very little infrastructure sharing between the operators there is a significant
degree of parallel infrastructure. In 2014, Fanasia, an Iranian company with a background as a turnkey service provider to the country’s MNOs, started their own towerco business. Their first project on Kish Island, conducted with the support of the Kish Free Zone Organisation, was to rationalise the number of towers on the island. With 110 sites on the Island, each with a single tenant and unsuitable for the addition of further tenants, Fanasia built 27 new sites which the operators were mandated to use, whilst existing sites were decommissioned. The municipality benefited from a revenue sharing model on top of the land rental fee and further benefited from the freeing up of land under the old towers. Following the success of the Kish Island project, Fanasia reached a similar agreement with the municipality of Mashhad, Iran’s second most populous city to develop a core network of 350 sites in March 2016. Fanasia currently owns 106 towers.

In early 2017, in response to the growing trend towards infrastructure sharing in Iran, a new tower company, Iranian Towers, was formed. The three shareholders in the company are MCI and Rightel, Iran’s number one and three MNOs, and Fanasia, Iran’s first towerco. The first phase of Iranian Towers’ operations will be the construction of approximately 1,000 new sites which are capable of accommodating multiple tenants. These sites will be constructed primarily in the major cities in order to accommodate 4G and 4.5G rollout. The new rollout will include both ground based and rooftop sites and will be conducted with the coordination of municipalities who will benefit from revenue sharing on the sites. Iranian Towers now own around 1,000 sites.

**Figure eight: MNO tower ownership in Jordan**

![Figure eight: MNO tower ownership in Jordan](image)

Iraq

**Subscribers:** 36.7mn  
**Tower count:** 14,769  
**MNOs:** Three national plus several LTE only players in Kurdistan  
**Towerco activity:** None (although rumours circulating)

Iraq has three nationwide MNOs which own 2G and 3G licenses; Zain, Asiacell (owned by Ooredoo) and Korek Telecom (in which Orange has a stake). Zain has the largest mobile market share, with Asiacell close behind, whilst Korek Telecom is the country’s fastest growing operator which is dominant in the Kurdistan region. In addition to the three nationwide operators, there are a host of 4G LTE players in the Kurdistan region, Fastlink being the largest with Tishknet, Goran-Net and Mobitel amongst the other players. The government had proposed the introduction of a fourth national operator (in which the ruling government would have a stake) although further details are yet to emerge with political issues thought to be holding the process up.

There are 14,769 towers in the market split between the national and Kurdistan operators (figure seven). Approximately 10-15% of the country’s total stock was understood to have been destroyed or damaged during the conflict over the past three years, with power systems particularly damaged, and so major reparatory works have been underway.

There has been significant under investment in networks in recent years with 3G coverage understood to be particularly poor and so significant network expansion is required; Korek Telecom forecast that they need to build a further 2,500 sites. Major investment has been pledged
by international investors and donors in a bid to rebuild Iraq’s economy, with significant funds expected to be channeled into telecoms.

Iraq’s MNOs are struggling with high OPEX, attributable in large part to security and logistics issues across the country. Power remains a major challenge and whilst figures for power availability vary by region and by time of year (ranging from zero grid to 16-18 hours in Kurdistan in summer), the vast majority of sites are reliant on two diesel generators. Hybrid solutions are yet to have any large scale trials in the country, and whilst fuel is not expensive by a global comparison, the costly and difficult logistics associated with fuel delivery and generator maintenance means that a switch to hybrid solutions is attractive.

Jordan
Subscribers: 11.7mn
Tower count: 6,836
MNOs: Three
Towerco activity: TASC Towers

There are three MNOs in Jordan; Orange, Zain and Umniah (owned by Batelco) which have a roughly similar mobile market share and as such, the market is highly competitive. There are just over 7,000 towers in the country, roughly split between the three MNOs, and towerco, TASC Towers, owns a modest portfolio of sites.

Jordan’s Telecommunications Regulatory Commission (TRC) is in the process of creating a centralised database of fibre optic networks in a bid to limit duplication of infrastructure and encourage network sharing. Whilst no such scheme currently exists for towers, infrastructure sharing does exist between the MNOs with Orange reporting that just under 15% of the sites that it uses are shared with other operators.

The telecommunications sector is subject to heavy taxes in Jordan with operators having been exposed to increased electricity prices which has had an impact on operator profits. Orange have invested in a 33.7MW solar PV plant to produce the electricity it requires.
Kuwait

Subscribers: 7.2mn  
Tower count: 4,100  
MNOs: Three  
Towerco activity: IHS Towers (pending closure of the Zain tower deal)

There are three MNOs in the Kuwaiti market where intense price competition has driven data costs down drastically, putting pressure on the country’s operators. Decreasing ARPU has made justifying investment in rolling out new sites tough, with each MNO focussing on implementing cost optimisation initiatives.

Market leaders Zain have reached an agreement to sell 1,700 towers to IHS Towers for US$165mn. The deal is expected to close imminently, with just a couple of minor regulatory issues to be finalised. When completed, the deal will mark the first major tower transaction in the Middle East (excluding Pakistan). The entrance of a towerco will provide a more cost effective means to expand networks in a market where infrastructure sharing has been limited to date. There are approximately 4,100 towers in the Kuwaiti market with significant parallel infrastructure existing. Decommissioning is expected to play a significant role in IHS’ business model in the country.

Lebanon

Subscribers: 4.6mn  
Tower count: 2,600  
MNOs: Two  
Towerco activity: None

There are two state owned MNOs in Lebanon, touch and Alfa, for which Zain Group and Orascom have management contracts. The two operators have a roughly equal market share in a country which has some of the highest mobile tariffs in the world. There are approximately 2,600 towers evenly split between the two operators, with no independent towercos operating in the country. Whilst subject to budget approval from the government, plans have been announced to add between 700-800 new towers before the end of 2019.

Of the 2,600 towers, approximately 15% are on good grid with 24 hours of availability, 73-75% are on poor grid (with availability ranging from 6-18 hours) and 10-12% of sites are completely off-grid. Alfa has signed an ESCO contracts with IPT PowerTech, with IPT PowerTech taking over management of the operators full portfolio of sites.

Morocco

Subscribers: 43.9mn  
Tower count: 19,054  
MNOs: Three  
Towerco activity: None although two new towercos eyeing the market

Maroc Telecom is the leading MNO in the Moroccan market with 42% market share, ahead of both Inwi (in which Zain has a 15.5% stake) and Orange in a country with 43.9mn subscribers. Data usage continues to grow as 4G rollout progresses, with Maroc Telecom reporting 4G population coverage at 93% (versus 73% in 2016).

Maroc Telecom has the largest tower portfolio with approximately 10,000 sites, whilst Orange and Inwi are understood to have 4,000-5,000 each.
Infrastructure sharing between the MNOs exists, with approximately 15% of sites thought to be shared.

Oman

Subscribers: 6.6mn
Tower count: 15,400
MNOs: Two (plus resellers); entrance of third MNO imminent
Towerco activity: Oman Towers Company

Oman has two MNOs, Omantel and Ooredoo as well as two mobile resellers, Renna Mobile and Friendi Mobile. In 2017, the government introduced a tender process for a third MNO which attracted interest from parties including Zain, Saudi Telecom Company, Etisalat and Sudatel. The tender process was cancelled with the government instead deciding to award the license to a consortium involving local funds (potentially led by a flagship sovereign wealth fund) and a global strategic partner. The stated objective for the change in strategy was to enable the local funds to deploy their assets in Oman as part of an overarching economic diversification vision away from oil. Details are yet to emerge of what kind of commercial model is being proposed for the consortium, similarly no official dates have been announced for when the license will be awarded.

In addition to the threat of a third MNO and existing competition from OTT players, Omantel and Ooredoo have felt further pressures from an increase in MNO royalty fees from 7% to 12% and a tax increase from 12% to 15%.

There are approximately 4,900 ground based towers and 10,000 rooftop sites in the country, roughly evenly split between the two major MNOs. Omantel are understood to be increasing their tower count by about 4-5% per annum, suggesting an average of around 100-120 new towers are built by the operator each year. For Ooredoo, similar numbers are forecast. Infrastructure sharing has been limited to date but has started to increase as the MNOs aim to execute the rollout of 4G more cost effectively, with current estimates suggesting approximately 10% of towers are shared.

In February 2018, Oman 70 Holding Company, ActivCo and the Omani Government set up a new organisation called Oman Towers Company. The company plans to build approximately 600 towers in the first five years, and has an interest in acquiring or managing the existing portfolios of Oman’s MNOs.

Rumours have surfaced that Omantel are considering the sale of their towers with a formal process expected to be announced by early 2019.

Pakistan

Subscribers: 147.8mn
Tower count: 34,300
MNOs: Four
Towerco activity: edotco and AWAL Telecom (plus several other licenses held)
Pakistan has four MNOs; Jazz (formed through the acquisition of Warid by VEON’s Mobilink) leads the market, followed by Telenor, China Mobile’s Zong and Ufone (in which Etisalat has a stake). With a relatively low mobile penetration rate of ~73% and a data penetration rate of ~24%, there is significant opportunity for long-term growth in the market.

Towercos have been licensed in Pakistan since 2006 but MNO attitudes towards infrastructure sharing only started to thaw in 2011, initially seeing their networks as a source of competitive advantage.

Towershare-owned Tanzanite built a portfolio of 700 sites in the market, built largely from acquisitions, with the majority of towers coming from previous WiTribe assets. The Tanzanite portfolio, 40% of which were ground based towers, secured tenancies from all major operators, reaching a tenancy ratio of 1.6x before being acquired by pan-Asian towerco, edotco Group for US$88.9mn in 2017.

edotco subsequently joined forces with Dawood Hercules, a listed Pakistani holding company conglomerate to acquire the 13,000 Jazz towers which had been carved out into a subsidiary, Deodar. The sale has however since fallen through although rumours suggest that local investors and their partners are working to rekindle the deal, albeit perhaps at a smaller scale.

Whilst several local companies are also licensed as towercos (with 14 license holders currently listed by the Pakistan Telecommunications Authority), only AWAL Telecom appears to be trading as such.

MNOs Telenor, Zong and Ufone each retain their tower portfolios. Ufone has been exploring the potential sale and leaseback of their towers in Pakistan for some time. The process was stalled by the de facto merger of PTCL and Ufone, and associated management changes, but Ufone could yet contribute over 6,000 further assets to the pool of commercially shared towers.

China Mobile’s Pakistan opco, which trades under the brand name Zong, has around 9,100 sites, of which around 2,000 are co-locations.

Telenor is a keen advocate of all forms of network sharing; towers (sharing primarily with Jazz), fibre (sharing with Zong), and has taken a lead role in exploring active infrastructure sharing. Telenor and Zong undertook Pakistan’s first RANsharing trials across around 30 sites, while the Norwegian-owned MNO has also shared IBS, both under the MORAN model where spectrum is not shared.

There has been extensive infrastructure sharing between operators but significant parallel infrastructure exists, especially in urban areas, implying that decommissioning is likely to be a key part of towerco strategy in the future.

TowerXchange estimate the prevailing tenancy

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**Figure thirteen: Tower ownership by Tunisia’s MNOs**

- **Tunisie Telecom**: 4,500
- **Orange**: 2,500
- **Ooredoo**: 1,383

Source: TowerXchange
ratio (the average number of tenants across all towers in the country) to be around 1.25 in Pakistan, with a clear pathway to 1.5. Of around 10,000 co-locations in the country, most originate from barter arrangements, with some application of commercial lease rates, but more often offset against one another so no cash changes hands. These agreements will continue to be converted to commercial leases as towercos continue to become more prevalent.

Pakistan’s MNOs cite power as the number one operational challenge in the market, followed by security and landlord issues. While Pakistan’s electricity grid remains unstable, and outages can last eight or more hours, the situation has improved notably in recent years. Backup diesel genset runtime is being reduced at sites on the country’s better grid connections, with DGs increasingly being removed from such sites. edotco will offer a full tower+power service in Pakistan, meaning they will lease tower and ground space as well as providing DC energy.

There is little to no infrastructure sharing in the market, but with both operators now effectively owned by the state the government may start to view infrastructure sharing more positively.

At the end of 2017, Ooredoo launched one of the first “5G speed experiences” at select locations in Doha. Qatar is positioning itself as a front runner in the rollout of 5G, with a world class infrastructure backbone one of the key pillars of the Qatar National Vision 2030.

Saudi Arabia

**Subscribers:** 43.9mn  
**Tower count:** 35,500  
**MNOs:** Three  
**Pending towerco activity:** Communication Towers Co. Ltd (STC’s carve out - not yet active) plus IHS Towers (pending closure of the Zain deal)

There are three MNOs in Saudi Arabia; market leaders Saudi Telecom Company, Mobily (in which Etisalat has a 27% stake) and Zain. Additionally there are two MVNOs; Virgin Mobile and Lebara.

Between them, Saudi’s MNOs own over 35,500 towers with STC having the largest portfolio. Infrastructure sharing in the Kingdom has to date been very limited, with less than 2% of sites believed to have more than one tenant. In the major cities, Riyadh and Jeddah, there has been some infrastructure sharing as part of MNO densification plans to meet growing data usage, whilst in some of the country’s holy sites where access to land is limited, infrastructure sharing has arisen out of necessity. These infrastructure sharing arrangements are typically under bilateral commercial agreements and thus far have only covered passive equipment.

With little infrastructure sharing a high degree of parallel infrastructure has developed; 95% of Zain and Mobily’s sites are reported to overlap and as such, the government is keen to promote infrastructure sharing.

Various passive infrastructure strategies have been explored by each of the Kingdom’s MNOs in recent years. As early as 2011, Saudi Telecom Company and Mobily announced their interest in forming a towerco joint venture only for talks to stall; the MNOs revisited joint venture plans in late 2016 but once again decided not to proceed.

The first talks about tower sales emerged in late 2014, when Zain appointed Citi to oversee a potential sale of their towers. Mobily followed suit announcing a tower sale process before STC also weighed in on the action hinting they too may look to sell their larger portfolio. Ultimately all tower sale processes were pulled, leaving bidders with their fingers burnt after so many stop-start discussions.

In late 2017, Zain announced that it had entered
into exclusive negotiations with TASC Towers and Saudi based Acwa Group to sell their portfolio. Talks expired and Zain subsequently entered into exclusive negotiations with IHS Towers and Towershare, with the operator having previously agreed the sale of their Kuwaiti towers to the pair. On 28 November 2018, Zain announced that it had accepted an offer valued at SR2.43bn (US$647.7mn) from IHS Towers for the sale and leaseback of its portfolio of 8,100 Saudi towers, with a new build order for 1500 towers included in the deal.

In Q1 2018, Saudi Telecom Company established Communication Towers Co. Ltd., a fully owned limited liability company, with a share capital of SR 200 million which “will be responsible for owning, constructing, operating, leasing and commercialising telecom towers.” The vast majority of Saudi Telecom Company’s 16,400 towers will be transferred into the entity which is yet to start commercial operations, awaiting the necessary licenses from the relevant authorities. STC issued an RFP for a towerco management partner, but with the operator reluctant to give up an entity in the towerco venture, interest from the international tower community was limited.

Market intel suggests that there has been movement in recent weeks in CITC’s discussions regarding towerco licenses, with such developments expected to spur progress with the Zain tower sale and Communication Towers commencement of operations.

### Tunisia

**Subscribers:** 14.2mn  
**Tower count:** 8,383  
**MNOs:** Three plus Lycamobile  
**Towerco activity:** NATIC and Infrashare (newly formed towercos)

There are 15mn active subscribers (source: INTT Q3 2018) and three MNOs in the Tunisian market; market leader Ooredoo, Orange and Tunisie Telecom. Emirates International Telecommunications (which has a stake in UAE operator du) recently reached an agreement to sell its stake in Tunisie Telecom to private equity firm, Abraaj Group. Rumours had circulated that the transaction may precipitate a sale of Tunisie Telecom’s towers and whilst the takeover has since been called off, leaving the fate of Tunisie Telecom’s towers in the balance, observers expect a tower deal to occur in the future.

There are an estimated 8,383 towers in the Tunisian market, split between the region’s MNOs. In addition, there are two new towercos eyeing up the market, NATIC and Infrashare. Whilst NATIC has an appetite for build to suit (which is understood to be somewhat limited in the country), Infrashare’s interest relates more to sale and leaseback activity should it arise. When it comes to major infrastructure projects, the government has instigated limitations on foreign direct investment, limiting international participation to 49% Such legislation is expected to be extended to towers in the country, although forthcoming elections may shake things up once again.

Infrastructure sharing exists with Orange reporting that approximately a third of its sites are shared with other MNOs. In addition to passive infrastructure sharing, Tunisie Telecom and Ooredoo have a RANsharing deal in the country into which there had initially been discussions to include Orange.

### UAE

**Subscribers:** 19.0mn  
**Tower count:** 13,000  
**MNOs:** Two  
**Towerco activity:** None

Etisalat lead the UAE’s market where it competes with du (and new MVNO, Virgin Mobile). Emirates International Telecommunications (which has just sold its stake in Tunisie Telecom) is a shareholder in both du and Virgin Mobile in the country.

Whilst two competing entities, both Etisalat and du have a common shareholder in Emirates Investment Authority which has 60% share in the former and a 39.5% share in the latter which creates an unusual situation in the market. The two operators have a fixed network sharing deal.

There are an estimated 13,000 towers in the UAE of which Etisalat owns 8,000.

The country is very much positioning itself to be a front runner when it comes to 5G.
**MENA News**

A roundup of tower news across MENA

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**Egypt: Etisalat Misr increasing funds for infrastructure deployment**

Etisalat’s Egyptian opco, Etisalat Misr, is reported to have increased infrastructure capex for 2019 to as much as EGP4.5bn ($251mn). Quoted in the Daily News Egypt, Etisalat Misr CEO Hazen Matwally stated that the increase in plans is driven by fast growth in data demand in the country.

**Kuwait: Viva and Huawei rolling out nationwide 5G**

Viva Kuwait claims to be rolling out over 1,000 5G sites this year in strategic partnership with Huawei. They also announced the establishment of a 5G Innovation Centre in 2019, to explore, develop and launch new 5G use cases.

**Kuwait: Zain lays foundations for 5G rollout**

Zain Kuwait has announced that it will be ready for 5G rollout as soon as spectrum can be allocated and the regulatory authorities grant permission to launch. According to the Kuwait Times, Zain stated that ‘once commercially launched, the 5G network will empower government entities and enterprise (B2B) digital transformation, smart city development and the fourth industrial revolution’.

**Morocco: Changes to telecoms law boost ANRT powers**

Changes to the Moroccan Post and Telecommunications Act have been made to give more power to the national regulator, Agence Nationale de Reglementation de Telecom (ANRT) which will allow the ANRT to impose penalties of up to 2% of turnover in cases of infringement. Other issues are also tackled including consumer protection and infrastructure sharing.

**Oman: Ooredoo reaches 96% 4G population coverage**

Ooredoo Oman’s ‘Supernet’ network now reached 96% of Oman’s population, following an extension into 25 new areas. “The availability of 4G services in rural areas is a big achievement along our journey,” said Eng. Ahmed Al Abri, Ooredoo’s Chief Technology and Information Officer, “It allows customers to stay connected with friends and families for longer to share, stream, chat, message and more. We remain committed to enriching the digital lives of people in Oman and providing them with a fantastic data experience.”

**Oman: Third MNO license to be issued imminently**

According to Oman’s regulator, the Telecommunications Regulatory Authority (TRA), Oman’s third MNO will be granted a license in the near future and an announcement will be made as to the new MNO in early 2019. As new spectrum is allocated to the country’s MNOs and plans for more effective tower sharing are underway, the Omani telecoms landscape will see significant change in 2019.

**Saudi Arabia: STC pushing 5G rollout further**

Saudi Telecom Company has announced the first phase of its 5G rollout programme, with over 450 sites now deployed. According to CEO Nasser Al Nasser on Al-Arabiya TV, STC will launch its 5G network in H2 2019.
Saudi Arabia: Massive MIMO milestone hit in Jeddah
Zain KSA has begun rolling out Massive MIMO in Jeddah alongside their deployment partners Nokia, using Nokia’s AirScale Massive MIMO antenna. Abdulaziz Al Deghaither, CEO of Zain Saudi Arabia, said: ‘This pilot is a significant milestone in our journey towards 5G. The deployment of Massive MIMO helps us meet our customers’ evolving needs for the best experience even while using multiple bandwidth-hungry applications. As our longstanding partner, we are confident that Nokia’s proven expertise will allow us to provide innovative use cases to Zain KSA’s individual and enterprise customers.’

Saudi Arabia: IHS and Zain reach agreement for second portfolio of towers
Zain and IHS Towers have announced the agreement for the sale and leaseback of 8,100 towers in Saudi Arabia for around SAR2.43bn ($648mn). As with the two parties’ agreement in Kuwait, which is expected to close imminently, the deal will cover passive infrastructure only. The agreement is for a period of 15 years with a five-year renewal option and a build to suit agreement for a further 1,500 towers over six years.

Tunisia: Timescale for 5G licenses announced
Tunisian Minister for Technologies Communication and Digital Economy, Anouar Maarouf, has announced that 5G licenses will be issued in 2021, as part of Tunisia’s push to grow its digital economy. It is believed that operators will be allowed to stagger their payments to ensure a faster rollout.

See you at our future events!

Meetup Europe 2019
9-10 April, London

Meetup Americas 2019
9-10 July, Boca Raton

Meetup Africa 2019
8-9 October, Johannesburg

Meetup Asia 2019
3-4 December, Singapore

Meetup MENA 2020
28-29 January, Dubai

TowerXchange www.towerxchange.com
We open with the updated TowerXchange global towerco league table, and the news that towerco's now own 67.5% of the world's investible towers and rooftops.

Next, two reports from MWC19. First we explore towerco's growing appetite for smart poles, IBS, small cells, fibre, even 'network as a service' plays. We also had the opportunity to visit the Cellnex booth, where demonstrations illustrated Europe's leading towerco's transition to a digital infraco, pioneering edge data centres, drones and infrastructure for smart cities and autonomous vehicles.

Delta Partners make several recommendations of how regulation needs to evolve to support network densification and 5G. And our global section concludes with a report from TowerXchange's inaugural data collection and utilisation working group meeting in Dubai, showcasing success stories in IT and BPM, and initiating our drive to evangelise best practices and demonstrate ROI.

Don't miss:
141 The famous TowerXchange towerco league table
148 Towercos attending MWC19 show appetite for business model diversification
152 Cellnex: swiftly embracing digital infrastructure innovation
155 Tower regulation: The Delta perspective
163 Data collection and utilisation working group report
TowerXchange now tracks 289 towercos and infracos who between them own 2,996,087 of the world’s 4,440,402 towers (67.5%)

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Meet the towerco CXOs, their investors and their partners at your next TowerXchange Meetup!

**TowerXchange Meetup Europe 2019**
April 9-10 London

**TowerXchange Meetup Americas 2019**
July 9-10, Boca Raton, FL

**TowerXchange Global Meetup 2019**
July 16-17, Beijing

**TowerXchange Meetup Africa 2019**
October 8-9, Johannesburg

**TowerXchange Meetup Asia 2019**
December 3-4, Singapore

**TowerXchange MENA 2020**
January 28-29, Dubai

For agenda information and to register, visit: [www.towerxchange.com/meetups/](http://www.towerxchange.com/meetups/)

**TowerXchange tower count research methodology**

TowerXchange's famous global towerco league table provides a simple comparison of the scale of towercos by tower count. We have derived tower counts for the category’s 21 listed entities from quarterly statements, where available, while the other counts are drawn from qualitative market research. Smaller towerco’s count may be updated less frequently, we offer no guarantee that the counts they provide are accurate: we ask for a count of complete macro and rooftop towers marketed for co-location, but have only recently begun to include DAS and lamp-posts / city poles, while inevitably some towercos inflate their tower count by including works in progress and other special structures. As such, TowerXchange’s tower count should be considered estimates.

TowerXchange is preparing a digital tower count, back-dated two years to track growth, as a premium business intelligence product.

As the product of proprietary market research, TowerXchange asserts copyright over this table and the data listed herein. If you want to use data in your own analysis, you need to request our permission.

If you wish to suggest a correction, please email Kieron Osmotherly at kosmotherly@towerxchange.com
TowerXchange visits Huawei booth at MWC19

Towercos attending MWC19 show unprecedented appetite for business model diversification

From dialogues about small cells, fibre and edge data centres, to dabbling in semi-active equipment: plug and play coverage!

We’re not privy to the GSMA’s MWC19 demographic statistics, but it seemed like more senior representatives of towercos than ever before attended Mobile World Congress 2019. Why? The same reason as everyone else: the search for transformational innovations.

Here’s a simple truth you need to bear in mind when considering a tower company’s appetite for innovations: the macro tower sharing business model is proven, scalable and highly valued. Perhaps more highly valued than any other telecom infrastructure asset class. As such, towercos will rightly be wary to dilute the elegant simplicity of their core business: they build towers, they buy towers, they lease up the towers. But what if the urban infill site of the 5G era is not a tower, as it cannot be in many dense metropolitan areas where land, even rooftop sites, are increasingly hard to come by? How does the tower industry sustain growth and remain relevant in the 5G era?

TowerXchange surveys suggest 2019 will be the first year in which more “alternate site typologies” will be built by the world’s towercos than macro / ground based / green field towers. But the innovation at hand is not just a move from three legged towers to city poles (although smart pole manufacturers are much in demand!) Where regulations permit, towercos are dabbling in semi-active infrastructure service provision.

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Here’s a couple of first mover examples: Russian Towers now offers plug and play continuous citywide coverage in several regions – MNOs

Keywords: 5G, American Tower, Cellnex, Data Centre, Digital Colony, Edge, Global, IBS, Infill, Infraco, Multi-Operator, Research, Russian Towers, Small Cells, Space World, The Future Network, Towercos, Valuation

Read this article to learn:

- Why towercos are cautious about diluting their core business model
- The urban infrastructure innovations towercos are exploring: smart poles, IBS, small cells
- Dabbling in semi-active equipment: BTS hotels and ‘network as a service’
- What is the ‘right kind of fibre’ for towercos? And what do they want it for?
- How will antenna configuration change in the 5G era?
just bring their base stations, plug and play! The towerco provides not just passive infrastructure, but cabling and antenna. We heard another example of a “network to suit” offering in Latin America. In Asia, edotco has long been a pioneer of BTS hotels, and they recently launched a landmark indoor coverage small cell offering in KL Sentral.

edotco’s partners in the KL Sentral project Huawei hosted a roundtable in Barcelona on Digital Indoor Solutions, at which towercos were well represented, as well as a new breed of entrepreneurial neutral hosts focusing on the indoor market. This new breed of neutral host was exemplified by Digital Colony’s recent acquisitions Opencell and Stratto, and by Space World in India, which in just two years has assembled a portfolio of 500 sites representing 250mn sq ft of coverage, with a mind-boggling tenancy ratio of 2.7!

Towercos’ appetite for innovation extends beyond IBS and small cell to fibre. But what is the right kind of fibre for towercos to seek to deploy, own, or at least the right kind of fibreco to partner with? The preference seems to be for wholesale rather than lit fibre. It must be capillary enough and deep enough. Towercos have finite interest in long distance fibre, beyond what it tells them about stimulating demand for 4G and in future 5G in new cities. Rather, towercos’ focus remains primarily on metro and last mile fibre, for the purpose of fiberizing more towers, and to exploit opportunities to add small cell nodes along fibre routes. The list of towercos diversifying into fibre is getting longer by the day, and currently includes: American Tower, Arqiva, Cellnex, CETIN, Crown Castle, Digital Colony, Guodong, Helios Towers, IHS, INWIT, OCK, Protelindo, STP, Tower Bersama and Wireless Infrastructure Group.

The capital markets, it seems, buy in to the diversification narrative. Either that, or investors frankly don’t understand the difference between towers, fibre and small cells!

Going back to my opening point that towercos are reluctant to diversify too far beyond their macro tower roots for fear of diluting their impressive valuations, Crown Castle, which now derives as much revenue from fibre and small cell as from macro towers, continues to closely track American Tower and SBA Communications valuations.

Sticking along fibre lines for a moment, many of the towercos we met in Barcelona were keen to understand the largely nascent edge data centre opportunity. The theory being that if towercos own fibre or partner with fibrecos, they have visibility into where the regen sites are in fibre networks – where fibre signals are boosted and where there

How will antenna configuration change in the 5G era?

Focusing back on the towercos’ core business, the big question is how to accommodate 5G antennae, particularly massive MIMO, within the current antenna configurations, structural and power capacity, and contractual frameworks governing towers.

Even though successive generations are getting smaller and lighter, massive MIMO may be too big to fit in most MNOs’ reserve space on towers (even given the concept of “bucket loading”, wherein lease costs are a function of wind load, giving tenants more flexibility that when charged for each piece of equipment loaded).

While these antenna configuration and loading challenges translate into great amendment revenue opportunities for towercos, will MNOs be able to afford to lease extra space? And is the right space available?

The notion that MNOs will free up space by removing all their 2G-3G-4G antenna from towers and replace them with one multi-band antenna array may not be realistic in the immediate term. Why? MNOs can’t write off legacy antennas until they have been fully depreciated.

If these spacial / economic / contractual challenges cannot be overcome, the rollout of 5G will surely be inhibited.
are already air conditioned enclosures in which a few racks could be hosted. It remains early days for edge data centres, and much seems to depend on unproven 5G use cases like autonomous vehicles, but towercos could be among the first movers to the edge!

Cellnex are one of the first towercos pioneering edge computing – indeed Cellnex may prefer to be labeled an “infraco” rather than a towerco these days! Cellnex sees edge computing as a great opportunity to add value to their sites, enabling them to offer storage and data processing capacity next to antenna, and to realise the promise of 1ms latency demanded by 5G connectivity. TowerXchange’s Arianna Neri visited the Cellnex booth at MWC19 – see “Cellnex: swiftly embracing digital infrastructure innovation” for a detailed report.

In conclusion, towercos remain rightly cautious to diversify beyond their core business. But if towercos’ core business is defined as building and buying shareable telecom infrastructure,
then most of the innovations we have discussed in this article remain in towercos' comfort zones. Multi-operator small cells are evolving to meet the needs of towercos and other neutral hosts. Smart poles seem more elegant and, more importantly, more affordable every year. Network-as-a-service technologies are available to sustain and extend the towerco business model into the complex (and still mysterious) world of 5G. Pioneers like Cellnex, Digital Colony and American Tower (see their participation in the Paris2Connect consortium) are testing 5G use cases. We're moving from the theory to the practical application of 5G. Honestly, I don’t think any towerco has a comprehensive 5G roadmap yet, but the appetite for innovation is unprecedented.

Continue the innovation dialogue at your local TowerXchange Meetup!

- **The TowerXchange Meetup Europe** (April 9-10, London) features unprecedented coverage of 5G infrastructure proofs of concept
- **The TowerXchange Meetup Americas** (July 9-10, Boca Raton) explores business model innovations including indoor coverage, fibreco partnerships, and CALA towercos' first forays into provision of energy services!
- **The TowerXchange Meetup Africa** (October 8-9, Johannesburg) will be co-located with the FTTX Council Africa’s annual conference – bringing the fibre and tower communities together!
- By the time we get to the 6th annual **TowerXchange Meetup Asia** (December 3-4, Singapore) we can expect more innovations from edotco and their peers in Indonesia, and the expansion of the Indian towercos’ business model as the IP-1 remit is extended to include small cells and smart cities!
- And look out for TowerXchange’s imminent launch in China, and the return of the smash hit **TowerXchange Meetup MENA**, which debuted to great acclaim in Dubai in January!

Register for your local Meetup (and why not attend one ‘out of market’ Meetup to stimulate ideas?) at: [www.towerxchange.com/meetups/](http://www.towerxchange.com/meetups/)

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5th Annual TowerXchange CXO Dinner attracts record attendance!

Thanks to our 63 VIP guests for joining us at TowerXchange’s fifth annual CXO dinner at MWC19!

Even with record numbers of towerco decision makers among the masses at MWC, we still make up less than 0.1% of the MWC audience, so the TowerXchange CXO dinner is a unique opportunity to relax, network and share ideas with a global community of tower industry peers.

Towercos represented on this year’s guest list included: American Tower, Axicom, Axion, Broadcast Australia, Cellnex, Helios Towers, Mexico Tower Partners, MXT Holdings, OMTEL, Phoenix Tower International, Phoenix Tower do Brasil, Russian Towers, SBA Communications, Service-Telecom, Skysites, SpaceWorld, TDF, TELXUIS, Towercom and Vertical Bridge. Thanks for your company!
Cellnex: swiftly embracing digital infrastructure innovation

Adaptive Edge, Connected Vehicles and 5G are all becoming a reality for the Spanish leader

I had the pleasure of visiting Cellnex at their booth during the recent edition of Mobile World Congress in Barcelona and interviewing the firm’s Director of Innovation and Product Strategy, José Antonio Aranda. Our conversation revolved around 5G innovation, IoT, V2V, V2X and beyond, and it became clear that Cellnex is much more than a towerco and is quickly embracing digital infrastructure in all its facets. I also had the pleasure to test Cellnex’s emergency response solution, which (virtually) threw me at the very heart of a wildfire. Exciting times ahead, but not for the faint-hearted!

Keywords: 5G, Alticom, Bouygues Telecom, Cellnex, Data Centre, Edge, Energy Efficiency, Europe Insights, European Commission, Horizon 2020, Insights, Small Cells, Smart Cities

Read this article to learn:
- Cellnex’s 5G strategy and initiatives: from towerco to digital infraco
- What Adaptive Edge means and why it is transformational
- The Parcmotor Castelloli-Barcelona’s Mobility Lab and urban use cases
- How Cellnex can change the way wildfire and other emergencies are handled

TowerXchange: What is Cellnex’s vision for edge computing? What applications will drive edge computing, and what do their requirements tell us about the infrastructure that must be deployed?

José Antonio Aranda, Director of Innovation and Product Strategy, Cellnex: For us, edge computing represents a great opportunity to add value to our portfolio of sites. We are now in the process of defining Cellnex’s role in this space but one thing we are sure of is that we do need to work closely to the MNOs to achieve substantial goals. Edge computing will allow us to offer more storage and data processing capacity closer or even next to the antenna. By extending edge computing at the very edge of the network, we are achieving 1ms latency, as demanded by 5G connectivity.

In terms of our activities in the edge computing sector, in 2017 we acquired Alticom in the Netherlands which allowed us to enter the data centre segment. Now we are participating in the 5G City Horizon 2020 initiative funded by the European Commission to enable 5G across Europe. This means first of all the definition of the role of towercos in the development of 5G infrastructure and the launch of 5G projects in three cities, namely Lucca (Italy), Barcelona (Spain) and Bristol (UK).

The required infrastructure will include edge nodes, centralised data centres and small cells. This is the future of digital infrastructure and MNOs will need neutral hosts to deploy these solutions all at once. The implications are obvious as by enabling...
third party infracos, we will avoid multiple civil works across metropolitan areas and maximise the efficiency of the MNOs' investments.

In 2018, we sealed an agreement with Bouygues Telecom, following the sale and leaseback deals of 2016 and 2017, that will allow us to build 88 strategic Central Offices and Metropolitan Offices, which are telecom centres with great capacity to house data processing capabilities. So Cellnex is officially shifting from being a “towerco” to an infrastructure partner, or infraco.

TowerXchange: What is “Adaptive Edge” and what are the use cases?

José Antonio Aranda, Director of Innovation and Product Strategy, Cellnex: We’ve been experimenting with edge for a while and have finally achieved the so-called “adaptive edge”, which is a real groundbreaking system. This function enables the ability to detect in real time, adapt and locally focus the capacity of the network, according to the point of highest demand for data consumption.

During MWC19, Cellnex, in partnership with Intel and NearbyComputing, showcased various demos that clearly demonstrated the differences between local and cloud-based content. This represents the basics of edge as we know it, whereby local content is very different and much better in quality and resolution thanks to its proximity to the end user.

This concept becomes interesting when applied to 4K videos, that require plenty of bandwidth. In this scenario, which we’ve demonstrated at MWC19, we’ve modified the network by creating a smart system which turns the local content on when traffic requires it. This allows the video to keep streaming by switching from the cloud to local services. Additionally, we are now able to predict the increase in users by utilising cameras and traffic analysis which automatically turns the local content on. This is why we are calling it adaptive edge, and this is why it’s a real game changer.

TowerXchange: Tell us about the Mobility Lab at the Parcmotor Castellet-Bercelona – what have you deployed there, what concepts are you testing, and what have you learned to date?

José Antonio Aranda, Director of Innovation and Product Strategy, Cellnex: We are now working on two different scenarios, one in a closed circuit and the other on urban grounds. The first one relates to our Mobility Lab which we are developing in the Parcmotor Castelloli-Barcelona car circuit.

We’ve deployed nine energy efficient nodes across the circuit, all equipped with both a solar panel and wind turbine, and with various sensors allowing communications both among cars and with the circuit’s central office. This is our testbed for various advanced traffic solutions, smart mobility systems and autonomous vehicles which we are also testing in urban context.
In fact, we’ve already started testing connected cars with nodes installed inside the vehicles, enabling a wide array of messages including traffic and emergency alerts. This is part of the V2X-Arch project, which highlights the importance of communications between vehicles and street fixtures (traffic lights) or communications between emergency vehicles and all other vehicles on a road and building these networks that make it possible to develop the connected vehicle.

TowerXchange: Tell us about Cellnex’s solutions for emergency response.

José Antonio Aranda, Director of Innovation and Product Strategy, Cellnex: Cellnex has been operating emergency networks for quite some time but now, we have been asked to perform with commercial standards, therefore enabling videos, bandwidth etcetera. For this reason, we have been working to develop private networks which can serve at times of emergency, when public ones tend to collapse. Our first use case relates to wildfires and allows a drone to fly and transmit live videos to the emergency team, which can then identify the fire and, after extinguishing it, ensure the emergency is indeed over. In fact, the drone can fly on the area after the intervention of the emergency team and not only live stream the area but also send temperature alerts thanks to its thermal cameras and sensors.
Tower regulation: The Delta perspective
The current landscape and how this should change

1. Context
Telecoms is an industry where economic regulation is a critical factor that determines growth, profitability of investment, affordability for end users and incentives to innovate. Typical regulatory measures include licensing, price regulation at retail and wholesale levels, reference offers, non-discrimination and even mandatory separation of different asset classes. However, the towers layer has not been subject to heavy regulation:

- Operators usually deployed duplicating infrastructure, so none could abuse its dominance in the infrastructure space to gain advantage in the retail market;
- Densities of macro grids remained fairly stable from 2G to 4G as all these technologies predominantly used low- to mid-band spectrum bands for coverage purposes. Even with traffic growth and capacity driven densifications, additional sites did not increase the grid size by more than 20-30%.

Under these conditions, regulation of infrastructure was mostly focused on ensuring site aesthetics, environment protection and, more recently, promoting collocation.

However, two important trends could encourage the need for a greater regulatory oversight:

- The emergence of a new breed of infrastructure-only players who drive consolidation of infrastructure assets;
- The introduction of 5G networks that use high and ultra-high spectrum bands, resulting in massive densification of networks with deployment of small cells.

Keywords: 5G, Delta Partners, Densification, Infraco, Infrastructure Sharing, Masts & Towers, MNOs, Multi-Region, Regulation, Risk, Towercos

To date, towers have not been subject to heavy regulation but a number of factors including the growing prominence of an independent tower industry and the introduction of 5G networks requiring massive densification are driving regulatory discussions increasingly into the spotlight. Delta Partners examine the current tower regulatory landscape and discuss how regulation should evolve to support the betterment of the communications sector.

Read this article to learn:
- Current practices of infrastructure regulation across developed and emerging markets
- Key trends and factors driving regulatory decision making
- The potential negative impacts of heavy handed regulation
- Risks facing the infrastructure sector and the role for regulation in protecting against these
- Delta Partners’ view on regulatory agendas required to support network densification
In this context, market players should drive regulatory agendas to ensure there's enough scrutiny over any sign of market abuse, promote infrastructure sharing and support industry players in removing any legal and regulatory obstacles for large scale site deployment.

This Delta Perspective shares the key trends that may influence industry’s response to the regulation of infrastructure, explains current practices of infrastructure regulation across developed and emerging markets and proposes new directions in regulatory agendas to support the required network densification.

2. Key trends that could drive the need to shift regulatory frameworks

2.1. New breed of infra players

Over the past decade, the telecom industry has seen the emergence of a new breed of infrastructure player. They are focused purely on deploying, operating and maintaining telecom infrastructure to telecom operators. The most widely well-known and adopted model are TowerCos, but there is growing number of those who are focused on pure infrastructure or basic wholesale connectivity services. These include: InfraCos and NetCos. Ownership and control over these new entities could range from completely independent pure-infra play through full or partial ownership by one or more telecom operators to light form of cooperation between telcos to share deployment or utilization of certain infrastructure elements.

The emergence of new business models has played an important role in generating efficiencies in the sector through better utilization of assets, deleveraging balance sheets and allowing telecom operators to focus on innovation and quality of service. However, the majority of infrastructure players were created through the carve-out and sale of the existing infrastructure from vertically integrated operators – including heavily regulated entities. As a consequence, one of the critical elements in telecom value chain, fundamental to the provisioning of connectivity services, moved away from traditional telecom regulation.

Yet, since the underlying assumption of all new business models is sharing assets by several telecom operators, it inevitably leads to infrastructure consolidation and lower redundancy. This causes heavy reliance on the financial health, operational capability and fair treatment of all players by a limited number of strong Infrastructure operators and, as such, could lead to greater regulatory scrutiny from a range of regulators such as telecom regulators, policy makers, competition authorities and municipalities among others.

2.2. 5G introduction and small cells deployment

With 5G’s introduction, operators are expected to deploy at least 10 times the number of outdoor urban cells currently operated with 4G. With such a massive scale deployment, specific challenges will arise which could severely impact site deployment time. These challenges include obtaining all
required permits for site deployment, obtaining rights-of-way to provide fibre backhaul, conforming to each city’s aesthetic and environmental regulations. Since all these processes and approvals are managed by multiple institutions on country and local level, the administrative burden can greatly impact the pace of large-scale site densification and fiberization required for 5G networks. According to a study conducted for 5G Americas, the primary challenges include:

- Fragmented regulatory frameworks at national and local level, preventing a scalable deployment process;
- Local authorities can delay or forbid deployments for aesthetic, environmental or public health concerns but these rules are inconsistent city to city;
- No standardized approval for equipment and sites. Only a few countries have a WiFi-like ‘fast track’ approval, or exemption, for small cells which conform to certain requirements (e.g. size, power);
- Inconsistent fees for use of public infrastructure that sometimes are so high they can break the business case for small cells in a particular city;
- Backhaul and approval issues could cause an operator to postpone the start of a densification project, especially an outdoor one, by an average of 26 months.

Another factor impacting infrastructure is the increased power of real estate owners. Until recently, operators and TowerCos depended on property owners to deploy rooftop sites. With the increased need for indoor sites and small-cell deployment, real estate owners will become de facto local monopolies. Regulators should consider how to avoid situations where these new players in the telco value chain extract abnormal returns and limit the availability and quality of 5G.

3. Current state of infrastructure regulation around the world

Although infrastructure sharing lowers CAPEX requirements in the telecom sector, promotes investment in QoS and leads innovation in the regulatory agenda globally, tower regulation is in its infancy. Yet, even with the relatively small sample size of countries where some form of tower regulation exists, we already see differing approaches between developed and developing markets with greater regulatory oversight and ex-ante regulations for the latter, especially for licensing and capital requirements.

3.1. “Light” form of infrastructure regulation in developed markets:

Markets like the US and Western Europe typically require no more than a registration/notification with relevant regulatory bodies. Some countries, such as the UK, Sweden and Denmark, have issued a general authorization allowing any registered company to engage in TowerCo/InfraCo services. In the US, there are certain restrictions for
TowerCos:

- Foreign ownership is limited to 25% - although this can be waived - likely because of US concerns regarding national security and security of critical infrastructure;
- New site deployments are subject to zoning laws;
- TowerCos are treated as real estate companies and generally operate as Real Estate Investment Trusts (REIT), which are subject to certain legislation in taxation and dividend payouts.

While TowerCo regulation in developed economies is ‘light’, regulators have introduced legislation that encourages or even enforces the sharing of communications infrastructure. The main driver for the regulatory push towards greater collaboration is efficiency of investment but also the protection of natural environment and health and, finally, aesthetics. The design standards to ensure aesthetic rules and environment and health protection rules may vary between different administrative units in the same country, as it does in the UK or US. This increases the complexity and costs of regulatory compliance as well as time required for large scale deployment of new sites.

Regulation comes in the form of site sharing rules, defining target designs of new sites to accommodate additional tenants and maintaining centralized records of sites to avoid redundant deployments. The requirement to provide information regarding existing infrastructure portfolio can be found in emerging and western markets. The US Federal Communications Commission (FCC) runs the Antenna Structure Registration (ASR) program which imposes regulation upon the owners of antenna structures to register with the FCC. Those affected include Antenna that are higher than 200 feet above ground level or those that could interfere with the flight path of a nearby airport. Germany’s Federal Network Agency “Bundesnetzagentur” operates the “Infrastructure Atlas” which contains detailed information from 650 infrastructure owners on the availability of fiber optic cables, ducts, masts and base stations. The provision of data, initially voluntary, is now mandatory.

Sharing regulation can be broadly categorized across three “axes”: the breadth of its applicability across different components of communications infrastructure; its applicability to new deployments and/or existing infrastructure; and whether it is applied asymmetrically (to dominant providers only) or symmetrically (to all providers):

- For new deployments, regulators typically require a certain level of coordination between market participants to reduce duplication of infrastructure. These coordination requirements can be sector- specific (telco only, like in Spain, the...
Exhibit 4 – Infrastructure regulation in developed markets is focused on incentivizing competition through accessibility

<table>
<thead>
<tr>
<th>Categories</th>
<th>Relevant case</th>
<th>Benchmarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deployment regulation</td>
<td>FCC execution of exclusive agreements as well as enforcement of existing exclusive agreements between cable providers and developers</td>
<td>US, EU</td>
</tr>
<tr>
<td>Access to rights of way</td>
<td>Australia has removed all costs related to RoW even cost compensation for direct costs. Cost only occurs if the Carrier causes a third party damages</td>
<td>Australia, EU, UK, China, Canada, Japan, India</td>
</tr>
<tr>
<td>Coordination</td>
<td>EU directives state that any network operator conducting civil works should (if partially publicly funded) must meet any request for coordination of civil works</td>
<td>Europe</td>
</tr>
<tr>
<td>Passive</td>
<td>Austrian communications providers must be granted duct access from any network owner, regardless whether this owner is a communications provider</td>
<td>Austria</td>
</tr>
<tr>
<td>Active</td>
<td>The Spanish regulator has obliged Telefonica to offer VULA1 on its fiber network nationwide, except for few municipalities where competition is sufficiently developed</td>
<td>Spain</td>
</tr>
<tr>
<td>Process simplicity - Dispute resolution, Information sharing etc.</td>
<td>As per EU directive planned civil works have to be made public 6 months in advance and relevant information has to be available in one single point</td>
<td>Europe, Switzerland</td>
</tr>
</tbody>
</table>

1 Virtual unbundled local access; Source: BEREC, Ofcom, FCC, EC, Rules for access to physical facilities, MDDO report

Netherlands and the UK). The Dutch telecom act requires coordination on the deployment of passive infrastructure such as ducts, manholes and sites for mobile antennae (e.g. towers). However, current EU guidelines advise legislators to enforce coordination on a cross-sector level including telecom and utility companies (e.g. joint duct deployment for fiber of utility and telecom companies as well as joint usage of manholes);

- Sharing regulation for existing infrastructure is mostly focused on ensuring competition and enforces access rules for passive infrastructure such as ducts and dark fibre but also for two or three active wholesale products from operators;
- Access rules have traditionally focused on dominant market players with significant market power (SMP). In countries like the US, Spain, Singapore and the Netherlands, this has been extended to apply “symmetrically” to all market participants.

3.2. Regulation of infrastructure players in emerging markets focused on controlling asset ownership

Compared with developed markets, emerging economies impose greater regulatory scrutiny on TowerCos. Sometimes these regulatory measures are enforced as conditions of a license, which must be purchased in order to offer TowerCo/InfraCo services.

Such countries include Pakistan, Bangladesh, Malaysia, Singapore, India, Bahrain, Australia, Nigeria and Qatar. The most stringent are Qatar and Nigeria where the number of licenses and, thus, the level of competition is limited. The scope of such licenses commonly includes the operation and lease of towers, ducts and dark fiber. Sometimes however, the scope of services may be much wider including services such as satellite hubs or submarine cables like in Pakistan and Malaysia. Other than licensing, some of the additional regulatory measures that are commonplace in emerging markets include:

- Capitalization requirements, which is typified by Malaysia, can also apply to companies in western economies depending on how they are incorporated. For example, US stock exchange listed companies need to have a minimum aggregate market value of publicly held shares of $40 million domestically and $100 million internationally;
- Requirements for relevant experience and expertise which are subject to regulatory review. This occurs in Bangladesh, Egypt and Malaysia;
- Regulatory review of a business plan, as is the case in Pakistan, Indonesia, Bangladesh and Egypt;
- Prevention of anti-competitive behavior and structures either through explicit license conditions or through reference to overarching competition rules;
- Master-lease agreements and technical KPIs. This is comparable to a reference offer for wholesale telecom services, requiring the licensee to specify terms & conditions of its services, such as the price it will charge to telecom service providers, which is common in India, Nigeria and Egypt;
- Countries impose limits on foreign ownership
to ensure control and security of “critical infrastructure” (e.g. India, Indonesia, Bangladesh, Malaysia). Limitations may range from a complete ban of foreign companies, which happens in Malaysia, to India’s approach of having a 49% minority stake limitation with the possibility of a waiver;

- License fees and royalties, which usually consist of a fixed initial and recurring fee plus revenue share ranging for 0.5% to 6.5% of annual gross revenue. Pakistan, Nigeria, Egypt, Malaysia and Bangladesh are notable examples of this.

The greater emphasis on preselecting the right number of potential entities that are focused on providing shared infrastructure in emerging markets may be driven by lower access to capital compared to developed markets. As such, the financial stability of the infrastructure provider becomes a critical factor for the sustainable development of the whole industry. At the same time, limitations on foreign ownership protect from a scenario of losing the control over critical assets to foreign entities.

### 4. What needs to change in 5G era?

#### 4.1. Price regulation may be required for small cells

With further consolidation of the infrastructure layer expected, there may be growing concern over potential abuse of market power and overcharging telecom operators and, as such, squeezing their margins or inflating prices for end-users. Price regulation in the telecom industry was among the most commonly used measures to ensure that entities with SMP did not overcharge other industry players or end-users. Therefore, it’s valid to question whether price control mechanisms should also be commonly used to regulate prices for a pure infrastructure play. However, experience so far suggests that such a measure may not be required as market mechanisms appear to work well, at least for macro grid:

- Wholesale focus - Price regulation of telecom services mostly applies to vertically integrated players to prevent predatory pricing of wholesale services and to protect market position in retail market. Conversely, infrastructure players are purely focused on wholesale market and providing services to telecom operators;

- Price of services linked to price paid for the infrastructure - Majority of the infrastructure players, especially TowerCos and InfraCos, start their operations in a market through the acquisition of an existing portfolio of assets from existing telecom players. Occasionally, operators carve-out the infrastructure into a separate, fully or partially owned entity and procure services from them. In both cases the lease price for infrastructure reflects not only operational costs incurred by infrastructure player but also the agreed value of assets acquired (e.g. portfolio of towers). This transaction value is determined by numerous factors, including the owner’s cash requirements. Price regulation would

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### Exhibit 5 – Tower regulation / licensing in emerging markets

<table>
<thead>
<tr>
<th>Requirement</th>
<th>India</th>
<th>Pakistan</th>
<th>Indonesia</th>
<th>Ghana</th>
<th>Nigeria</th>
<th>Bangladesh</th>
<th>Egypt</th>
<th>Chile</th>
<th>Malaysia</th>
<th>Namibia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Require min. capitalization</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Review track record</td>
<td></td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
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<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Review business plan¹</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
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<td>✔️</td>
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<tr>
<td>Define min. portfolio size</td>
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<td>✔️</td>
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<tr>
<td>Dominance control</td>
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<td>✔️</td>
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<tr>
<td>Prevent discriminatory behavior</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
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<tr>
<td>Collect info on agreements &amp; perf. KPIs</td>
<td>✔️</td>
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<tr>
<td>Guarantee security of critical telco infra.</td>
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<td>✔️</td>
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<tr>
<td>Apply telco royalties²</td>
<td>✔️</td>
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<tr>
<td>Enforce regulatory compliance</td>
<td>✔️</td>
<td>✔️</td>
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<td></td>
<td>✔️</td>
<td>✔️</td>
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<tr>
<td>Limit foreign ownership</td>
<td>✔️</td>
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</table>

¹ In some cases reduced to a technical/network plan; ² Including TowerCo-specific royalties; Source: Regulator websites, Delta Partners analysis

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therefore impact valuation of assets and as such could reduce interests of buyers and sellers to enter in transaction;

- Cost-plus vs cost-minus approach - The common approach to price setting for regulated services assumes that the price of a service should be close to self-provisioning costs and assumes a margin guaranteeing fair return for service provider. In infrastructure plays, the actual market price for services offered by infrastructure owner assumes improved utilisation of shared infrastructure and, as such, should be lower than self-provisioning costs.

Price regulation is unnecessary for the macro grid. Yet, a certain influence over price setting may be required to prevent abuse of power by landlords and municipalities. With extremely dense small cell networks, the locations for both outdoor and indoor sites become critical for rollout and are very valuable. This creates a risk of setting rental prices above the fair value. Regulatory measures that could prevent inflation of rental prices range from restricting rental charges for the telecom space to zero-rental fees for small cells. For indoor sites, sharing of small cells should be encouraged with price guidelines recommended by regulators.

4.2. Importance of regulation in streamlining 5G deployment process
As network deployment shifts from low to mid band technologies (3G/4G) to the high-band, super densified 5G technology, traditional regulatory frameworks and processes may pose a significant obstacle to large-scale and economically viable technology upgrades.

As 5G site deployments are expected to grow ten-fold compared to existing technologies, it is paramount that deployments are swift and cost efficient. While certain steps of the deployment and activation process depend on operators themselves (e.g. radio planning, installation and backhaul connection), it is administrative and regulatory processes that cause the vast majority of deployment time for telecom sites. Even though some operators claim they can deploy and activate a small cell within a day, getting relevant approvals and negotiating fees may take up to two years, like in the US. This illustrates the disproportionate effort and time operators have to invest in administrative tasks to deploy their networks. This administrative burden might have been manageable in a 3G/4G scenario where large macro sites could serve larger numbers of customers and could be deployed at a slower pace. Yet, considering that 5G networks will depend on small cells, which connect a significantly lower number of customers, it is clear that administrative timeline needs to decrease if 5G deployment is to be an economically viable investment. Some of the main regulatory and administrative challenges that need to be tackled include:

- Regulatory and administrative fragmentation for site approvals - In some countries (e.g. US) gathering the required approvals for a single site
or small cell and related equipment may require a given operator or InfraCo to interact with several regulatory authorities and stakeholders at a local and national level. Under current regulation, most telecom sites, even small cells, have to go through the same approval process and considering the significant increase in deployments for 5G networks, current processes could easily compromise the cost and scalability of 5G networks;

- **New site types** - While 3G and 4G deployments are largely made up of traditional telecom towers and rooftop sites, 5G deployment will be dominated by smaller set ups such as small cell solutions on electrical utility poles or street light poles. Current regulatory and administrative frameworks for telecom sites need to be updated to accommodate the efficient deployment of such new site types;

- **Access to existing power sources** - Due to the larger number of sites in a 5G network, there may be a shortage of space for dedicated new power sources for a significant number of small cells. Tapping into existing power sources provides challenges from an administrative and cost perspective as access must be negotiated with municipalities and/or landlords. Regulators need to provide effective frameworks at which existing power sources (e.g. in existing buildings) can be accessed quickly and at a sustainable cost;

- **Prevention of predatory rental charges** - As operators and infrastructure players will be required to deploy large numbers of sites to launch 5G technology, they will be more exposed to predatory pricing of rental charges. Due to the smaller coverage radius of 5G high band sites, network planning and site acquisition teams will be much more limited in their flexibility to choose from several locations to accommodate their network design, consequently giving them less bargaining power when negotiating with landlords. Hence, regulators need to be wary of the effect that excessive rental charges could have on the business case of 5G networks.

Although there is much work to be done, some regulators have already taken steps to adapt regulatory and administrative processes to 5G requirements:

- In the US, 20 states have passed legislation aimed at easing the deployment of wireless infrastructure, much of which has been focused at formalizing shorter approval timelines and simplifying access rules for rights of way and city structures;

- Singapore’s IMDA has regulation to reduce the rental cost of telecom sites to zero. Under the new Code of Practice for Info Communication Facilities (COPIF) any new rental agreement for telecom sites will be free of charge.

Considering the large number of telecom sites needed to be deployed to build 5G networks, the main challenge from a regulatory perspective is to reduce the length and cost of administrative processes, approvals and fees. Current timelines and cost structures, if unaltered, could significantly slow down and limit the scale of 5G deployments.

5. Summary

The degree of tower regulation globally is limited. Regulators in developed markets are focused on aesthetics, environmental impact and promotion of infrastructure sharing, while those in emerging markets restrict the number of infrastructure players and ensure that only experienced entities with proper capabilities are licensed to operate telecom infrastructure.

While current regulation may have been manageable and appropriate given the scale and type of deployments in a 3G/4G era, upgrades to larger and denser 5G networks will require certain adjustments to facilitate an efficient and economically viable transition to 5G technology. Considering an expected ten-fold increase in the number of sites deployed to build 5G networks, regulators should initiate legislation to streamline approval processes and prevent excessive fees (e.g. rental charges or rights of way for fiber, indoor installations) for telecom sites. If operators and infrastructure players have to navigate through an environment of multi-year approval timelines and predatory rental charges, the cost efficiency and scalability of 5G networks could be compromised. To safely navigate regulation, Infrastructure players should build capabilities in areas of market regulation and start a dialogue with regulators to help drive a development of optimal regulatory environment to support large scale infrastructure deployments.

Regulators around the world need to think of ways to help TowerCos flourish in their market, whether that is mandating Telcos to carveout their assets or offering incentives for TowerCos to establish themselves and acquire local assets. In markets that are either too small or economically challenging, regulators need to be progressive enough to attract TowerCos by setting win-win market conditions, knowing that TowerCo’s help achieve ultimate goals of telco regulators, which is promoting universal, cheap and fast access to infrastructure.
Data collection and utilisation working group shares BPM and IT success stories

Sharing best practice and demonstrating ROI

Tower companies and tower managers at MNOs have access to an increasing amount of data about the performance of the assets in their portfolio. Progressive tower owners are able to analyse that data and translate it into actionable intelligence, optimising the operational, commercial and ultimately the bottom line performance of their businesses. But the reality is that telecom infrastructure owners are relatively new to the art and science of data collection and utilisation. TowerXchange has inaugurated a new working group to share requirements and experiences among the Chief Data Officers of tomorrow.

Keywords: Asset Register, Change Management, DG Runtime, Data Collection and Utilisation, Delmec, Global, Infozech, Job Ticketing, KPIs, M2Catalyst, Operational Excellence, RMS, ROI, Research, Russian Towers, Site Visits, Uptime

Case study: Russian Towers

The working group opened with a case study from Timur Shikov, Head of Strategy and Marketing at Russian Towers. Russian Towers operates a portfolio of 4,000 sites and, with 25-30% year on year organic growth, is one of the world’s fastest growing towercos. They are also one of the most innovative, both in terms of business model and site typologies, but also in leveraging IT as an enabler.

Russian Towers had used off the shelf software solutions, but grew frustrated with their technology partners’ unresponsiveness to customer service and customisation requests, so they brought their requirements to market through a tender sent to many of the most established and widely used site management and Business Process Management (BPM) systems used by communications infrastructure operators. Finding nothing that met their needs, Russian Towers resolved to develop an in-house solution, dubbed RUBAHA, which has been live since March 2018.

Read this article to learn:
- Russian Towers case study: an in-house BPM and IT platform, fostering increasing standardisation and transparency of internal processes
- The importance of sound IT project management and detailed database management
- How to create and maintain accurate asset registers
- How to demonstrate ROI in IT to shareholders and investors
RUBAHA has a BPM module at its heart, a customer portal with a digital interface for order placement, checking status, and where MNOs can overlay their rollout plans with Russian Towers’ sites.

All internal documentation and workflows now run through RUBAHA, as well as 35% of customer communications. Russian Towers have successfully created transparency within their internal processes, enabling them to diagnose what is right (and wrong!)

A second case study was presented by an emerging market towerco which acquired a large portfolio of unmonitored towers, and which implemented a flexible BPM platform to meet their incident management needs. Once implemented, the platform and associated process improvements reduced meantime to dispatch significantly, and helped identify underperforming sites, enabling buying decisions to be made based on the real performance of equipment in the field, rather than based on the manufacturer’s stated performance characteristics.

A data platform is only as good as the data in the platform

A similar example was shared in the working group of another towerco which, at the point of being carved out from its MNO parent company, inherited multiple data tools and data sets, with no ‘single source of the truth’ database. This prompted a mammoth data integration exercise, demonstrating

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### Data collection and utilisation working group objectives (initial draft)

- To support and accelerate tower companies and tower management teams within MNOs on their journeys to business process optimisation and IT transformation
- To enable the collection and consolidation of data from multiple sources: site audits, RMS, site visits et cetera
- To share best practices in data validation / data quality management
- To share best practices in the transformation of data into meaningful, actionable information, for example through integration with job ticketing
- To enable the creation and maintenance of comprehensive asset repositories, defining the load, capacity, condition, and ultimately the value of cell sites, and to leverage such data for revenue assurance purposes
- To ensure user adoption of data, IT and BPM tools across multiple functions to break down silos
- To enable smarter procurement and partner selection decisions based on robust analysis of performance in the field, rather than being based on the performance characteristics stated by manufacturers
- To ensure the scalability of data, IT and BPM platforms as towercos expand into new regions and new countries
- To share success stories illustrating the return on investment in IT, BPM and data initiatives – and to defend (where relevant expand) the budget for such initiatives
- To evangelise best practices in IT project management to ensure delivery on time, on budget
- To seek to extend data collection and utilisation initiatives to improve the business intelligence governing the selection of new site locations, the sale of co-locations on existing towers, and the evaluation of the lease-up potential of towers offered for sale
- To leverage innovations such as AI, machine learning, Blockchain and drones to further enhance data collection and utilisation strategies
- To define a new role of a Chief Data Officer, whose job it is to aggregate, organise and analyse data, leveraging it to drive business process optimisation
- To leverage all the above technology and process improvements to accelerate time to market, to reduce site visits and operating costs, to improve site level profitability and ultimately enhance the profitability of tower companies, or to position operator-captive towers as a profit centre
that cleaning data is at least as important as collecting data!

Incentivised to hit a ‘go live’ deadline, the towerco’s selected vendor had their tool up and running on time within four months, but the legacy data within the tool was incomplete and out of date. A new data template and scope had to be defined and agreed in partnership with the vendor, field team and internal stakeholders. Data had to be cross-checked and validated cell by cell, a process which took six months. Weekly data reconciliations were undertaken, with random data checks and reviews against site visit photos – the persons responsible for any data gaps were penalised.

When the architecture and the data was ready, the towerco encountered a new challenge bulk uploading 500GB of data into the platform. The project ultimately concluded successfully, but took closer to two years than the one year initially targeted, and serves to illustrate the criticality of sound IT project management and painstakingly detailed database management.

One point which came up was around Data Quality and the need for good input data. In cases where the input data is not complete or not interpretable because of complexity, the first step is to make it consistent and understandable. For instance, with a large telco operating in India and 14 countries in Africa they had over 200,000 leases to account for, as a part of the new IFRS 16 regulations. In this example, the telco needed to get accounting details of the leases down to each site by month.

The input data appeared to be simple (just one record per lease) and the output was the right of use and lease liability numbers for the entire lease duration. Once the processing started, after every iteration of processing, there was realisation that some input may have been incomplete or partial. Five iterations were done over a one month period to finally cleanse the data to get complete numbers for all of their 14 countries’ deployment in Africa. One of the key reasons for this becoming possible so quickly was due the high speed data engine, part of the Infozech framework, which automated the transitions over multiple iterations.

“This example illustrates the importance of Data Quality Management and data cleansing when it comes to effective Data Utilisation”, said Tulika Pradhan, Director of Analytics at Infozech.

Creating and maintaining accurate asset registers

Among other services, Delmec specialise in auditing tower structures and forecasting capacities – an essential step when evaluating lease-up potential when buying or selling towers. Post tower transaction, maintaining asset registers to the same high standards is critical to revenue assurance.

Delmec uses an in-house platform to combine data from their own site inspections with data and photos from third parties, and to visualise the current capacity and co-location potential of a given tower. “Our goal is to create a facility that enables a towerco’s sales team to instantly know what they can sell,” said Delmec CTO Spencer Crawford-White.

Some of the other insights Delmec are able to share are cost benefit analyses where a structure requires strengthening to accommodate an additional co-location – should the towerco add capacity for one or two further tenants? And where should towercos and MNOs focus their investments to minimise the health and safety risks associated with overloaded towers?

Educating shareholders and investors about the importance of IT investments

Tower companies are asset-based businesses, and generate tremendous ROI on those assets. In comparison, investment in IT can seem intangible. This makes it imperative for towercos, and their brethren within MNOs, to identify shareholders and investors who recognise the transformational potential of IT, and to demonstrate a specific business case showing (achievable) return on investment.

Reducing the cycle time to permit, build and QA a new tower, or to add a new co-location, can yield exponential returns, while automation can keep
But there are significant challenges yet to be overcome. Too much data is locked in guarded silos such as project and finance Excel documents – data flows within towercos and MNOs must be standardised and streamlined. Data templates must be reviewed to capture new data templates to ensure IFRS16 compliance.

SG&A costs to a minimum, maximising margins. Savvy investors increasingly appreciate the value of reliable data for their own reporting and forecasting. “Given the impact on valuation, shareholders will appreciate the value of good data when they exit!” Quipped one working group participant.

Infozech CEO Ankur Lal wrapped up the inaugural data collection and utilisation working group by emphasising the need to increase awareness of the power of data, building trust and transparency, and ultimately securing investment in IT.

“We want to increase belief, and investment in, data collection and utilisation tools,” commented Lal. “If IT currently represents 0.5-1% of towerco expenditure, we believe an increase in spend to 2% could increase returns tenfold.”

Towercos and MNOs now have access to huge amounts of data from remote monitoring systems and sensors embedded into energy and access control systems. For example, patterns in diesel genset runtime can be analysed to forecast battery cell failure months in advance – not only can that cell be replaced without risk of downtime, but the cell can be replaced at a scheduled maintenance visit instead of a reactive visit, saving expensive truck rolls. Leveraging data in this manner will avoid SLA penalties and improve the efficiency of the field workforce.

Similarly, revenue can be assured based on accurate asset repositories that track every piece of equipment on a site. “We should strive to make a site audit last ten years,” recommended Lal.

Utility bills can be reconciled against meters – substantial savings can be realised. Tower owners can realign their businesses to be focused on project outcomes. “One example of this”, added another working group participant, “is that sharing performance data with your field workforce partners can enable linking remuneration with actual performance.”

Leveraging data to drive co-location sales

M2Catalyst briefly presented their capability to leverage crowdsourced network performance data to drive co-location sales. A more economical alternative to drive-testing, M2Catalyst is able to pinpoint weak or non-existent signal strength. Of particular interest to towercos is M2Catalyst’s ability to triangulate cell site locations, determining which MNOs’ equipment and which technologies are co-located on any given site, providing unique insight into lease-up potential.

Used wisely, M2Catalyst could transform co-location sales from reactive to proactive, and could become an invaluable tool during tower transaction due diligence.

We’d like to invite YOU to participate in future data collection and utilisation working groups!

TowerXchange will host data collection and utilisation working groups at all our future Meetups, and we’re calling for the participation of IT, process and operational specialists from MNOs and towercos! Whether you have a success story to share, or simply wish to listen and learn to inform your own IT / BPM transformation journey, we would love to get you involved! Also most welcome: developers of data collection and utilisation platforms, from remote monitoring and access control systems to site management, data analysis and visualisation platforms – this working group is a great way to connect with current (and prospective) customers, and to inform product development to align with customer need!

Interested in taking part? Email Kieron Osmotherly, CEO of TowerXchange at kosmotherly@towerxchange.com.
TowerXchange brings the tower industry to you!

Connect with us today and discuss available opportunities for our Meetups across Africa, Asia, Europe, Americas and China! Exhibiting or sponsoring at TowerXchange Meetups is the best investment you can make to showcase your products and expertise in front of the global telecom tower industry.

Email Annabelle Mayhew, CCO, at amayhew@towerxchange.com today to find out more

TowerXchange Meetup calendar

TowerXchange Meetup Europe 2019
9-10 April, Business Design Centre, London

TowerXchange Meetup Americas 2019
July 9-10, Boca Raton Resort & Club, Florida

TowerXchange Meetup Africa 2019
October 8-9 Sandton Convention Centre, Johannesburg

TowerXchange Meetup Asia 2019
December 3-4, Marina Bay Sands, Singapore

TowerXchange Meetup MENA 2020
28-29 January, Dubai, UAE

Visit our website at www.towerxchange.com
2019 promises to be a very dynamic year for the European digital infrastructure market. The multi-national players in the market, such as Cellnex, American Tower and Digital Colony are all looking for growth, be it through sale and leaseback deals, market consolidation or innovative partnerships. The number of mobile network operators looking to manage their passive infrastructure opex is snowballing, and several MNOs are in the process of carving out their towers ahead of the sale of part of all of their tower assets. We’re also seeing new towercos and neutral host operators being created to serve untapped or emerging needs in the market, creating choice and driving innovation in the model.

Much of what is underpinning this change is an increasing awareness of the impending change which will be driven by 5G rollout. As trials expand and use cases grow, the business case remains blurry but the key players in the market are aware that this could be a critical time to lose or gain ground in what could be a total revolution in how people work and interact. TowerXchange has been investigating the implications of 5G rollout for MNOs and towercos and is delighted to bring you insight and commentary from some of the leading minds in the industry.

Don’t miss:
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The three pillars of Cellnex’s growth

Europe’s leading towerco and connectivity infrastructure increases focus and lays out roadmap for 5G service offering

TowerXchange was yet again granted the privilege of speaking with Cellnex Telecom CEO, Tobias Martinez, as he reflects on the activities of 2018 and plans for growth in 2019 and 2020. As ever, Europe’s biggest and most acquisitive towerco has a clear vision for both its current and future service offering to customers, which is reflected in its entry into new contracts with clients to deliver services in edge computing, as well as consolidating core competencies in towers, small cells and fibre. We asked Tobias what he thought about how the market was developing, and where opportunities may lie in 2019, as well as finding out more about the ‘three pillars’ on which Cellnex is building out its service offering to customers.

Keywords: 5G, C-Level Perspective, Carve Out, Cellnex, Co-locations, Consolidation, DAS, Data Centre, Deal Structure, Edge, Europe, Fibre, France, Infrastructure Sharing, Italy, MLA, Netherlands, Network, Rollout, Sale & Leaseback, Small Cells, Smart Cities, Spain, Switzerland, Towercos, UK

Read this article to learn:
- Cellnex’s take on the European tower landscape in 2018
- Growth plans and objectives for the short and long term
- Cellnex’s forecast for tower opportunities in 2019/2020
- How Cellnex plans to evolve to meet the needs of its clients as 5G rolls out

Tobias Martinez, CEO, Cellnex Telecom: Our focus over the past year has been on two areas: market consolidation and increased contracts for 5G. On existing market consolidation, 2018 has been an important year for us to enhance our footprint by strengthening relationships in existing markets. Our most notable achievement has been to enter into new contracts with tower customers looking for 5G solutions. In terms of our 5G activity, we have seen a number of acquisitions and agreements. These include our recent fibre acquisition in Catalonia and more recently our agreement with Bouygues to build to their requirements for strategic telecom centres known as Metropolitan and Central Offices. Although 2018 was not remarkable in terms of M&A activity, nonetheless Cellnex grew its portfolio through organic market development and greater 5G service contracts.

Our latest deal with Bouygues, which is a five-year BTS construction project for 88 Metropolitan and Central Offices, is followed by a 15-year service agreement. This serves as a good case study for other telecom operators who are considering entering into deals beyond towers with infrastructure providers. Cellnex is one of the major players moving from being a tower operator to also becoming a network operator.
These transactions with Bouygues demonstrate to other market players that they have opportunities to share their existing networks beyond the current remit of just towers or rooftops. Fibre will be part of this value proposition as will edge computing and Metropolitan and Central Offices where we’ll see the consolidation of data and voice services. This allows us to deliver the core of the 5G network, going beyond pure towers and ensures MNOs slim their infrastructure by outsourcing and investing in future infrastructure.

Generally, when building a new platform like Cellnex is, people expect greater M&A activity. However, the opportunities aren’t always readily available to consolidate your strategy. This is why we did a lot of work on organic growth in 2018 and we’re optimistic that in 2019/20 we will be able to capture outsourcing opportunities with more MNOs. Nonetheless, we believe 2019 will be more active in terms of M&A.

**TowerXchange: There has been a lot of change in the European market too, with new market entrants and MNOs exploring new options. What is Cellnex’s view on how the market is developing?**

**Tobias Martinez, CEO, Cellnex Telecom:** 2018 has not been as attractive in terms of M&A, as we only saw the Altice transaction come to market for a minimum stake. However we see the big players are reviewing their strategy to outsource passive infrastructure, as such we think 2019 will be very active.

This is because 5G network design, planning and execution is and will be highly demanding, requiring two to three years of work ahead of a massive rollout. This is why MNOs are starting to review their outsourcing strategy accordingly. For a company like Cellnex, with a clear value proposition and neutrality at its core, we expect this will be an opportunity. The growth in the market is very appealing for investors such as private equity funds, infrastructure funds, as we saw in 2018 with the SFR transaction with KKR, but those transactions were minority stakes, and we will see how they are affected by IFRS 16.

**TowerXchange: Talk us through Cellnex’s current growth plan and market objectives.**

**Tobias Martinez, CEO, Cellnex Telecom:** As I said, for us it’s very important to gain scale on our existing markets, we want to find the right target in the UK and the Netherlands because scale matters when talking about telecoms infrastructure. We will also test the water around our domestic markets, potentially acquiring more assets from the big European MNO players and smaller towerco acquisitions. In terms of market consolidation, many of these smaller towercos are owned by infrastructure funds and financial institutions and sooner or later we expect this basket of towercos in Europe will be accessible for consolidation.

TDF, for example, is not a small towerco as they also deliver broadcasting and FTTH and are really a wholesale telecom infrastructure player, but TDF coming to market would be a sign of the current markets dynamism.
TowerXchange: We believe several towerco assets may be coming to market in the CEE region soon. Will this be of interest to Cellnex?

Tobias Martinez, CEO, Cellnex Telecom: Central and Eastern Europe is our second priority. Our first priority is to explore and consolidate in Western Europe: we don't have enough scale in the UK yet, the second largest market in Europe; we'd like to do more in the Netherlands; we will have to track how potential prospects in our core markets evolve, like TDF. There are many moving parts but when it comes to looking at Eastern Europe, why not? We would consider some countries, in Eastern Europe there are several markets with different appeal for us so we are keeping one eye on CEE as well.

TowerXchange: At the last count we estimated there were around 65 towercos of various shapes and sizes in Europe. Do you think we will see an acceleration in towerco consolidation in the coming year? Is this a priority for Cellnex?

Tobias Martinez, CEO, Cellnex Telecom: This is one of the ‘baskets’ of towers we are looking for. One is the MNO towers, the second one is the small telecom operators, the third is the existing towercos in Europe. There is an opportunity for consolidation in every country, we just need to understand shareholders’ ambitions and their willingness to sell down and consolidate the capital gain. At a certain point in time these financial investors should sell and these exits are an opportunity for us to assess and consider the integration of those type of companies.

TowerXchange: We’ve been talking for some time about convergence between communications infrastructure verticals. Cellnex is clearly leading the way in this in the European market with acquisitions and expertise in small cells, DAS, datacentres and fibre. What will ‘towercos’ look like in 5 years’ time?

Tobias Martinez, CEO, Cellnex Telecom: The first thing we see is that the towerco model is evolving thanks to the advancement of technology and changes to our customers business models, which is in turn is driving ‘pure’ towercos to become network infrastructure providers. It's a question of time, but we feel that this is the evolution of the structure and value creation that telecom infrastructure companies like us will take.

We are building our own value creation proposition on three pillars: the first is the extension of existing wireless infrastructure, by which I mean adding small cells, DAS, and datacentres, so it’s no longer a question of towers but of urban infrastructure as well. Second is fibre, at least to the antenna. If you have more than that you can provide backhaul services to the interconnection point, which will be a value add for our customers. The third pillar of our development is based on edge computing. This is maybe the newest part of our role in the value chain: we don't have previous experience in managing edge computing, which is why we are very happy to help our customers, like Bouygues, to develop this new business model. This was the reason why we acquired Alticom in 2017, as they already delivered a part of these types of services. All in all, we're focussing on improving our capacities, our experience and our knowledge to deliver these new types of services for 5G. This is the path where we are developing our future strategy and structure and crystallising the whole telecom infrastructure system related to 5G. There are a lot of new roles in the value chain, it’s not just a real estate proposition.

TowerXchange: Do you see your customer base changing shape as 5G use cases and proven and it rolls out further?

Tobias Martinez, CEO, Cellnex Telecom: Yes, very much so. There will be new roles for the MNOs or for new providers in the market. 5G will require more vertical solutions aside from connectivity or capacity. Telecoms operators should deliver more solutions and integrate more niche companies to provide more services for all kinds of verticals such as insurance, manufacturing or healthcare. Partnerships will allow a small but highly knowledgeable skill set to be integrated into a solution around 5G technology. I don’t expect to see Orange or Deutsche Telekom, for example, delivering industrial solutions without partnering with specialist niche companies. Then what will be our role? Delivering edge computing and telecom services on our passive infrastructure. We are exploring the new part of this role with our core customers now.

TowerXchange: We are seeing European MNOs looking to spin out their towers into a captive towercos rather than looking for a trade sale (such as Altice and Vodafone). Does this mean
the days of sale and leaseback are numbered? Will towercos have to look elsewhere for growth?

Tobias Martinez, CEO, Cellnex Telecom: I can see the appeal of this structure, when extracting the monetisation without any accounting adjustment as it was prior to IFRS 16, but after this you should move from MLAs to MSAs. If you keep MLAs you will receive 49.9% of the value of monetisation but the ratings agencies will account for this through debt or EBITDA adjustments, meaning you gain nothing. This won’t be the best way to reduce debt, and minority transactions won’t be the most attractive, while we expect majority stake transactions and opportunities to deliver a lift to capitalisation of contract through IFRS 16.

This is the reason why we believe 2019/2020 will be critical for big players to consider best strategy for them considering the impact of IFRS 16. A lot depends on objectives of telecom operators, looking at big players we don’t believe that a minority stake transaction could be the best for them. It may well be a first step, but it may not be the most efficient solution to capture all the value of their asset and reduce net debt.

We don’t think the days of sale and leaseback are numbered, there will be opportunities out there, but operators will need to think carefully in terms of how the deal is structured, an MSA in our opinion is the best solution as it’s a service and means you don’t have to make adjustments in terms of liabilities, so you’re maximising the value of the transaction by monetising a bigger portion of your infrastructure and avoiding capitalisation of the service contract.

TowerXchange: The European market is probably one of the most diverse in terms of towercos profile – independent towercos, broadcast towercos, MNO captive towercos and joint ventures all serve the MNO community in Europe, backed by a variety of financial structures. How do you think this will evolve further as the industry develops? What new business structures or partnerships could we see evolving?

Tobias Martinez, CEO, Cellnex Telecom: From our point of view we are open to any type of collaboration in terms of infrastructure but having said that we have one line in the sand which we will not cross – that of neutrality. It’s not just a marketing play, we believe in the value of being neutral to all the players in the market and we must be able to allocate services to everyone under the same conditions, as we do on our existing infrastructure. As a long-term partner of mobile network operators, we consider this to be critical, it’s around this pillar that we develop the best solutions in each country.

We have formed partnerships before, for example in Switzerland with Swiss Life and Deutsche Telekom Capital Partners, so why not consider other strategies and arrangements with partners to help us execute our business plan, incorporate assets or consolidate our position in certain countries. We’re certainly not against partnering with others but we should have majority control in order to deliver our independent role. This is our commitment to our investors: we can’t be a passive, minority investor, nor just a financial investor, we need to capture synergies amongst our assets and deliver the same service to our customers across Europe – there are a lot of restrictions and requirements which invite us to remain as an industry player with a controlling stake in all our operations. However, under the right circumstances we are open to partner with the right and suitable players in every country. This is not about money is about sharing a common vision on the drivers of this industry and how a network infrastructure operator is able to meet its customer’s demands and expectations.
Towers in Italy: seven key scenarios

In Europe’s most dynamic tower market there are many moving parts and very few certainties

The Italian market has always been at the forefront of towerco activity in the European market, and that trend looks set to continue into 2019. In the last few years we have seen one of the first European sale and leasebacks of scale, the sale of 7,377 Wind towers to Cellnex in 2015, and one of Europe’s most successful MNO tower carve outs, INWIT, successfully floated on the Milan Stock Exchange in 2015 – a feat few towercos have managed since. Over the last 12 months, deals, new market entrants and announcements have again had a huge impact on the market, in this article TowerXchange reviews the market developments which will have the biggest impact on the Italian tower landscape in 2019.

Keywords: 4G, 5G, Acquisition, Build-to-Suit, CK Hutchison, Carve Out, Cellnex, Co-locations, DAS, EI Towers, Europe, Europe Research, Fibre, Free, HighTel, INWIT, Iliad, Infrastructure Funds, Investment, Italy, Market Overview, Rai Way, Sale & Leaseback, Small Cells, Telecom Italia, Tenancy Ratios, Three, TowerTel, Towercos, Transfer Assets, Vodafone

Read this article to learn:
- Key background on Italian MNOs and their towers
- Which towercos are currently in Italy
- Seven possible scenarios for the Italian market
- What shape Italian towers will take longer term

Mobile Network operators in Italy

Telecom Italia
Telecom Italia has had a rocky 2018 to date with new investor, US hedge fund Elliott, gaining control of the Telecom Italia board in May 2018 after quickly and quietly building a stake through a derivative investment known as an equity collar. Elliott have clashed with Telecom Italia’s biggest shareholders Vivendi (who had control of the board until Elliott’s move in May 2018), with CEO Amos Genish the latest senior figure to leave Telecom Italia. Elliott has been accused of short-termism, and is believed to be interested in working with the Italian government to split off Telecom Italia’s fixed line infrastructure in order to merge it with rival, Open Fiber, to create a national wholesale network which could then be re-nationalised.

With Telecom Italia’s share price dropping by a third since Elliott’s takeover in May, and debt levels remaining unaddressed, plus Telecom Italia coming under pressure from Free’s aggressive entry into the market, the Italian incumbent will continue to come under pressure in 2019.

Vodafone
Vodafone Italia’s history dates back to the launch of Omnitel in Italy in 1995, and Vodafone was the second MNO in Italy for many years prior to the merger of Wind and Three. Vodafone Italia has worked closely with Telecom Italia for several years, most recently in terms of sharing 4G towers in rural locations in Italy, as well as being a strong tenant...
for Telecom Italia’s towerco, INWIT. Vodafone’s new CEO, Nick Read, stated in September that he would consider the sale of Vodafone’s towers in Europe, although no firm plans have yet been announced.

**Wind Tre**
The merger of Wind and CK Hutchison’s Three began in 2015 and was completed in Q316, and in September 2018, CK Hutchison bought out VEON’s 50% of the newly merged entity, Wind Tre, to become sole owners. The merger allowed the number three and four operators in the market to leapfrog Vodafone and compete with Telecom Italia for the top spot in Italy. Consolidation in the market also catalysed the Italian regulator to grant a licence to a new operator, French disruptor Iliad.

**Free**
Following the merger of Wind and Three in Italy, the regulator granted a new licence to a fourth operator, and Iliad entered the Italian market in May 2018, signing up a million subscribers in its first month. Driving growth through low subscriptions and an infrastructure-light model, Iliad’s Italian operation had reached 2.23m subscribers by Q318.

**5G plans and spectrum auctions**

Italian spectrum auctions took place in September 2018, raising far more than the initial €2.5bn which the government expected to achieve and ending up at €6.55bn.

The largest packets of frequencies in the most

---

**Figure one: Italian mobile market share (by subscribers) Q218**

Subscriber numbers for new market entrant Free reached 2.23 million in Q318 – they are targeting 25% market share, and have around 17% market share in their home market (France). How this affects overall market share is not yet clear.

Source: Bloomberg Intelligence

**Figure two: Who paid what in the Italian spectrum auctions?**

<table>
<thead>
<tr>
<th>Operator</th>
<th>Amount (Billions)</th>
</tr>
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<tbody>
<tr>
<td>Telecom Italia</td>
<td>2.41bn</td>
</tr>
<tr>
<td>Wind Tre</td>
<td>516.5mn</td>
</tr>
<tr>
<td>Vodafone</td>
<td>2.40bn</td>
</tr>
<tr>
<td>Iliad</td>
<td>1.19bn</td>
</tr>
<tr>
<td>Fastweb</td>
<td>32.6mn</td>
</tr>
</tbody>
</table>

(Billions)
sought-after licences, the 3600MHz-3800MHz band, were won by Telecom Italia and Vodafone, with Wind Tre and Iliad acquiring smaller allocations. Telecom Italia, Vodafone and Iliad also acquired spectrum in the 700Mhz band, and all four mobile network operators (as well as ISP Fastweb) won spectrum in the 26GHz band.

The high prices paid will no doubt be a bonus for the Italian government, but many operators and industry experts have expressed concern about the financial burden of these auctions, particularly in a country where the mobile network operators are struggling with debt and competing hard on price following Iliad’s entry into the market. Telecom Italia has already mooted the idea of selling non-core assets to cope with 5G spending, and Vodafone and Wind Tre have also talked about offloading towers to reduce unmanageable levels of debt. Ironically, the pressures of paying for 5G spectrum may well inhibit operators’ ability to roll out the infrastructure they need to support 5G rollout across Italy.

Telecom Italia and Vodafone had been rumoured to have entered into talks to roll out 5G infrastructure together, signing a non-disclosure agreement with a view to reaching an agreement in early 2019. This deal could include towers, radio equipment and access to spectrum, although the dismissal of Telecom Italia CEO Amos Genish only 24 hours after this deal was reported could have thrown doubt on whether and how this deal will proceed.

**Italian towercos**

**Cellnex**
Spanish Cellnex are highly committed to the Italian market, having acquired 7,377 Wind towers from VEON in 2015 and small cell and DAS provider CommsCon in 2016. Cellnex currently has 8,057 towers in Italy, and is aligning itself to build a significant number more for Iliad once their network needs are defined. As the only independent dedicated telecoms infrastructure owner in the Italian market, Cellnex are focusing on organic growth, creating value through decommissioning towers and working with partners to prepare Italy for 5G rollout. Having said that, they have the funds and the appetite for an acquisition and will certainly be following the changes in the Italian market closely in order to assess any portfolios which come to market – be that through another sale and leaseback, or through the acquisition of a carved out entity.

**INWIT**
Telecom Italia carved out INWIT in 2015, creating a towerco which incorporated all of Telecom Italia’s Italian towers and which listed very successfully on the Milan Stock Exchange in 2015. Since then, TIM came close to selling their remaining 60% stake in 2016, with Cellnex and F2i believed to have been close to acquiring the asset. After announcing that they planned to build more value before selling, INWIT cancelled the process and focussed on leasing up their towers, improving their network and rolling out small cells. In April 2018, INWIT CEO Oscar Cicchetti left the company and since the appointment of new CEO Giovanni Ferigo the infrastructure company has kept a lower profile in terms of its plans for growth or a possible sale. With significant changes at the top in TIM and a tussle between US investor Elliott and French stakeholders Vivendi, it remains to be seen which direction INWIT will take from here.

**EI Towers**
The other key player in the Italian market is broadcast towerco, EI Towers, whose telecom-focused subsidiary TowerTel has built and acquired a portfolio of 1,000 telecom towers with an aggregate EV of up to €55mn, ~500 of which have been added through several small acquisitions. In October 2018, EI Towers delisted from the Milan stock exchange through an acquisition by F2i and Mediaset through JV 2i. TowerXchange believes this delisting was completed as a result of EI’s desire to acquire Italy’s other broadcast towerco, RaiWay.

**HighTel Towers**
Italian HighTel Towers was keen for both domestic growth through BTS activity and growth through acquisition in the Balkan region. HighTel has around 350 towers in Italy and 12 DAS sites.

**Rai Way**
Rai Way is 65% owned by the Italian government and 35% listed on the Boursa Italiana, owns 2,300 towers delivering 99% coverage. Rai Way manages both active and passive infrastructure for their broadcast clients and report having MNO tenants...
on ~700 of their sites, as well as a towerco’s usual “non-traditional MNO” tenants: emergency services and fixed wireless access operators.

Possible scenarios in the Italian market

5G collaboration: As already mentioned, the day before Amos Genish left Telecom Italia, Bloomberg leaked the news that TIM and Vodafone has been in talks about a fairly deep collaboration on 5G rollout, including passive and active equipment as well as spectrum. The likelihood of this deal going ahead is as yet unclear given the uncertainty around the TIM board at present, but if this collaboration were to come off, it could prove a catalyst for Italy’s two biggest spenders in the spectrum auction to really press home their advantage.

EI acquiring RaiWay: With many political hurdles still to overcome, EI’s ambition to acquire counterpart RaiWay still has a long way to go before it looks like a reality. However, having one organisation control Italy’s broadcast assets would could make the network more efficient and help EI manage risk more comfortably. EI’s track record with telecom tenants could also mean more high towers across Italy opening up for colocation.

Vodafone creating a towerco: Nick Read, Vodafone’s new CEO, has stated his intention to carve out Vodafone’s European towers into a stand-alone entity, with the sale of a minority stake looking likely. The creation of a new carve out towerco in Italy (and another 8,933 towers available for commercial colocation) could drive efficiencies across the market, but would also add another layer of competition in a highly competitive market.

Wind Tre selling their towers: Wind Tre are rumoured to be selling their ~8,000 towers in Italy. Cellnex will no doubt evaluate these towers if they come to market, but it’s unlikely that INWIT or EI would be interested in acquiring 8,000 telecom towers from an operator at this stage. If Wind Tre do sell, we may see another independent towerco enter the market, or they may look at carving out their towers into an operator owned towerco (see below).

Iliad buying towers: As part of Wind Tre’s agreement with the EU when they merged, they agreed to make around 5,000 towers available to Iliad, Italy’s new entrant, made up of redundant towers created by the merger. It is as yet unclear how many towers Iliad will take – much of this will become clearer as they roll out across Italy in 2019 – but industry experts who have worked...
The Italian market is one of the most dynamic markets in Europe, with everything to play for. At this point it seems likely that at least one more player will enter the tower market, although whether that is a carve out towerco or a multi-national independent (or both) remains to be seen.

with Iliad in France think they will much prefer to use third party towers when given the choice, rather than buying and maintaining their own assets. TowerXchange estimates that Iliad may take around 2,000 of the ~5,000 made available to them.

Hutch carving out a towerco: Unsupported rumours currently suggest that CK Hutchison is working on plans to carve out their European assets into a towerco. With towers in Italy, the UK, Ireland, Sweden and Denmark, Hutchison could have a strong proposition for an infrastructure investor who wishes to invest in communications infrastructure. If Hutch’s Italian opco Wind Tre is carved out into a towerco in parallel with Vodafone Italy doing the same, we could see north of 90% of the Italian tower market available for commercial colocation – and competition in the market reaching unprecedented levels.

INWIT for sale: As US investor Elliott and French Vivendi wrestle for control of the TIM board, it’s as yet unclear what the future holds for both Telecom Italia and its tower subsidiary, INWIT. However, it’s known that Elliott is keen to offload infrastructure, and Telecom Italia did announce their intention to sell their remaining 60% stake in INWIT in the future, most likely in 2019, when they postponed the first sale process back in 2016. It’s very possible that INWIT could come to market next year, and would doubtless attract the attention of those who joined the process last time around, including Cellnex, and F2i, the new owners of EI Towers.

What shape will the Italian market take?

The Italian market is one of the most dynamic markets in Europe, with everything to play for. At this point it seems likely that at least one more player will enter the tower market, although whether that is a carve out towerco or a multi-national independent (or both) remains to be seen.

Despite Italy’s stringent EMF regulations, if tower sharing becomes more efficient there will be a need for significant rationalisation in the Italian market. The problem is that, while every player in the market acknowledges the need for rationalisation, none of them wants to be the one to make significant reductions to their portfolio, so the entry of one or possibly even two new players into the Italian market will simply exacerbate this problem, while a merger or acquisition is likely to result in value creation through a considered decommissioning strategy. We could see a very top-heavy market developing, with five towercos vying for Iliad’s business to achieve the tenancy ratios which will create value in their assets.

TowerXchange predicts 2019 will be one of the busiest years for European towers, and Italy will be a weathervane for this change as independent towercos, broadcast asset owners and carve out towercos backed by infrastructure investors vie for position in an increasingly crowded market. Longer term, we feel rationalisation within the market will be inevitable, but in the short term it’s not clear what shape the market will take.
Facilitating better relationships between local government and infrastructure providers

Unique insights into the obstacles which need to be overcome to enable closer partnerships with local government

Urban Foresight is a smart city and innovation consultancy with a strong practice in working with in public sector bodies (at all scales), industry and investors; notably in areas such as smart cities, digital transformation and smart mobility. Through their extensive experience in helping to get Smart City projects off the ground, they have seen the difficulties faced by local government in attempting to create and enact digital policies despite funding and staff cuts, and have witnessed how infrastructure providers struggle to navigate complex public sector chains of command and decision making structures. Graham Thrower, Head of Infrastructure and Investment at Urban Foresight, talks to TowerXchange about where he sees the challenges for infrastructure providers, and how both industry and local government can collaborate more effectively to deliver the next generation of infrastructure and services that our cities need.

Keywords: 5G, Business Case, Business Model, Europe, Fibre, Infrastructure Sharing, Lawyers & Advisors, Leasing & Permitting, Regulation, Small Cells, Smart Cities, TowerXchange Research, UK, Urban Foresight

TowerXchange: Please introduce Urban Foresight and the scope of what you do.

Graham Thrower, Head of Infrastructure and Investment, Urban Foresight: We’re a smart city and innovation consultancy, originally born out of an expertise in low carbon mobility and electric vehicles. We have now expanded to encompass an array of technologies considered by urban governments in context of their digital transformation and smart city plans.

To understand how we work, think of a triangle: on one side are entities that have challenges which need solving, they could be in the public or private sector. On the second side we have solutions providers, from the diversified global technology firms to small companies providing data sensors to monitor air pollution. On the third side we have funders: from research organisations financing test beds, pilots, demonstrators and accelerator facilities, through to central Treasury funding, banks, pension funds, Sovereign Wealth Funds, through to infrastructure funds and PE.

Each of these three sides of the triangle speaks a different language and they need someone in the middle translating. We bring problems which need solving together with people who can help them be solved. It could be a large scale, city-wide IoT solution or connectivity technologies such as 5G. Also the work we do around mobility, is not just taking carbon out of the transport network, whether that’s cars, taxis or buses, but also improving the efficiency of mobility; and that is increasingly a data intensive subject.

Read this article to learn:

- How the economics of 5G impact at a municipal and regional level
- The varying approaches of local government to Smart City readiness
- How local authorities are preparing for 5G rollout
- How infrastructure providers can better collaborate with local government
In terms of mobility as a service, we think of ways to make it more efficient: combining journeys, public transport handing off to other forms of transport, EV charging points and the energy infrastructure needed to make that happen. We’ve run a project around assistive technology for vulnerable communities where the technology used could be an off the shelf solution like Alexa or customised platforms from large players to much more niche suppliers. We sit down with clients to understand the issue they have, define the problem, develop the solution to that problem, and then deliver that solution. We don’t just produce research (although we do produce market-leading research) but we work always with the aim of delivering improved outcomes for stakeholder groups in whatever area we’re working in.

TowerXchange: 5G is being discussed in depth at the moment but the use cases which will make the business model work are yet to be made clear. Can you talk us through how you see technology working in the cities of the future? How will the economics of 5G work?

Graham Thrower, Head of Infrastructure and Investment, Urban Foresight: It is challenging in a way that the previous iterations from 2G to 3G to 4G haven’t been. In the past we have seen business cases predicated on selling more services to an existing client base, effectively keeping up with demand. With 5G there’s an element of that. EE have been making announcements about where they’ll put 5G in major UK cities for example and if you unpick that it’s not that different from what a number of MNOs are saying: they’re targeting exiting dense patches of business clients and increasing demands for capacity from personal customers in urban hotspots. Part of what MNOs will do is put in fibre to help meet that demand, which gives you some 5G type connectivity but only in defined hotspots to a defined customer base.

MNOs and infrastructure owners are looking at other easy wins – those cities which have extensive train and subway networks are a logical place to put fibre. In Tyne and Wear, operators can put fibre on the metro and that will get them close enough for quasi 5G connectivity to 40% of the population. But outside of major cities there is a lot of geography and communities without an easy or clear case for 5G. In those cases at the moment we’re seeing various business constituencies which are putting forward their case for needing this connectivity: increasing requirements around supply chain management and business processes using things like immersive technology which needs substantial data-carrying capabilities over a number of parties. But you still have the remaining issue that if you want a fully 5G enabled local authority area then you will have to deal with a lot of marginal areas. Local authorities we’re speaking to are trying to work out how to make it as easy as possible for industry players to deploy 5G. They’re trying to put together packages of owned infrastructure assets, the primary purpose of which at present isn’t telecoms, but so they can be used as part of a 5G network. By packaging and granting access to those, perhaps through a neutral host operator, you can make life easier for other industry players to roll out. We need a combination of working with industry to create use cases to justify spend, coupled with trying to facilitate rollout and make your area easier to work with than others. Even though those use cases aren’t known now people can see what’s coming particularly in areas such as urban focused IoT and preparatory work for autonomous vehicles. The fear cities have is that even if they can’t see the justification now, in five to ten years they may be left behind which will be a constraint on their economic growth.

TowerXchange: You work with local government bodies to help them steer towards the most effective uses of technology – can you talk us through the spectrum of their readiness for 5G and smart city infrastructure? Where do you find most local authorities sit on that spectrum? What are the galvanising factors which help a local authority to prepare more effectively?

Graham Thrower, Head of Infrastructure and Investment, Urban Foresight: We work with cities across continental Europe and through projects with multi-national organisations we work even further afield than that, but our biggest field of expertise is in the UK. Firstly for any of the Tower community dealing with Local Authorities, they’ll realise the incredible complexity of local government in the UK. There are national strategies, not just 5G but industry strategies driving the digitalisation of industry. Then you have Local Authorities, Local Enterprise Partnerships (LEPs), Combined Authorities (such as in Greater Manchester or the North East), elected mayors in some places with varying responsibilities, differing amounts of devolved responsibility and, as a results of the City Deals process, highly variegated levels of control over funding.
All that feeds into two really important things: Local Authorities can have widely differing financial capabilities to deliver Smart City strategies and to be a financial partner with industry. When trying to deal with local government you’ll be looking at different scale as well, so in some places at a combined authority level, at a LEP (Local Enterprise Partnership) level you could have five or six different stakeholders around a table, in other areas you’ll be dealing with just one Local Authority. Each region a potential technology supplier or partner approaches will have a different financial capacity, different responsibilities and different institutional capacity. Austerity has been hitting local government for a while, and in some places considerable amounts of capacity and knowledge have been lost as part of the need to cut headcount, which of course is problematic in terms of 5G rollout which is an enabling tech for cities of the future. You can’t have a smart, sustainable, prosperous city in the future without 5G because the services won’t be able to run. This means 5G strategies tend to need to involve more than just normal technology or IT type people: they will touch on transport, premises and real estate, key industrial sectors, housing etc., and knitting all these together in the past would have been senior people in planning who in the main aren’t there anymore. So, Local Authorities are finding 5G a real challenge and are struggling to decide where it sits.

Your clients will already have seen this, they try to initiate discussions and it quickly becomes clear that the Local Authority hasn’t been able to take a singular view on what their strategy is. In places like London or Greater Manchester they have much more institutional capacity, devolved funding, and the scale to engage with industry in a much more meaningful way, as well as the density of business demand, density of individual demand and scale. The question is: what happens to secondary and tertiary cities and the periphery beyond that?

TowerXchange: What are the key things you advise local authorities to do in order to prepare for 5G rollout?

Graham Thrower, Head of Infrastructure and Investment, Urban Foresight: I think the firstly to work closely and openly with business. To pull together the principal business sectors you already have in your area, for example in the North East of England we have a lot of advanced manufacturing business with complex supply chains, as well strong capabilities in data intensive immersive tech businesses. Then you need to make the business/ecosystem use cases for the sector and for the supply chains within the sector as well. Additionally, some local governments are bundling together Local Authority-owned street assets in a way where they can go to industry players with simplified planning approvals, meaning any assets in this vehicle will have an enhanced planning process and a level of co-operation to make these available.

I also think using the Local Authority as a lead business case in itself is important as well. We are aware that most Local Authorities are looking at a huge digital transformation in their own services, partly driven by the government agenda of doing more with less. It is also driven by realising that social housing, education, assisted technology for the elderly and vulnerable, transport and efficiencies in the way people and goods flow through the city are all drivers of 5G; meaning the most compelling use case is the Local Authority itself.

The enabling power of 5G becomes a recurring theme. Local Authorities can take a strong lead and can work with business, showing they’re really ‘open for business’. Metros or transport systems can be a real enabler for getting coverage quickly, and this, along with creating vehicles for street assets, can make one area more attractive to be part of the early roll out plans versus an area which doesn’t have these things. Most Local Authorities are speaking to large telcos and technology providers more generally, and have also been busy bidding into various government pots of money for testbed status to show they’re open for business. It’s a competitive environment but putting together the regional public sector side is one thing, being a strategic partner for test beds and working closely with business to articulate what the business use case is now and in coming years is critical.

TowerXchange: Our readers are mainly third party infrastructure providers, what would you advise them are the most important steps they can take to work effectively with local government?

Graham Thrower, Head of Infrastructure and Investment, Urban Foresight: I think first of all that the industry players need to recognise this will be a hugely expensive network to deploy. I’m sure they do realise but, if I remember back to the early days of mobile, there wasn’t a great deal of
co-operation unless enforced by regulation. The shared infrastructure model becomes so compelling when you look at the number of sites required for 5G. Part of what confuses Local Authorities is when they’re visited by many individual companies who all seem to be saying quite contradictory things. Of course, it’s a competitive industry and people want to demonstrate why Local Authorities should choose them, but in terms of fundamental infrastructure layout, making the 5G estate most efficient needs to be laid out clearly and consistently by industry. At the moment the local government is struggling to get its head around the business use cases, it shouldn’t need to struggle to know what an optimal 5G network will look like as well. You need to map out roads, rail and existing communications infrastructure. A lot of cities are already digitally rendered by various entities, so you can map all this stuff onto a city, overlay a bundle of assets the Local Authority might make available to a neutral host operator and agree on what that structure should look like. Industry has a huge role to play in getting Local Authorities up that learning curve.

When individual companies are speaking to local government it’s important to try and be open around the business models that industry see and communicate them clearly. Lots of Local Authorities are trying to work out what those business models might be but they’re one step removed and don’t have access to all the current data so, although they’re trying to sit down with business, the real experts are the industry players. I’m not saying businesses need to open up all of their data but perhaps they can give examples of experience in cities where this is starting to happen, what have been the most compelling uses, test beds or deployments in the most busy parts of the city. It’s useful to dig into conversations that MNOS are having with potential future transport providers, communicating what the business cases will be with local government who will be having discussions around smart parking, low carbon mobility, autonomous vehicles and managing traffic flow. The more they can see what is starting to work elsewhere, then Local Authorities can make the case themselves. We do see Local Authorities at some industry events and see some telcos at Local Authority events but I’m not sure the flow of information is all it could be.

TowerXchange: Some of the main challenges faced in planning and rolling out urban infrastructure in Europe are planning and permitting – with this driven to a degree by local populations and a reluctance to see RF devices placed near to homes or schools. Do you envisage this process becoming easier in the future?

Graham Thrower, Head of Infrastructure and Investment, Urban Foresight: I think it’s undeniably a challenge and always has been. The vast majority of research shows there isn’t an issue here, but that doesn’t help in the court of public opinion. Regardless of how easily Local Authorities make bundles of infrastructure available, national planning regulations do allow concerned people or communities to raise objections, and a lot of those aren’t going to be addressed or shifted by published research. People can tell school trustees it’s safe to have a mast on the school roof, it doesn’t mean they’re going to agree it.

These are real world problems. When I was financing large scale mobile rollouts (primarily in the UK and Continental Europe) this was a real factor. It caused delays in civil works, which affected network capacity and had a knock on effect on revenues. Industry needs to continue to reach out to the public and local government to try and provide reassurance. The danger is that if we don’t, then areas where learning is critical won’t be covered as effectively as they should. It would be a shame if schools and colleges are left among the weaker areas of coverage. I’ve not seen any concerted and successful attempts by the industry to address this in countries like the UK which have a culture of people protesting planning approvals. I think businesses engaging with schools and colleges and perhaps having someone come along and contribute to something like a science challenge in a school can help. People are used to 4G and know the value of being in coverage. 5G will enable them to do so much more but will mean being always in reach of the infrastructure needed to provide the connectivity. People are now more comfortable with living in a networked society than they were 10-15 years ago and, if it makes people’s lives easier, then it will break barriers down.

As always, both for those who govern our cities and the Tower community and other technology providers, it comes down to open communication and early and meaningful engagement with all stakeholder constituencies. We look forward to working with all sides of this challenge to help facilitate this next generation of critical enabling connectivity. ■
Wireless Infrastructure Group - hungry for growth

The UK’s largest pure play independent towerco continues its long run of entrepreneurial growth

Over the last ten years Wireless Infrastructure Group has strived to maintain excellent service to its customers whilst expanding its range of infrastructure solutions. With a leading position now established in the UK indoor neutral host sector and a growing portfolio of fibre-connected small cells under its belt, WIG now turns its attention to opportunities for both organic and inorganic growth in 2019. TowerXchange spoke with CEO Scott Coates to find out more about what the company has planned.

### Keywords

- 4G
- 5G
- Acquisition
- Arqiva
- C-Level Perspective
- DAS
- Densification
- Europe
- Fibre
- IoT
- Ireland
- Netherlands
- Project Finance
- Sale & Leaseback
- Small Cells
- Smart Cities
- Towercos
- UK
- Wireless Infrastructure Group

Read this article to learn:

- How WIG’s activities in 2018 have positioned them for growth
- The advantages of medium scale in delivering DAS projects
- WIG’s methodology and plans for future growth
- Potential changes and shifts in the European tower market

TowerXchange: Can you update us on where Wireless Infrastructure Group is right now?

Scott Coates, CEO, Wireless Infrastructure Group:
We are now organised clearly into three distinct units: Towers, Indoor Networks (which incorporates our established DAS business but operates with a far broader scope) and Strategic Projects, which includes longer range opportunities such as fibre, smart cities and transport-based developments such as the Transport for London (TfL) project.

Through these business units, our core strategy remains the same as it has been for many years - to keep improving the quality of service for our customers and to add to our base of high-quality infrastructure through new construction and selective M&A.

Our business operations platform is very well established with many of our team having been together for a decade or more running independent wireless infrastructure in the UK. This is a key asset for our business, and we continue to develop it alongside our processes to lead the sector on infrastructure and service quality. A good example of this is the early investment we made in implementing Sitera in our back office to become the first European towerco with this capability.

WIG is primed and more capable than ever to manage a significant step up in tower ownership and operation.

TowerXchange: Tell us about your expansion plans for 2019.
Scott Coates, CEO, Wireless Infrastructure Group: We are looking to grow through new infrastructure construction and through M&A.

We secured significant new long-term debt facilities in the second half of 2018 which gives us plenty of firepower for the right M&A targets and our organic growth plans.

We have a very full pipeline of Indoor Networks projects. We now work with 20 of the UK’s largest 30 shopping centres, a growing number of iconic stadium venues such as Anfield, Lord’s and BT Murrayfield, and large campuses such as King’s Cross, MediaCityUK and Canary Wharf. Across our Tower portfolio, we’ve recently completed a build-to-suit (BTS) programme which is a relatively new model in the UK – we have the capacity and desire to do more of these kinds of programme.

On the M&A front we have maintained our disciplined approach to transactions and during 2018 we completed a number of transactions including the acquisition of a new tower portfolio in Ireland and a portfolio of DAS assets from Arqiva. We will continue to look at most deals in the market but believe there is a creeping tendency for over-heating in some assets that may not be strategic enough to merit it.

Our key priority on M&A is to position ourselves for any opportunities from a major divestment of tower assets by UK MNOs. The UK needs a proper scale rival to Arqiva in the independent infrastructure space and with over 10 years’ experience in the UK market and a well-invested platform we know WIG would be a great partner for a strategic deal that could be transformative in the UK market.

TowerXchange: What about your indoor connectivity business? Tell us about your recent acquisition from Arqiva.

Scott Coates, CEO, Wireless Infrastructure Group: Our Indoor Networks business is mainly an organic story but the Arqiva acquisition represented a strategic opportunity for our growth ambitions in this space.

One thing we find with Indoor Networks is that they often demand a bespoke solution with a hands-on approach to getting deployment delivered. For bigger wireless infracos, even a large stadium network doesn’t shift the needle enough to really command the attention required to make the project work well. WIG has around £500mn of wireless infrastructure assets and we can still get excited about the intricacies of indoor projects and the entrepreneurial approach required to make them succeed. The deal with Arqiva involved 42 systems and the attraction for us was more around the opportunity to really invest behind the portfolio to upgrade and extend these systems. We were also pleased to secure the transaction in an off-market process that benefitted both sides.

We have been developing Indoor Networks for nearly seven years now and have made some real changes to the way the market works here in the UK. The old model involved real estate owners demanding significant payments to allow infrastructure to be deployed in their venues. A lot of our up-front work with venue partners is to illustrate the benefits of great connectivity in terms of customer experience and engagement.

Today the model in the UK has completely shifted and we see more of our venue partners actively
participating in infrastructure costs to secure the best possible network. We are pleased to have played a leading part in that. Moving forward the opportunity is to deploy high quality 4G infrastructure into medium sized buildings like offices and hotels under a model that sees the venues and real estate owners pay for the infrastructure as a service rather than the MNOs.

TowerXchange: What’s happening with your developmental projects?

Scott Coates, CEO, Wireless Infrastructure Group: On the back of our first fibre and CRAN deployment last year, our next project of scale is in Birmingham and Coventry, where we are the wireless infrastructure partner to a programme testing connected and autonomous vehicles. We are planning a major investment into fibre deployment to support small cells on lampposts and to create a backbone infrastructure for future expansion. We still view fibre as exploratory – the volumes for small cell rollout in the UK are still thin, with only a handful of trials and a few pockets of deployment. We are a long way from the US market take up of small cells.

We have a handful of other strategic projects in the transport sector, and are also a shortlisted bidder (the only British provider, in fact) for the TfL project to deploy DAS on the London Underground and deploy fibre across TfL’s London asset base. Whilst this is an important opportunity to extend our DAS activities it will only work, in our view, if TfL follows the approach taken elsewhere in the market to help manage the affordability of the infrastructure to the MNOs. If the commercial model is wrong then we risk a similar outcome to the Toronto metro which has suffered from minimal MNO take up and sub-optimal wireless experience for end users. Great connectivity on the Underground can help stem a decline in passenger numbers and improve productivity and so there is a lot at stake.
Europe 2019: TowerXchange forecasts a dynamic year
Sale and leaseback, consolidation and operational complexity anticipated for 2019

Despite 5G use cases being thin on the ground, both towercos and MNOs are beginning to make significant changes to their organisations in order to position themselves to capture the nascent value in the impending ‘fourth industrial revolution’ and to minimise the cost of infrastructure rollout. TowerXchange predicts a busy 2019 for European towers, from carve outs and tower sales to a much sharper focus on managing opex through data generation and analysis. Business models will continue to multiply, with state players entering the market, MNOs creating more towercos and investors keen to deploy capital into this growing asset class. In this article we highlight some of the major changes we predict for 2019, and assess some of the drivers behind them.

**Keywords:** 5G, Acquisition, Active Infrasharing, Arqiva, Business Model, CTIL, Carve Out, Co-locations, Densification, Europe, Europe Insights, Fibre, Infraco, Infrastructure Sharing, Investment, IoT, Market Overview, Masts & Towers, Operator-Led JV, Sale & Leaseback, Small Cells, Smart Cities, TDF, Telenor, Telia, Valuation, Vodafone

**Read this article to learn:**
- Which MNOs are carving out towers and what they might do with them
- Where market consolidation is likely, and where new players are entering the market
- Likely exits for European towercos in 2019
- Operational pressures and how tower owners are driving efficiencies in Europe
- New structures and models for towercos in the face of 5G rollout

**Next steps for Europe’s indebted MNOs**

With European MNO still struggling under the pressure of debt, and investor confidence remaining shaky, operators are evaluating their options and exploring how they can monetise their passive assets. Recent 5G auctions in Italy saw MNOs bidding as much as €6.5bn for spectrum, and the burden of rolling out 5G infrastructure is making operators question the economics of the 5G model.

With this in mind, towercos can offer MNO solutions on two fronts: firstly, through the acquisition of their existing macro infrastructure, offering both the chance to release capital and the conversion of capex expenditure into more predictable opex commitments. Secondly, towercos can position themselves as neutral hosts for the rollout of 5G infrastructure, accessing their own capital to build new infrastructure and allowing MNOs access to a more efficient, shared network rather than creating four parallel sets of infrastructure, as was often the case in the creation of macro networks in the 1990s.

However, European MNOs are keen to retain control of their assets and we’re seeing a proliferation of MNO-captive towercos being created, with more expected in 2019. In addition to the long established Deutsche Funkturm (Deutsche Telekom’s captive towerco in Germany and, more recently, the Netherlands) and Global Tower (Turkcell’s captive towerco in Turkey),
we saw Telecom Italia create and IPO towerco INWIT in 2015 as well as Telefónica carving out their German and Spanish towers (plus towers in LATAM COUNTRIES and subsea cable), 49% of which was sold to KKR in 2017 for €1.3bn.

Most recently, Altice created two SPVs in 2018: Hivory (the new name for SFR Towerco) in France; and Towers of Portugal in Portugal, of which Altice sold 49% to KKR and 75% to Morgan Stanley and Horizon Equity Partners respectively.

The trend could well continue into 2019. New Vodafone CEO Nick Read has stated that the British giant is in the process of creating a ‘virtual tower company’ with a dedicated management team as

**Figure One: European MNO debt (Net debt/EBITDA)**

<table>
<thead>
<tr>
<th>MNO</th>
<th>Ratio</th>
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<tbody>
<tr>
<td>Telecom Italia</td>
<td>3.1</td>
</tr>
<tr>
<td>KPN</td>
<td>2.7</td>
</tr>
<tr>
<td>Telefónica</td>
<td>2.7</td>
</tr>
<tr>
<td>Deutsche Telekom</td>
<td>2.4</td>
</tr>
<tr>
<td>Vodafone</td>
<td>2.3</td>
</tr>
<tr>
<td>Orange</td>
<td>2.2</td>
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<tr>
<td>Telekom Austria</td>
<td>2.0</td>
</tr>
<tr>
<td>Elisa</td>
<td>1.8</td>
</tr>
<tr>
<td>Swisscom</td>
<td>1.8</td>
</tr>
<tr>
<td>BT</td>
<td>1.6</td>
</tr>
<tr>
<td>Proximus</td>
<td>1.1</td>
</tr>
<tr>
<td>Telia</td>
<td>1.1</td>
</tr>
<tr>
<td>Telenor</td>
<td>1.0</td>
</tr>
</tbody>
</table>

**Major European towerco equity deals and listings since 2016**

<table>
<thead>
<tr>
<th>Year</th>
<th>Seller</th>
<th>Entity and # towers</th>
<th>Buyer/Stock Exchange</th>
<th>Equity%</th>
<th>Deal value in €</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>Telefónica</td>
<td>Telxius 16,000</td>
<td>Pontegadea</td>
<td>10%</td>
<td>379,000,000</td>
</tr>
<tr>
<td>2018</td>
<td>Altice</td>
<td>SFR TowerCo 10,198</td>
<td>KKR</td>
<td>49.99%</td>
<td>1,799,000,000*</td>
</tr>
<tr>
<td>2018</td>
<td>Altice</td>
<td>Towers of Portugal 2,961</td>
<td>Morgan Stanley and Horizon Equity Partners</td>
<td>75%</td>
<td>495,000,000*</td>
</tr>
<tr>
<td>2017</td>
<td>Telefónica</td>
<td>Telxius 16,000</td>
<td>KKR</td>
<td>40%</td>
<td>1,300,000,000</td>
</tr>
<tr>
<td>2016</td>
<td>American Tower</td>
<td>American Tower Germany 2,197</td>
<td>PGGM</td>
<td>49%</td>
<td>Undisclosed</td>
</tr>
<tr>
<td>2016</td>
<td>Antin Infrastructure Partners</td>
<td>Axion 584</td>
<td>AMP Capital</td>
<td>100%</td>
<td>Undisclosed</td>
</tr>
<tr>
<td>2016</td>
<td>New equity investment</td>
<td>Wireless Infrastructure Group 2,000</td>
<td>3i Investments</td>
<td>Undisclosed</td>
<td>300,000,000</td>
</tr>
<tr>
<td>2015</td>
<td>Telecom Italia</td>
<td>INWIT 11,200</td>
<td>MIB</td>
<td>40%</td>
<td>875,300,000</td>
</tr>
<tr>
<td>2015</td>
<td>Abertis</td>
<td>Cellnex 15,091</td>
<td>MCE</td>
<td>66%</td>
<td>2,138,000,000</td>
</tr>
<tr>
<td>2015</td>
<td>Coillte</td>
<td>Telecoms assets 300</td>
<td>InfraVia Capital Partners</td>
<td>100%</td>
<td>70,000,000</td>
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*estimated  Source: TowerXchange
he attempts to reduce operating costs by €1.2bn by 2021. Read’s suggestion of partnering with a towerco may be well received, but suggestions Vodafone might sell a minority stake in the towers will most likely leave the towercos with the digestive capacity to get on board cold, particularly in light of IFRS 16 regulation and the needs of towercos such as Cellnex or American Tower to control their own portfolios. We’re therefore more likely to see Vodafone entering into a deeper agreement with one or more towercos across Europe, or looking for a financial investor who will be happy to settle for a 49% stake in the new towerco. With KKR already holding minority stakes in 16,198 European towers across two portfolios, there’s no doubt there could be appetite for more.

While MNOs such as Duetsche Telekom and INWIT have already spun off their towers into new entities, we may begin to see captive towercos coming to market. Telecom Italia already kicked the tires of a sale of their 60% stake in INWIT in 2016, but postponed (at the time saying 2019 seemed like the optimal time to sell). With internal politics between Vivendi and Elliott possibly driving a very infrastructure-light model, we may see this parcel of towers coming to market in 2019 as well, an rumours of Deutsche Funkturms coming to market have sprung up several times over the last few years.

In Italy, Three is looking to sell ~7,000 towers and rumours abound that they may divest towers in others European countries as well. Telia has also carved out its own towerco, and we believe Telenor may be doing the same – all vehicles which can help MNOs to manage their portfolios more effectively, but in light of IFRS 16 they may become more effective in terms of managing cost of sold to a majority partner.

There will be no shortage of MNO towers moving balance sheets in 2019 – but exactly whose balance sheets they move onto remains to be seen.

**More activity from international towercos in Europe and increased market consolidation**

In 2018, Digital Colony entered the European market. Hoping to replicate their investment platform model which has worked so successfully in the USA and Latin America, they acquired Finnish Digita and UK indoor service providers OpenCell and Stratto over the course of just five months. Highly acquisitive and dynamic, we anticipate Digital Colony will make further acquisitions in towers, fibre and communications infrastructure throughout 2019.

American Tower, whose operations have remained fairly low key in Europe since the acquisition of French FPS Towers in 2017, have recently undergone a management reshuffle, placing Julian Plumstead, former Managing Director at Rothschild, as the new CEO of Europe. With so many potential opportunities to both consolidate towerco portfolios and acquire towers from MNOs in 2019, we expect American Tower to play a more active role in 2019 processes and to expand their European portfolio through strong deals with high profile counterparties.

In a recent interview with Tobias Martinez, CEO of Cellnex, he stated that Cellnex are looking to consolidate their portfolios in the Netherlands and the UK, so we can expect Cellnex to be actively looking for acquisitions in these markets, as well as their other primary target markets including Portugal, Ireland, Belgium, Germany and Austria (Target Markets i: Cellnex Annual report 2017)

We expect to see an increasing amount of towerco consolidation in 2019, with markets such as Ireland, where there are eight towercos or JVs active in the market, ripe for acquisitions.

**New towercos enter the market**

Despite the high number of towercos in Europe, we are seeing new ventures launching as well, headed by experienced tower professionals who believe they can fulfil needs that have not been met by the current players.

One such towerco is Atlas Tower Group, launched in the UK by a team with a background on the MNO side of the fence: CEO Russell Jeffries has held various roles at MBNL, Vodafone and Three, and has a vision for a flexible, dynamic towerco which offers a build to suit solution for UK MNOs. From the Altice deals, Portuguese OMTEL also launched
in 2018, with 2,900 towers across the country and plans for more and Altice/KKR towercos Hivory is bringing a further 10,198 towers for colocation in France.

Return of the IPO?

With IPOs shelved by Arqiva and Global Tower in the last three years in Europe, 2018 saw three African towercos (IHS, Eaton and Helios) prepare and fail to float their businesses. The only listed company fluctuation in Europe in 2018 was EI Towers’ de-listing, undertaken as part of a plan to try and acquire broadcasting competitor Rai Way.

We expect to see more IPO attempts, and successful ones, in 2019. Global Tower’s expanded and ambitious plans to consolidate towers in Turkey will possibly see them engage with a minority investor prior to another IPO attempt, but their need for a more diverse ownership in order to build value as an independent player is clear. Arqiva has spent the last 18 months putting together new partnerships, refining their value proposition and posting consistently positive results, which will stand them in good stead for another run at a floatation. With the TDF process also ongoing, we may well see Arqiva’s French counterpart considering an IPO if the sale process fails to meet valuation expectations.

Increases in operational challenges and complexities

As the European tower market matures and towercos look to manage costs, the effective deployment of capex and tighter control of opex will become more and more critical. From delivering consolidated backup power solutions for tenants whose networks form a part of critical national infrastructure, to managing a tenfold increase in points of presence as small cells roll out, towercos will need to manage their assets more closely in order to improve EBITDA as their model moves away from ‘real estate’ and towards ‘service’.

In addition to managing existing portfolios, regulations and operational challenges around urban infrastructure will change the cost structure of small cell roll out, bringing new service providers into the ecosystem and driving a leaner model which will be driven by new partnerships. Permitting, power, accessibility and access to fibre will all become critical components of small cell rollout, while the technical and engineering services needed for macro networks will become less relevant to newer, denser urban networks.
Since the capex-heavy days of the 90s and early 00s, when MNOs rolled out their networks, European infrastructure has tended to need little investment beyond some infill and expansion. However, this will need to change dramatically over 2019 and 2020 as infrastructure owners prepare for 5G rollout. Many industry commentators have stated that the infrastructure needs of moving from 4G to 5G won’t be simply a case of adding a few towers; the investment and reach needed will more closely mirror the initial network rollout of 20 years ago. TowerXchange’s own research discovered that 51,500 new towers are planned for construction in Europe over the next five years, and a further 180,000 towers will need to be reviewed for their suitability for 5G equipment, with significant upgrade work required.

Finally, towercos will need to be able to generate, manage and interpret huge amounts of data from across a burgeoning number of sites in order to maximise the value of their portfolios and provide the depth of service their customers will demand. Effective platforms which will help to manage and analyse data will become more and more critical as we move through 2019.

**New stakeholders entering the infrastructure landscape**

Could 2019 see greater state involvement in European towercos? As 31.9% owner of Deutsche Telekom, the German state is a de facto minority owner of Europe’s biggest towercos, Deutsche Funkturm, and Norwegian Telenor, who have been rumoured to be carving out towers in Europe and Asia, is 54% owned by the Swedish government. However, we may be about to see a more conscious move by governments to enter telecoms infrastructure, perhaps to harness a highly successful growth industry, or perhaps to allow them to push rollout in directions which are believed to be beneficial for government goals.

Most notably in Europe, Rostelecom, Russia’s state telecoms provider, has recently expanded ambitiously into digital services. Owners of Russia’s fixed line network, they are already the biggest fibre owner in Russia, also offering datacentres and digital solutions. Their recently announced ‘Strategy 2022’ sets out Rostelecom’s digital transformation from a telecoms operator into an IT-company, servicing retail, business clients and the Russian Government. Already over 50% of the Rostelecom’s revenue comes from digital and content services, internet access, pay TV, cloud-based solutions, data centres, cybersecurity and other services, and now they are undergoing significant organisational changes internally to reflect their new focus. Rostelecom is establishing new teams and centres of excellence created to boost key focus areas, such as biometrics, cybersecurity, IoT and smart homes.

Owned by the state-owned Bank for Development and Foreign Economic Affairs and the Federal Agency for State Property Management, this state-owned organisation owns 45% of Tele2, giving it substantial interests in wireless telecommunications infrastructure as well as access to Russia’s broadcast towers.

To date, only Rostelecom and Russian MNO MegaFon have access to Russia’s 5G spectrum, with MegaFon trialling 5G in Moscow and St Petersburg.
in 2018, and Rostelecom doing the same with partners Nokia and Ericsson in different locations.

Rostelecom owns much of the infrastructure needed to support 5G rollout but only owns a handful of high towers, lacking the wireless infrastructure needed for 5G. Their stake in Tele2, which owns ~9,000 towers in Russia, could be augmented to a controlling stake of around 55% through the transfer of assets from Russian banks and insurance companies, which would effectively make Tele2 the mobile wing of Rostelecom, and give them access to towers in Moscow and St Petersburg.

The option which would give Rostelecom national reach, however, would be to acquire the ~15,000 towers which MegaFon claims to be bringing to market, or to do a deal to work collaboratively with MegaFon in order to use their infrastructure. Combining the towers of Tele2 and MegaFon could result in a network of ~24,000 towers across Russia, which, combined with Rostelecom’s existing fixed line network, data centres and infrastructure, would put them significantly ahead of any one of the European tower cos focussed on preparing for 5G rollout.

In Turkey, where the only towerco to gain scale in recent years has been TurkCell’s carve out, Global Tower, PTT, the Turkish Ministry of Transport and Infrastructure group company, has established a new tower arm, PTT Kule, which will allow the Turkish government to capitalise on the ownership of tower infrastructure in Turkey, as well as creating some of the most impressive pieces of infrastructure in the world. With a 369m tower under construction in Istanbul, which will provide space for 80 broadcasters and all three Turkish MNOs as well as ISPs, IoT providers and other wireless service providers, PTT is already throwing a lot of capex at Turkish infrastructure. However, with several thousand towers currently managed by Turkish MNOs due to revert to government ownership in 2022, and over 3,500 towers rolled out in rural areas as part of the state-mandated Universal Services Project, there are plenty more opportunities for PTT Kule to reach significant scale very rapidly.

**Looking ahead**

While 2019 will be a busy year, we expect the pace of evolution in the European market to accelerate into 2020 and beyond. As 5G economics are proven through demonstrated use cases, technology is refined and business models for tower cos become more evident, we will see more tower owners following the first movers in diversifying their portfolios and delivering a full range of communications infrastructure services, not just to MNO partners, but to a greater number of relevant parties. €100s of millions will exchange hands in 2019 as investors, tower cos and MNOs strive to find the optimal landscape from which to grow European 5G infrastructure efficiently, quickly and collaboratively.
How to determine the tenancy lease-up potential, and value, of sites coming to market in France

Automating the analysis of over 50,000 cell sites in France

France has seen multiple tower transactions and tower investments, and rumor suggests further portfolios of assets are coming to market. This article uses France as a pertinent example to illustrate how crowdsourced business intelligence can rapidly enhance prospective investors’ understanding of the tenancy lease-up potential of sites in France – or any other country.

Keywords: Co-locations, Data Collection and Utilization, Due Diligence, Europe, France, Investment, M2Catalyst, Research, Site Level Profitability, Tenancy Ratios, Tower Count, Valuation

Read this article to learn:
- The proportion of France’s that are self-supporting macros, monopoles, rooftops and alternate site typologies
- How to leverage AI and data science to add extra layers of insight to due diligence
- How M2 can determine the Tenancy Lease-Up Potential of all 50,000 of France’s sites in a matter of days
- How to identify where Free’s network is poorest, thus which sites they are most likely to co-locate
- How the M2 platform can also identify opportunities for IBS and the deployment of small cells along fiber routes

TowerXchange: Please reintroduce M2Catalyst and Crowd SiteIntel for any readers not yet familiar with your unique capabilities.

Mike Brough, CEO, M2Catalyst: The Crowd SiteIntel Business Intelligence Dashboard (CSI-BID), automates the process of benchmarking the network performance of all MNOs in the market, around any site, whether it is a macro tower, monopole, rooftop, alternative site, small cell or indoor DAS system.

Traditional drive and walk testing for analyzing the Tenancy Lease-Up (co-location) potential of cell sites can be very time consuming and expensive. CSI-BID automates the process of analyzing the co-location potential for non-tenants on each site, offering critical insights to investors, buyers and sellers of tower and small cell portfolios. Comprehensive reports covering portfolios of tens of thousands of towers can be delivered just a few in days.

Crowd SiteIntel is a mobile business intelligence platform driven by contributions from millions of mobile phone enthusiasts. The crowdsourced contributions abide by strict privacy laws. CSI-BID has trillions of data points instantly available across 200 countries.

TowerXchange: What can you tell us about the towers, rooftops and other points of service used by MNOs in France?

Mike Brough, CEO, M2Catalyst: In France, there is a publicly available database called ANFR, to which
all investors have access, which is a primary source of information when considering investing in sites.

Where M2Catalyst excels is in the use of algorithms, AI and data science to layer additional insights on top of this publicly available data. Leveraging billions of recent network performance measurement readings in France, M2Catalyst benchmarks the performance of over 50,000 sites, enabling the speedy analysis of target investment sites in relation to neighboring/competing sites. The ANFR database also identifies site types, finding 22,400 self-supporting macro sites, 5,400 monopoles, 10,100 rooftop sites and a variety of alternative sites. The analysis from M2 is adjusted based on the site type because the coverage area of a macro site is very different from that of a small cell, rooftop, or other type of sites.

**TowerXchange: With more sites coming to market in France, how can prospective bidders determine the value of those sites?**

**Mike Brough, CEO, M2Catalyst:** The value of sites has been calculated in the same way for years, using traditional metrics such as the fiber access, height of the tower, the term of the land lease, distance to the nearest competing tower, et cetera – essentially a standard brick and mortar analysis. Crowd SiteIntel adds layers of additional insights into the valuation equation by crunching massive amounts of data to determine the tenancy lease-up potential of each site.

In a four MNO market, what is the probability that a
non-tenant will lease space on a given site? What is
the amount of mobile usage on this site versus other
sites? How much mobile data is being used? What is
the network performance of each MNO within 100
meters, 250 meters, 500 meters, 1KM, 2KM or other
ranges from the site? How is the site performing
for current tenants at all these ranges? Figure
three shows the benchmarking of readings within
100 meters of each rooftop site in this Marseille
neighborhood. The one site circled in blue has three
MNOs with poor performance within range, thus
has high Tenancy Lease-Up Potential.

**TowerXchange: What is the ANFR database, and
what insights can you add beyond that?**

**Mike Brough, CEO, M2Catalyst:** In France, each time
a new tower, rooftop, small cell or any other type of
site is deployed, the details of that deployment must
be entered into the ANFR (L’Agence nationale des
fréquences) database, which is publicly available.
There are over 400,000 entries and more than
50,000 locations in the database, with details such as
the mobile network operator, whether the antenna
is 2G/3G/LTE, the band channel, site type, and more.
In the Crowd SiteIntel database for France, there
are 2,689,695 unique Cell ID’s across 2G, 3G, and
4G-LTE.

When you combine the ANFR data with the Crowd
SiteIntel data, the insights from the automated
reports from M2 grow exponentially and can, in
fact, be delivered in days. For example, a very
common question regards the range of each cell
tower. The Crowd SiteIntel dashboard answers
this with its Cell ID coverage maps, which look at
each Cell ID or Band Channel for each antenna
separately. For each Cell ID, where does coverage
break down or transition to another site? Crowd
SiteIntel can answer these questions and many
more.

**TowerXchange: Can you share an example of
what the tenancy lease-up potential report
actually looks like, and the kinds of insights in
can generate using an example city?**

**Mike Brough, CEO, M2Catalyst:** See figure four. The
Tenancy Lease-Up Potential (TLUP) reports provide
automated benchmarking of all the sites in the
target investment portfolio and the neighboring
sites. In the case of France, we can provide reports
in days across more than 50,000 sites. The reports
will provide an executive summary for each site
type and then the details of all the readings within
multiple ranges of the site.

**TowerXchange: MNO Free will be a key driver
of growth for towercos in France, because they
need to acquire thousands of sites as their
roaming agreement ends. How can you model
the specific needs of Free?**

**Mike Brough, CEO, M2Catalyst:** The Crowd SiteIntel
dashboard enables the isolation of single MNOs to
quickly identify all the coverage gaps.
For example, there are over three million readings for Free in Marseille, with 42% of those readings being poor. Each tile on the map below represents the average reading in a transparency, so the darker red tiles reflect areas where Free has the greatest number of very poor network performance measurements while the dark green show where the Free network performance is very good. This process of identifying where Free has poor network performance within range of one of the 50,000+ sites in France can be automated through the TLUP reporting.

TowerXchange: Beyond the Tenancy Lease-Up Potential report, how can M2Catalyst help towercos understand opportunities to expand not just outdoor coverage, but indoor too?

Mike Brough, CEO, M2Catalyst: The crowd SiteIntel dashboard has benchmarking tools to create polygons around any park, city street, and right down to smaller sections of buildings.

TowerXchange: If a client were able to provide you with the locations of metro fiber rings and last mile fiber in France, how would you be able to leverage that data to forecast demand for sites at specific locations along those routes?

Mike Brough, CEO, M2Catalyst: For fiber ring and last mile analysis, we load hundreds or sometimes thousands of potential sites along the fiber, sometimes just 100 meters apart. Then each proposed site is automatically analyzed for Tenancy Lease-Up Potential Benchmarking for each MNO in the market. Sometimes a minor site adjustment of
The XLS below shows a series of tabs across the bottom, each with a different set of ranges for each site type. These distance and dBm ranges are adjustable for the reports.
100 meters can have a significant impact on MNO coverage. Then a TLUP report can be automatically generated to benchmark each potential site location along the fiber line, to identify how many multi-tenant locations can be placed, prior to building sites (or buying or building the fiber ring).

TowerXchange: Finally, we’ve used France as an example, but please sum up how M2Catalyst can be used to provide unique insights to inform any sale or investment in cell sites.

Mike Brough, CEO, M2Catalyst: There are three ways in which M2 can help with a tower investment analysis:

- Quick standardized Tenancy Lease-Up Potential benchmarking reports can be delivered in days, across portfolios of 50,000 or more sites.
- Access to the Crowd SiteIntel dashboard can be provided within 24 hours. This enables more in-depth customized analysis, varying dBm ranges for Signal Strength, Quality and Signal to Noise ratio. Analyzing data consumption trends in proximity of each site, Cell ID and Band Channel mapping, indoor versus outdoor network performance, and more.
- In addition, M2 can provide consulting services if further acceleration of deeper site portfolio analysis is required.

For more information, email: info@m2catalyst.com
The operational challenges of urban 5G rollout

No clear pathway to ‘ideal’ infrastructure scenario yet

As the buzz around 5G grows and trials of the technology increase across Europe, MNOs, towercos and other neutral host providers are faced with the real challenges of providing the complex and dense infrastructure that will be needed to support the cities of the future. In European markets, where regulation can be set on national, regional or EU-wide scales, infrastructure operators will find themselves picking through a quagmire of bureaucracy and operational challenges to roll out at scale. Even where trials and small-scale rollouts have been successful, the management fire power needed for negotiations and navigating tricky relationships could escalate broader rollout costs beyond the realms of feasibility. Making the jump from our current reality to the vision of Smart Cities with millions of IoT connections and smart, connected transport will demand a significant shift in the way infrastructure is owned, managed and rolled out.

Keywords: 5G, Co-locations, DAS, Europe, Europe Insights, Fibre, Infill, IoT, Multi-Operator, Off-Grid, On-Grid, Outdoor Equipment, Small Cells, The Future Network, Urban vs Rural

Read this article to learn:
- The hold ups caused by 5G economics
- Where and how infrastructure owners are struggling with power in urban areas
- How the need for fibre is being addressed
- Challenges around permitting and regulation

5G economics

The lack of clarity around 5G economics is one of the biggest hurdles for infrastructure owners of all types. Mobile network operators who shouldered the cost of infrastructure and spectrum needs for 3G and 4G have found much of the benefit of these technologies snapped up by OTT players whose investments in infrastructure have been very much on their own terms. As 5G is presented as a ‘revolution’ rather than an ‘evolution’, indebted MNOs are naturally very cautious to leverage further without a clear picture of where the returns will lie.

Sitting in the balancing point between mobile network operators’ fear of over committing and their need to capture the nascent gains which 5G presents are the neutral host operators. Towercos, fibrecos and other communications infrastructure providers have the ability to roll out one set of neutral infrastructure for use by three or four mobile network operators and their access to relatively cheap capital makes the business case much more compelling. However, whether infrastructure is rolled out by MNOs or neutral host operators, rollouts face operational complexities around densifying infrastructure by as many as 10x points of presence for every one currently in existence, particularly in urban areas.

Powering urban infrastructure

Although power might not be the first challenge which comes to mind when thinking of urban
rollout, it’s a more significant challenge for infrastructure owners than you would expect.

Outdoor small cells will be connected by fibre, so in most cases power will have to be transmitted by a discrete power grid connection. Although bringing fibre to outdoor locations has its own challenges, connecting to the grid is more dangerous and therefore even more strictly regulated, both in terms of how the cabling is laid and how access to the site is managed. For infrastructure owners, dealing with national grids on a strategic basis is tricky: most of Europe’s power grids are facing more immediate challenges in terms of upgrading ageing infrastructure and supplying mounting demands from both industry and population, the idea of providing hundreds of thousands of new connections for 5G infrastructure is not yet a priority for them.

In many cities, this problem can be circumvented by attaching smart antennas to street furniture, which has a pre-existing power supply. Lamp posts are the most common piece of street inventory used for small cell rollout, but many European lamp posts are on a passive system, with no power supplied to the poles during the day, when of course small cells will be working hardest. At this point, two additional problems present themselves: 1) existing lamp posts are often not structurally able to support small cells and 2) in many countries local government has a specific negotiated rate with electricity providers which would preclude them from allowing any third party access to the grid via their assets.

New smart poles can help to navigate these issues on many fronts, providing integrated real estate for small cells and offering access to power on a 24/7 basis. These smart poles will revolutionise the way infrastructure owners can access both space and power in urban areas, but there is still work to be done in terms of defining who will bear the cost of rolling them out on a large scale.

In order to power their urban infrastructure, MNOs and neutral hosts must either find a route to power that bypasses the grid (which is only applicable in some circumstances) or navigate a route through various relationships and entities in order to obtain reliable and constant grid access. While deploying the relevant managerial and legal fire power to obtain agreements with local government, power providers and other stakeholders has worked well for pilot schemes and small scale rollouts to date, the cost of management time needed to replicate these deals on a nation- or continent-wide scale would render small cell rollout unfeasible.

**Access to fibre**

For many towercos and MNOs rolling out small cell networks, one of the biggest issues they face is accessing fibre. Although we are seeing huge
amounts of fibre being rolled out in Europe, many fibrecos are focusing heavily on the immediate need of Fibre To The Home, Premises or Enterprise. While more fibre in the ground offers a better opportunity for connectivity, the technical and commercial specifications of much of the fibre being laid today don’t match the needs of small cell nodes.

For small cells to work, fibre needs to be configured specifically as a part of wireless communications infrastructure, which means MNOs and towercos either need to work in close partnership with partners in the fibre space or own their own fibre. To date, towercos in Europe have been exploring different models that will allow them access to fibre to facilitate their urban rollout while maintaining a level of ownership or control over the critical infrastructure, which will maintain their value.

Cellnex, always a market leader among European towercos, has taken the first steps in owned fibre, with the acquisition of Xarxa Oberta de Catalunya, 3,000km of fibre in Spain in 2018. As with their acquisition of CommsCon in Italy in 2015 and Alticomin in the Netherlands in 2017, Cellnex’s choice to acquire Xarxa de Catalunya is as much about onboarding expertise and experience as it is about owning the physical infrastructure owned by their acquisition. And with over 25,000 towers across six countries, it seems likely that Cellnex won’t rely on just one model for fibre access across all of Europe.

Spanish towercos Axion in Spain and Arqiva in the UK have taken a different tack, forming partnerships to gain access to fibre for their customers. In Axion’s case their new joint venture with Spanish utility Enagas, Axent, will offer 4,600km of dark fibre for their own rollouts, and also to commercial partners in the telecoms community. Arqiva’s deal with CityFibre provides 15km of dark fibre in London to facilitate the UK’s largest pilot of 5G ready small cells. MNOs Three and Telefónica have also moved into partnership with SSE, using London’s sewer system to provide fibre backhaul ahead of 5G rollout.

**New service providers**

As small cells roll out on larger and larger scales, towercos and MNOs must also form relationships with new service providers who can deliver a cost effective street-level service for operational and maintenance needs. Rather than the skilled engineers who work at height on macro towers, small cell operations will necessitate a new type of managed service provider, who can reach urban sites quickly, comply with local government stipulations in terms of street works and have their own relationships with local councils. As small cells move towards a ‘plug and play’ model, installation skills will become less and less relevant, and on site teams will just be needed to ensure the cells are onsite, before remote commissioning takes place.

For towercos and MNOs who have worked for 20 years with managed service providers across Europe, finding the right partners for this urban infrastructure, agreeing the scope of their responsibilities and setting up relationships which will drive urban rollout and maintenance of their networks is critical.

**Permitting and regulation in urban areas**

One of the hardest challenges for infrastructure owners in urban areas is the issue of permitting.
Getting the required permissions from local government isn’t a straightforward process, and when cities of historic interest such as Rome or Paris come into the equation, the aesthetic considerations muddy the water further.

Local governments are running very lean operations across much of Europe at the moment, and finding the counterparts with the skills and experience to negotiate on access to street furniture is becoming harder. Indeed, as yet there’s no clear picture as to how local bodies will choose to approach allowing access to urban infrastructure, with some viewing better connectivity as a reward in its own right for local enterprise and populations, and others aiming to use space as a way of raising funds through ground rent.

The man hours needed from both telecoms infrastructure players and local government in order to deploy as many as 10,000 small cells across a major city will undermine any cost efficiencies made in terms of operational rollout. It’s clear that all parties will have to work together more effectively in order to deliver infrastructure on the kind of scale needed for 5G.

However, it’s not just the allocation of space on street lights which threatens 5G rollout. European attitudes to EMF under 5G rollout, which have long been cautious during previous technologies, threaten to present a major obstacle to the development of new infrastructure in all areas.

In January 2019, a letter signed by more than 180 scientists from 36 countries was written to the EU to demand further stringent testing on the potential effects of electromagnetic radiation on European populations. If the EU follows Resolution 1815 of the Council of Europe, then time will be taken for an independent task force to be recruited to reassess the health effects of 5G, and 5G rollout will be further delayed.

**Moving forward**

For small cell rollout to reach the levels forecast for 5G, regulatory, strategic, governmental and operational challenges must all be tackled and radical new solutions sought. Those MNOs and neutral host providers who apply ‘macro tower’ thinking to their small cell portfolios will find themselves left in the slipstream of the more creative, innovative and proactive players in the market. It’s clear that stakeholder engagement and creating partnerships will be absolutely fundamental to the success of urban infrastructure, and that identifying and working with new solutions providers, be they in power, street poles, regulation advice or streetworks can make or break urban plans over the coming years.

Finding the balance between staying ahead of the pack and keeping a careful eye on the market is becoming increasingly hard, and European towercos, from huge multi-nationals to innovative local players, are all taking their own approach to preparing for the next communications revolution.
Putting down roots: Europe’s new multi-national digital infrastructure platform

Digital Colony plans for further growth across the European market

In 2018, Digital Colony invested in three European digital infrastructure businesses: Digita in Finland, and Stratto and Opencell in the UK. Graham Payne, formerly the CEO of Opencell and now the CEO of Digital Colony’s broader UK digital infrastructure platform spoke to TowerXchange about Digital Colony’s rationale for entering the European market now, their investment philosophy and their plans for growth in Europe in the coming months.

Keywords: 4G, 5G, Acquisition, C-Level Perspective, Consolidation, DAS, Data Centre, Deal Structure, Digita, Digital Colony, Europe, Fibre, Finland, IBS, Investment, LTE, Market Entry, Market Overview, Opencell, Small Cells, Stratto, Towercos, Transfer Assets, UK

Graham Payne, CEO, Digital Colony UK

Read this article to learn:
- Who Digital Colony are and how they were formed
- What Digital Colony owns in Europe and how this fits with their investment philosophy
- Where Digital Colony sees differences in the European market versus the rest of the world
- How the unique shape of European infrastructure ownership might affect 5G rollout

TowerXchange: For those who don’t know you, please introduce Digital Colony, how you were formed and your global portfolio.

Graham Payne: Digital Colony is a partnership between Digital Bridge and Colony Capital, who have combined to form a partnership called Digital Colony. Digital Bridge is the technology lead in this, they are currently invested in nine platforms, with over $10bn in committed capital, 150+ acquisitions and $450mn of site cashflow.

Digital Colony’s investment target is in digital infrastructure; that is datacentres, wireless towers, small cells (indoor and outdoor) and fibre. Digital Bridge is very much a digital infrastructure company, using their experience and knowledge in the partnership with Colony Capital, which is a NYSE listed company with $44bn assets under management and 400+ employees across 10 countries.

TowerXchange: Digital Colony made three acquisitions in Europe last year, can you talk to us about those three acquisitions and how they interact with each other?

Graham Payne: Digital Colony's European investment started with acquisition of Digita, one of the biggest independent towercos in Finland, which is a broadcast towerco with lots of mobile tenants. We then followed with
the acquisition of Stratto and Opencell in the UK. Stratto was just starting off in in-building solutions on big sites and Opencell had launched a new small cell model where the enterprise pays for the infrastructure, rather than the MNO – a model which had gained 130+ sites in the UK. By combining best of both worlds from these two companies we can cover anything from smallest in-building solutions to the largest. With Digital Colony committing to additional investment there is a wonderful in-building opportunity in the UK.

**TowerXchange**

**Why did Digital Colony choose to enter the European market now, tell us about the market conditions or other factors which influenced the decision?**

**Graham Payne**

‘Looking at where growth is in telecoms, we believe there is no sign of a slowdown. When you look at the key metrics for Western Europe, we’re seeing subscription connection growth at 3%, which is fairly small, but the regional share of smart devices and connections are seeing massive growth with mobile data traffic up 6x and video share up 31%.'
If we look at the US, Digital Colony knew the US market and compared the US to Europe: although Europe is clearly behind North America in terms of infrastructure deployment, it’s catching up. There are two clear examples of this. Firstly in fibre, where we see significantly more deployed in the US, and therefore in small cells, where the US has deployed 100,000 small cells and in Europe there are hardly any. Secondly the US has embraced hyperscale datacentres and these have yet to really roll out in Europe. A combination of both of these, coupled with good regulation and a stable investment landscape, means we still see Europe as being a very healthy investment opportunity.

If you look at 5G and how it will differ in Europe and the US, the biggest challenge for the mobile network operators is the investment case for 5G, and the concern that rolling out 5G infrastructure will cost a lot of money and they won’t see huge returns. They are currently scratching their heads and wondering how to fund it all.

It’s a good opportunity for us because through Digital Colony’s expertise and investment, we can take a lot of that pain away for the operators and help them to roll out 5G. Growth in data traffic won’t go away and eventually 4G will run out as 3G did. The 5G standard and frequencies are so much more efficient, it’s inevitable that it will happen. In my opinion the view for the UK is that there will be pilots in 2019 and some operators with launch areas but our expectation is that rapid rollout will not follow everywhere like it did with 4G. Initially, 5G will be targeted at urban areas where populations are denser.

There will be a gradual evolution from 4G to 5G traffic initially, then as the network rolls out more and more and applications can use the faster latency and more devices will see the revolution kick off. Full deployment should happen by 2021. This is a massive investment opportunity which will need lots of network deployed in terms of fibre, and space for antennas and datacentres.

TowerXchange: The European market is quite unique in that much of the ‘towerco’ infrastructure is owned (carved out) by MNOs, who often sell a minority stake to an investor. Do you think this will have a long term influence in shaping the way neutral host operators and MNOs work together or do you see this as a stage of evolution towards a different end point?

Graham Payne: I don’t know how that will pan out. I founded MBNL and did the negotiation between T-Mobile and Three, following that I then became Managing Director of MBNL, then I ended up...
supporting Vodafone on their Beacon contract to form CTIL with Telefónica.

In terms of Vodafone’s purported plans to monetise CTIL, I think that’s absolutely the right thing for these guys to do because of the return they should get from that and the funding to help them support 5G rollouts will be significant. The downside for the mobile network operators is that they risk losing some control and ability to do things quickly on their network. It doesn’t have to be the case, naturally they will want to leverage as much money out of the transaction as they can, but they will need a partner who understands digital infrastructure, has proven to be a trustworthy operator of networks and can deliver SLAs which can be flexible enough to deliver when they want to do something. In the current climate they can’t just be doing it for money and selling for 19x multiples, they need to choose a business which can deliver fantastic SLAs, then can migrate to a neutral host model.

_TowerXchange: What’s next for Digital Colony? Will you be making more European acquisitions in 2019? What can you share of your plans for the future?_

_Graham Payne: Digital Colony is absolutely looking at making more acquisitions in Europe, and we will be looking at towers, datacentres, fibre, and small cells indoors and outdoors. We are actively looking and engaged in a number of conversations already._
Regional coverage:

CALA features

TowerXchange always predicted that CALA towercos should go beyond the steel and grass model and in this editorial we offer an initial overview of the changes occurring across the industry. From Phoenix Tower International’s entrance in the Mexican fibre industry to Phoenix Tower do Brasil’s interest in energy management across its sites and American Tower’s strategic acquisitions in fibre across multiple countries, the industry is evolving at a fast pace.

Towercos aren’t the only ones investing in technology and innovation and TowerXchange spoke with both Telefónica and Claro Brasil’s experts about some of their latest opex saving initiatives. Shifting to Argentina, Andres Tahta, Executive Vice President of the Agencia Argentina de Inversiones y Comercio Internacional shared with us some of the changes occurring across the local telecom infrastructure industry.

Don’t miss:

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232 Interview: Argentina needs to build 50,000 towers in the next five years
CALA towercos go beyond steel and grass

From Mexico to Argentina, fibre and energy become an increasing focus

The so-called “steel and grass” business model has always been the default for CALA towercos, especially for those entities with some roots or links to the U.S., the pre-eminent steel and grass tower market in the world. A simple model based on the premises that towercos only deal with the tower and the ground beneath it, with responsibilities including land acquisition, fencing, outsourcing of the engineering function and maintenance of the actual steel structure. A very different model compared to the complex tower + power that towercos handle across Africa or in certain Asian markets. But the wind has changed and TowerXchange reports for the first time on the diversification efforts finally being undertaken by various towercos across CALA.

Keywords: American Tower, Americas, Business Model, Central America, ESCOs, Editorial, Energy, Energy Efficiency, Fibre, Hybrid Power, Operational Excellence, Opex Reduction, Phoenix Tower International, Phoenix Tower do Brasil, RESCOs, Renewables, SBA Communication, Solar, South America, Torrecom, Wind

Read this article to learn:

- From steel and grass to integrated infracos: the time is now
- Examples of diversification across CALA into fibre, IoT and energy
- Electricity in CALA: grid availability versus price sensitivity

Since the inception of TowerXchange, dozens of towercos have started operating in CALA. In light of the relative simplicity of the business model, the overall economic outlook for many of these towercos remains positive, driven by great coverage and densification needs.

In recent months, towercos across CALA have started to look beyond towers and entered new business segments including fibre, IoT and energy management. The examples are still relatively rare and TowerXchange is gathering insights that will be shared as soon as available, but one thing is sure: towercos across CALA are increasingly diversifying into fibre and small cells while also starting to engage with ESCOs and RESCOs to provide energy efficient solutions to their MNO clients.

While for the first few years there seemed to be a distinct commonality in towerco business models (if not always in the nuances of the underlying contracts), it comes as no surprise that towercos have now started to differentiate by offering a more holistic set of services, driven by MNO demand for a more integrated approach to infrastructure management. In this editorial, TowerXchange reports on some early examples of diversification while inviting all readers to contact us to provide further insights.

Fibre, urban infrastructure and IoT

Brazil: American Tower – Cemig Telecom and LoRaWAN network

In November 2018, American Tower (AMT)
concluded the purchase of Cemig Telecom’s assets in São Paulo, Minas Gerais and Rio de Janeiro. The assets included around 14,000km of fibre-optic network and were part of the divestment put in place by Brazilian utility company Companhia Energética de Minas Gerais.

In December 2018, AMT announced that its Brazilian LoRaWAN network had surpassed 400,000 connected devices and the towerco is targeting two million or more by the end of 2019. AMT is deploying its network in partnership with LoRa maker Semtech and the rollout is particularly relevant for metering and IoT applications as well as smart city networks. By mid-2019, the network should cover 80 key cities across Brazil.

**Mexico: American Tower – KIO Networks**

Exactly one year earlier, in November 2017, AMT announced the acquisition of KIO Networks’ Mexican subsidiary, RedIT. At the time of the deal, the company owned more than 50,000 concrete poles and around 3,400km of fibre network across various key urban centres.

According to RedIT’s website, to date the firm runs over 4,500km of fibre optic network across 20 cities (Ciudad de Mexico, Monterrey, Guadalajara, Tijuana, Mexicali, Ensenada, Toluca, Queretaro, Aguascalientes, Celaya, Leon, Irapuato, Puebla, Merida, Xalapa, Veracruz, Villahermosa, Tuxtla Gutierrez, San Luis Potosi and Cuernavaca) as well as across the border to San Diego, Los Angeles, Phoenix, Chandler, El Paso, Dallas, Laredo, McAllen and Miami.

**Access to electricity and energy production in CALA**

According to the World Bank, in 2016, 100% of the population in Argentina, Brazil, Chile, Costa Rica, Dominican Republic, Mexico, had access to electricity, 99% in Colombia, 98% in El Salvador, 95% in Peru*, 93% in Bolivia*, 92% in Guatemala*, 82% in Nicaragua*.

Grid availability though doesn’t solve all the problems as in certain countries, electricity prices have increased considerably over the past few years. Guatemala, Nicaragua, El Salvador have all seen an upward trend in tariffs as a function of drops in hydroelectric generation, the behavior of fuel prices or the decrease in rainfalls, depending on the main energy source.

In terms of production of clean energy, CALA is definitely at the forefront thanks to its historical development of hydropower and bioenergy. However, in recent years, the region is showing a diversification towards different types of renewable such as wind, geothermal and solar energy.

Chile is one of the ten leading producers of clean energy according to the International Renewable Energy Agency (IRENA) and aims at getting 90% of its electricity from renewable sources by 2050 (at 17% in 2017).

Uruguay is producing a surplus of energy which is being sold to Argentina and Brazil thanks to its mix of hydropower, wind and solar while a surge in energy investment is forecast in Brazil after its economy downturn.

CALA is home to some of the cheapest electricity grids as well as some of the most expensive ones. In perfect CALA style, the energy industry is complex and varied. If you are interested to find out more, we recommend you download the IRENA November 2016 report at this link:


* With considerable differences between rural and urban electrification. For more information, visit [https://data.worldbank.org/indicator/EG.ELC.ACCS.RU.ZS](https://data.worldbank.org/indicator/EG.ELC.ACCS.RU.ZS)
Argentina: American Tower – CyCSA

In 2016, the towerco reached an agreement to acquire CyCSA, an Argentinian infrastructure firm which, at the time of the deal, held a portfolio of 1,000 urban sites and 2,500km of fibre optic network as well as exclusive rights to deploy telecom infrastructure across certain locations in Argentina.

Mexico: Phoenix Tower International – undisclosed seller

In Q318, PTI acquired 17 fibre rings, equaling to 974km of network, and is now deploying fibre across Mexico’s key cities. Commenting on the deal, Don van Splunteren, Global VP of Sales and Leasing, Phoenix Tower International said that “…the main driving factor [of fibre deployment] is the exponential growth of small cells’ deployments expected in the foreseeable future. In the United States for example, it’s estimated that over 800,000 small cells will be deployed by 2026... That’s more than what has been deployed over the past 20 years!”

SBA Communications – looking beyond towers?

During the recent Q418 earnings call, the company’s President and CEO, Jeffrey Stoops, was asked about his “latest thinking on fibre” and replied that “we’re looking to expand the things that we do but in areas that we call exclusive real estate that will have some barriers to entry and our ability to control our destiny going forward.” While Stoops didn’t comment directly on fibre deals or deployment, the CEO hinted at a certain openness to diversify beyond towers.

Towercos entering the energy management game – some early examples

I recently attended the MWC in Barcelona and had many meetings with ESCOs, towercos and MNOs. Our conversations covered a variety of issues, but I was extremely surprised by the frequent reference to energy management projects being developed by Central and Latin American towercos.

Phoenix Tower International is said to be working with an ESCO in the Dominican Republic while its sister company Phoenix Tower do Brasil is assessing energy partners for sites across Brazil to reduce electricity bills at peak times. Two of Central America’s fastest growing private towercos

Towercos’ business model definition

**Pureplay steel and grass:** manages only the real estate and tower structure, power is a “pass through” – which means it is a cost which remains the responsibility of the tenant.

**Full service powerco:** lease rate includes power and O&M, so the towerco is responsible for distributed generation, energy storage and managed services.

**Decommissioning:** towerco which at least in part specialises in acquiring and consolidating parallel infrastructure in over-built markets.

**Build-to-suit:** builds new towers in response to MNO search rings, often supplemented by the speculative acquisition of land usage rights at sites which may be of future interest to mobile network planners.

**Strategic buyer:** derives a significant level of inorganic growth through large scale sale and leasebacks or acquisitions of existing portfolios from other towercos.

**Rollup / consolidator:** drives inorganic growth through a series of acquisitions, consolidating the assets of other towercos.

**Broadcast hybrid:** makes significant proportion of lease revenue from broadcast tenants; broadcast towers’ height and dispersed locations make them ideal for MNOs’ rural coverage and microwave backhaul, so many broadcast towercos are diversifying into telecom.

**Infraco:** towercos diversifying beyond macro-towers into DAS, microcells, small cells, fibre, data centres and/or subsea cable.

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havestarted projects with ESCOs at selected sites across their footprints. Even the big listed towercos in Latin America are believed to be exploring partnerships to offer energy services, or even offering backup power from their own battery banks. As you can tell, TowerXchange are not at liberty to name names yet, but the list of towercos looking for and evaluating ESCO and RESCO partners is much longer than we’ve hinted at already - one Brazilian MNO told TowerXchange that virtually every towerco in the country now offers energy services.

The reality is that Latin American countries are generally well connected to the grid, even in some relatively remote areas. While MNOs have hitherto had the responsibility of providing backup power for their equipment, creating duplicate battery banks at many sites, demand for towercos to provide these services has been growing. That pressure has been amplified by MNOs' commitment to reduce their carbon footprints by exploring renewable energy, and by the rising cost of grid power. Quite simply, MNOs increasingly recognise that they should be cycling batteries not paying for peak rate grid power - and they want towercos to take responsibilities for those energy storage and renewable power projects. While towercos had long resisted this demand, it was always likely that when one relented, the others would follow.

It should be noted that CALA towercos’ energy service offerings are as likely to be ‘back to backed’ to an ESCO or RESCO as they are to be provided directly.

Conclusions

While this editorial just represents a mere introduction to the diversification efforts being undertaken by towercos across the region, this change comes as a breath of fresh air at a time when the tower transaction pipeline is slowing - there are simply less and less investible towers left to acquire in CALA, and less and less investible towercos to consolidate.

Operational efficiency might not be as sexy as a sale and leaseback deal, but it generates long term value for everyone involved. Additionally, towercos can create stronger and healthier relationships with their tenants by offering more and getting involved in reducing their opex.

Lastly, by partnering with one energy supplier rather than letting each MNO choose their own backup power vendor, towercos are lowering the amount of space required, and the number of accesses required to each site, hence decreasing the risks of theft and increasing the overall site security.

TowerXchange welcomes contributions from its readers on practical examples of towercos diversifying beyond steel and grass in developed markets. Contact Arianna Neri at aneri@towerxchange.com to submit any comment. And don’t forget to sign up for the sixth annual TowerXchange Meetup Americas on 9-10 July to get actively involved in the discussion at our unique gathering of telecom infrastructure experts from across CALA!
Phoenix Tower International: from towerco to infraco

The leading firm launches fibre activities in Mexico following a strategic acquisition

With operations across fifteen countries, Phoenix Tower International (PTI) is one of the fastest growing towercos in the western hemisphere and has proven to be very entrepreneurial in its geographical expansion. In Q3 2018, PTI acquired 974km (or 17 rings) from a carrier in Mexico and in this exclusive interview, Don van Splunteren, responsible for the company’s global commercial activities, shares with TowerXchange insights into its fibre projects and why this “new” segment makes perfect sense for towercos to complement the traditional tower business model.

Keywords: Americas Insights, Build-to-Suit, Co-locations, DAS, Fibre, Infraco, Infrastructure Sharing, Insights, Mexico, Phoenix Tower International, Sale and Leaseback, Small Cells

TowerXchange: Please introduce yourself and your role within PTI.

Don van Splunteren, Global VP of Sales and Leasing, Phoenix Tower International: In 2017, I joined PTI to serve as Global Vice President of Sales and Leasing. In this role, I oversee every commercial segment across fifteen markets, and I am responsible for the performance of PTI’s commercial initiatives around co-locations, lease-ups, build-to-suit, small cells, DAS and, lately, fibre.

Prior to my current role, I worked for NAAP Global Solutions, Ciena Communications as well as Nortel Networks in various executive roles. Over my 20 years of experience in the telecom industry, I became deeply acquainted with the carriers’ needs including their expectations in terms of technology as well as infrastructure, which is very helpful in my current professional endeavour.

TowerXchange: Please share with us the drivers behind PTI’s investment in fibre.

Don van Splunteren, Global VP of Sales and Leasing, Phoenix Tower International: The infrastructure business is slowly evolving from the traditional steel and grass model but the change is accelerating. PTI believes that towercos will soon play a broader role within the infrastructure industry and can successfully get involved in fibre as well as in some of the active equipment segments. Fibre fits well as it is modelled as a telecom infrastructure asset in the same way that towers are.

Read this article to learn:
- PTI’s recent move into the fibre business
- The drivers for the shift from towercos to infracos
- What’s the niche for towercos to operate in fibre?
- The future of fibre: sale and leaseback, build-to-suit and more
With regards to the demand for fibre, the main driving factor is the exponential growth of small cells’ deployments expected in the foreseeable future. In the United States for example, it’s estimated that over 800,000 small cells will be deployed by 2026... That’s more than what has been deployed over the past 20 years!

While mesh infrastructure can be utilised temporarily, fibre is essential to ensure that small cells work properly so every single site will require fibre connectivity in the future. At the same time though, carriers are becoming much leaner in their operations and focusing on their core business so the deployment of fibre, just like the towers one, is likely to get outsourced to infrastructure companies, or infracos.

Towercos, with their infrastructure-related know how, can definitely help carriers with more value adding solutions such as fibre. Whenever I am referring to fibre, I am talking about dark fibre whose behaviour both as an asset and financially is quite similar to the towers’ one.

**TowerXchange: How did PTI sell the fibre opportunity both internally and to its investors?**

**Don van Splunteren, Global VP of Sales and Leasing, Phoenix Tower International:** It’s been an exciting journey and while it took us some time to get there, we were quick in seizing the first opportunity to acquire some existing fibre assets...
from one of the carriers in Mexico, when they became available.

All it took for us to take the leap was to identify an opportunity that matched both our customers’ needs as well as satisfied our investors from a financial standpoint. Once those two aspects were met, we went ahead without hesitation.

After the acquisition in Mexico, we are now deploying fibre and, similarly to the tower model, looking at leasing up our assets. The ROI in fibre is modelled similarly to the tower one so we are seeing good returns from day one and strong growth potential. While the sharing of fibre is a relatively new concept, we found Mexican customers to be very receptive to the model and we are sealing several interesting partnerships and collaborations.

Fibre is a great opportunity on its own and even more so, in combination with the traditional tower business. PTI is always interested in products and solutions that can add value to our customers and to our bottom line and fibre is definitely not a mitigation strategy. We are continuing to grow at a fast pace in the tower space, and fibre can provide more benefits to our customers and, in return, to us.

TowerXchange: Do you foresee fibre becoming an essential component of the towercos’ portfolio? And what does that mean in terms of competition among different players?

Don van Splunteren, Global VP of Sales and Leasing, Phoenix Tower International: With regards to the competition among towercos, I definitely think there’s the potential for more companies to get involved and some are already deploying fibre such as Crown Castle in the U.S. and American Tower across Mexico and Argentina for example. However, I don’t think smaller towercos will necessarily eye fibre opportunities. Fibre, just like towers, requires scale and a different skill-set and smaller towercos might opt to focus on the latter for the time being.

TowerXchange: Could you explain how the fibre ecosystem works and what role does PTI play?

Don van Splunteren, Global VP of Sales and Leasing, Phoenix Tower International: PTI is involved in the so-called “outside plant” component, meaning the deployment of fibre required to connect Points of Presence (PoPs) of our customers. The outside plant is where infracos usually own the physical fibre cable, ducts, posts, to deploy and operate these assets.

Plenty of players operate in the ecosystem, from service companies who build and maintain the fibre for us to the manufacturers of posts, if aerial fibre is being installed, as well as the cable and hardware solution providers.

Infracos don’t usually own the active equipment but just the cable, hardware and rights leading to the various PoPs where carriers and the other customers install their own equipment. The key PoPs for us are obviously towers and small cells. Customers can be carriers but also other fibre providers who are interested in providing capacity to their own customers in cities where we operate. We are also working with partners who manage smart cities and other municipal projects and PTI is always interested in getting involved in this type of activities.

TowerXchange: What are the pain points of fibre deployment? And the key opportunities?

Don van Splunteren, Global VP of Sales and Leasing, Phoenix Tower International: Fibre is a similar model to the tower one. But the challenge relates to its execution and if you ask me, what “keeps me awake at night” is how to create and execute flawless fibre projects and make the experience for our customers as easy as possible. There aren’t many innovations in the technology horizon that would change these models, but the competitive edge lies in making it easy for our end users to decide to outsource their fibre to us.

The macroeconomic context helps us nowadays as carriers are definitely under more pressure than they used to and also want to keep quality of their service as high as possible and at the quickest time-to-market. For infracos, this is a great selling point.

TowerXchange: Do most carriers own fibre portfolios? And do you foresee them divesting fibre assets like they did (or didn’t) with towers?

Don van Splunteren, Global VP of Sales and Leasing, Phoenix Tower International: Most carriers do own fibre across CALA and I believe they will treat
their fibre portfolios similarly to their tower ones. The strategy of divesting versus retaining could be applied to fibre too and build-to-suit in the fibre space will soon become the norm, and not only for the last mile but for larger projects too.

It took quite a few years for towers to stop being seen as a competitive advantage, and some carriers still treat them as such. Fibre will follow a very similar path and many carriers will soon see the advantage of operating under an opex model for their fibre projects. That’s when sale and leaseback will become more popular. It’s only a matter of time!

TowerXchange: Beside fibre, how do you see the tower market evolving across CALA?

Don van Splunteren, Global VP of Sales and Leasing, Phoenix Tower International: These are exciting times for CALA towers as well. Many changes are happening including some consolidation and acquisition among MNOs and this creates plenty of opportunities for growth. In fact, whoever ends up owning the spectrum following any consolidation or acquisition will need to leverage it and monetise it, which in simple terms equals to more antennas and more towers being required that ultimately will need fibre for back or front-haul.

I don’t see that equation changing anytime soon and at PTI we remain optimistic about CALA and its tower industry. For any company that exits the market, there will be others that will invest even more than before.

See you at our future events!

Meetup Europe 2019
9-10 April, London

Meetup Americas 2019
9-10 July, Boca Raton

Meetup Africa 2019
8-9 October, Johannesburg

Meetup Asia 2019
3-4 December, Singapore

Meetup MENA 2020
28-29 January, Dubai

TowerXchange
www.towerxchange.com
Brazil: strong organic growth and enhanced operational focus

Phoenix Tower do Brasil shares the latest from the largest CALA market

TowerXchange has caught up with Phoenix Tower do Brasil (PTB)’s CEO, Mauricio Giusti, for an update on the country’s tower market, macroeconomics and future perspectives. While Brazil hasn’t delivered many promising headlines over the past few months, Giusti shared positive considerations about the market and its strong growth pattern as well as news on the towerco’s possible move into energy management.

Keywords: 4G, ANATEL, Americas, Americas Insights, Brazil, Build-to-Suit, C-Level Perspective, Energy, Interview, Network Rollout, Off-Grid, On-Grid, Phoenix Tower do Brasil, Renewable Energy

TowerXchange: Can you give us some updates with regards to Brazil and PTB’s activities in the country?

Mauricio Giusti, CEO, Phoenix Tower do Brasil: PTB is still one of the fastest growing towercos across CALA and our build-to-suit volume has been very strong even in tough years like 2017-2018. In spite of the shaky macroeconomics of the past couple of years, we were able to perform extremely well. PTB is not only enjoying strong organic growth but also a good volume of amendment revenue, mostly driven by 4G.

TowerXchange: What is the status of 4G deployment across the country?

Mauricio Giusti, CEO, Phoenix Tower do Brasil: Most MNOs are still deploying 4G across Brazil but there are also areas where 4G is not yet available. ANATEL is currently freeing up spectrum that was previously utilised by analogue TV providers and the auction should take place in the second half of 2019. The spectrum allocation will further intensify 4G deployment efforts across the country.

TowerXchange: What are MNOs demanding in terms of site typology?

Mauricio Giusti, CEO, Phoenix Tower do Brasil: The largest demand still relates to macro towers but over the past 12-18 months we’ve actually seen an enhanced push for small cells as well as short poles (18-20m high). Typically, MNOs require these...
solutions in areas with poor quality of service to densify existing networks.

We’ve also seen an increase in demand for indoor DAS not only to provide coverage inside busy venues but also to offload the nearby macro sites. DAS projects usually target shopping centres, stadiums, business centres and conference venues.

TowerXchange: In spite of much talking, we haven’t seen any consolidation happening beside the Highline-SBA deal. What is your take on the lack of towerco-towerco deals?

Mauricio Giusti, CEO, Phoenix Tower do Brasil: Some analysts did forecast consolidation to be a big theme in Brazil but for now, we’ve only seen the Highline-SBA deal. I think that the improvement of the overall economic conditions combined with more spending by the MNOs has changed the priorities for towerco, which are now seeing renewed organic growth opportunities across their Brazilian operations. Consolidation is still likely to happen but not in the imminent future.

TowerXchange: Several towercos are reporting deeper involvement in operational issues. Is this the case at PTB too?

Mauricio Giusti, CEO, Phoenix Tower do Brasil: We are getting involved with more operational aspects of the business, especially in the energy sector. In Brazil, there is a considerable effort to adopt cleaner sources of energy, in particular solar solutions, and we are talking to various players in the field to define a strategy that can add value to our customers while also reducing opex.

TowerXchange: Is growth still in the cards in Brazil? And how is the market reacting to the new government?

Mauricio Giusti, CEO, Phoenix Tower do Brasil: For the next couple of years, Brazil is expecting further macroeconomic improvements. In fact, the country’s GDP is already growing and inflation is low, consumers’ confidence is quite high and we are expecting a better 2019-2020 than the previous couple of years.

The new government has just taken office and if all the plans and expectations are confirmed, we can project a strong year ahead. MNOs, just like everyone else, are waiting to see if the consumers’ spending will grow further and the overall conditions keep improving to hopefully announce even more investments.

TowerXchange: Several towercos are reporting deeper involvement in operational issues. Is this the case at PTB too?

Mauricio Giusti, CEO, Phoenix Tower do Brasil: We are getting involved with more operational aspects of the business, especially in the energy sector. In Brazil, there is a considerable effort to adopt cleaner sources of energy, in particular solar solutions, and we are talking to various players in the field to define a strategy that can add value to our customers while also reducing opex.

Just like with infrastructure, MNOs are inclined to outsource energy provisioning to companies like ours, able to ease the burden and offer streamlined, efficient solutions. While there are barely any off-grid sites across Brazil, this is relevant for on-grid sites whose energy sources are still fairly expensive.
Telefónica bets on renewables, efficiency and collaboration with towercos in Central America

The Spanish telecoms giant seeks 100% renewable energy use and optimisation—and infrastructure partners can play a big role

Over the years, Telefónica has positioned itself as one of the telecom world leaders thanks to its global footprint and its innovation strategy. The company is strongly pushing efficiency, infrastructure optimisation and clean energy use to power its operations, and its Central America unit is a great example.

From Panama, the Planning and Economic Control Division manages, among other aspects, the MNO efficiencies and infrastructure optimisation initiatives in Central America. In this interview, Carlos Santiago Rodriguez Medina, the Division’s subdirector, addresses the company’s ambitious take on renewable energy and analyses how new business models, technological innovation and collaboration between operators and towercos can help unlocking the different barriers that are still slowing down infrastructure development in the region.

Keywords: 5G, Americas, Americas Insights, Access Control, Active Equipment, Air Conditioning, Batteries, Built-to-Suit, Capex, Central America, El Salvador, Energy, Energy Efficiency, Energy Storage, ESCOs, Guatemala, Hybrid Power, Lithium-Ion, Managed Services, Meetup Preview, MNOs, Monitoring & Management, Nicaragua, Outdoor Equipment, Panama, Passive Equipment, Renewables, Site Management System, Solar, Telefónica, Towercos

Read this article to learn:

- Telefónica’s strategy across Central America
- MNOs’ operational and financial challenges in CALA
- What are Telefónica’s energy needs and priorities?
- The company’s future: renewables, fibre and new technologies

TowerXchange: Carlos, could you please explain your role at Telefónica and summarise the company’s infrastructure strategy across Central America?

Carlos Santiago Rodriguez Medina, Regional OPEX Budgeting & Efficiency Leader, Telefónica Centroamérica S.A: My role has the particularity that our department integrates a multidisciplinary efficiency team that has the goal of identifying opportunities for simplification, efficiency and synergies across all the other company’s departments. This efficiency team, that works under the Economic Control Department, has achieved an annual saving rate of US$35mn for the five operations of Telefónica Centroamérica, which integrates Guatemala, El Salvador, Nicaragua, Costa Rica and Panamá.

One of the singularities of Telefónica’s operational model in Central America is the implementation of a so-called Operative Costs Control area that integrates professionals with technical-economical profiles, which enables an integral management of all the network deployment resources and includes a Site Management unit. This unit participates in the strategic design of the infrastructure deployment models by choosing the most suitable economic conditions, depending on the technical needs of each deployment processes. Based on the network design, our Site Management Unit negotiates and allocates the search rings to tower companies, depending on the capabilities of those towercos and in accordance with the different commercial conditions that have been previously set during the framework agreements between companies.
In Telefónica Centroamérica, we use the built-to-suit (BTS) model for our network deployment so we can focus our investments in last generation technological equipment in order to lead the market and offer the best possible service to our clients. We trust our deployment partners as they have proven their experience and capacity over the last decade. Currently, over 80% of our equipment in Central America is installed on towerco’s infrastructure.

TowerXchange: What are the main operational and financial challenges that the company is facing when developing and maintaining its infrastructure?

Carlos Santiago Rodríguez Medina, Regional OPEX Budgeting & Efficiency Leader, Telefónica Centroamérica S.A: In January, 2016, the IASB (International Accounting Standard Board) published a new rule on the accounting of lease contracts called International Financial Reporting Standards 16. That rule, that became effective on January this year, will have considerable accounting and economic impacts on MNOs. In summary, when you increases a company’s assets and debt, lots of measures and ratios are affected - from the Return of Assets (ROA) to the EBITDA. In general, companies will appear as more indebted and consequently, they might breach a number of covenants related to the level of leverage. Additionally, we could see relevant market changes related to lease agreements, where we expect less sale and leaseback contracts and shorter commitment clauses.

On the operational and maintenance side, we expect an increase of integrated services and more as a service models for energy, climate and access that guarantee continuity and availability of those services that are supported by the infrastructure.

TowerXchange: Can you talk about Telefónica’s energy strategy in Central America?

Carlos Santiago Rodríguez Medina, Regional OPEX Budgeting & Efficiency Leader, Telefónica Centroamérica S.A: Both Telefónica Centroamérica and Telefónica Global focus our efficiency efforts in two aspects; energy consumption reduction and renewable energy use. For that reason, we have set some general premises that applied to all the company divisions and are based in four essential pillars for the next five years: opex and energy consume reduction and control, emissions reduction and control, auto generation and renewable energy use. Based on those pillars, we have set several actions in different areas:

Energy management:
- Unifying the consumption and energy expenditures databases as well as improving the billing management that comes from electricity service companies
- Optimising site management, creating a consumption profile based on theoretical data
Audits in high consumption sites and using big data analysis tools.

Energy purchase:
- We are purchasing energy under the PPA (Power Purchase Agreement) model on those countries where regulation allows us. Particularly, we have recently signed a contract of 4,850 Mwh per year for the biggest telephone centre in Panama, which will use solar energy backed by hydroelectric power, generating a 18% reduction on the final bill.
- Additionally, we have implemented different hybrid systems in remote and rural sites in countries like Nicaragua. Those systems use solar panels, batteries and generators, where solar is the main source, backed by batteries and ultimately by the generators that enable continuity and battery recharge.

Equipment modernisation:
- We are betting on data centre consolidation and the virtualisation of our platforms.
- Modernising our cooling equipment, replacing obsoleted terminals and installing high-efficiency equipment as well as replacing equipment with refrigerant R-22 for R-410A.
- Installing free-cooling equipment in sites where the exterior temperature allows a combination of external air and air conditioner to reduce energy consumption.
- Replacing energy and backup equipment for more efficient alternatives and also installing generators that consume less fuels.
- Finally, we are pushing lithium instead of acid-lead batteries, which improves backup performance and batteries lifecycle on top of reducing contaminating waste.

Unified infrastructure monitoring systems:
- The continuous network growth requires real-time monitoring systems implementation, which allow us to control energy and fuel consumption as well as observe any operational failure. Those unified monitoring systems allow us to automatise our activities based on tickets and reports. Moreover, they allow us to directly communicate with the workforce on the field and enable interaction between sites and centralized systems through mobile apps that can be used by technical employees. Finally, those systems enable the creation of second level structures as well as remote assistance and field workforce support.
- On the other hand, monitoring of administrative and operational buildings and their different components - from refrigeration and rectification systems to backup systems - allows us to control peak consumption points, automatizing those variables for energy consume reduction. A good example is the variation on the temperature set point on AC’s at the offices, shops or sites, where refrigeration demand is a relevant aspect of the general consumption.

Legacy equipment shutdown:
- Obsolescence shutdown and replacement of the network and refrigeration equipment for others that are more efficient and modern is part of our energy optimisation strategy. We can highlight the evolution of the cabinets access equipment, where internal radio systems have been replaced by inclemency instalment equipment, which reduces heat load and cooling needs, and therefore notably reduce electricity bills.
- We have to add the strategy of compaction for TDM central and/or IP conversion, where we have considerably reduced the quantity of cabinets in telephone centres.

TowerXchange: Telefónica has set very ambitious renewable energy implementation targets. How are you contributing to this corporate goal and what initiatives have you started?

Carlos Santiago Rodriguez Medina, Regional OPEX Budgeting & Efficiency Leader, Telefónica Centroamérica S.A: On a global level, Telefónica has committed that 50% of its total energy consumption comes from renewable sources by 2020, becoming 100% by 2030. In Germany, we have already reached that 100%. In Central America, achieving that goal is a little bit more complex due to the regulation in some countries, which does not allow us to subscribe contracts with renewable energy generators and distributors, despite the big presence of hydro and solar providers.

In Panama, regulation does allow us to sign contracts with generators but the distribution and transportation agreements are regulated. In this context, Telefónica Panamá is signing a PPA with a solar generation company that will also be backed by hydro and wind, which means an important investment in power generation through renewables. As mentioned, this contract will last five year and generate a 40% reduction
in generation, taking into account all billing components—generation, transportation and distribution—and an 18% reduction in the total cost. Moreover, we will increase our renewable energy use in Panama by 8%.

In Costa Rica, based on the country's energy matrix, we are consuming 99% of renewable energy. Additionally, we have objectives per production unit, which are based on the amount of energy required per data unit. Telefónica Global has set a 50% reduction of mWh/Pb (Megawatts per hour/ Peta Bytes)

On the other hand, we aim to reduce energy opex globally by US$109mn between 2016 and 2020, of which US$10mn correspond to Central America. Another pivotal goal is greenhouse emissions reduction that will have to be cut by 30% in 2020 and by 50% in 2030. On top of renewable auto generation and contract subscriptions, the reduction of fuel consumption on sites and company vehicles will also play a key role. With regards to generators, we are implementing energy as a service projects to replace them with energy services based on lithium batteries.

TowerXchange: Efficiency is an absolute priority for CALA MNOs. What are the other options that Telefónica is exploring to optimise your assets in the region?

Carlos Santiago Rodriguez Medina, Regional OPEX Budgeting & Efficiency Leader, Telefónica Centroamérica S.A: In addition to the initiatives that I have already explained, we are looking for smaller size equipment, radiant systems and more efficient technologies. We are also exploring collaboration agreements with other operators where we would share radio access equipment (RAN sharing), centralised platforms and multi-vendor platforms. This is a natural evolution of the new deployment models that will increase their presence in the Latin American telecoms market.

TowerXchange: What are your views on the role of fibre and how can towercos benefit from its integration?

Carlos Santiago Rodriguez Medina, Regional OPEX Budgeting & Efficiency Leader, Telefónica Centroamérica S.A: Fibre deployment is one of the most important aspects for telecoms progress and a pivotal element for the implementation of new technologies such as 5G. These technologies will require bigger transmission capacity as well as capillarity in the connectivity between base stations, which will be supported by the infrastructure. Therefore, having fibre will become as important as having energy. This is something to seriously take into account, since during the construction of new sites, there could be synergies in the development of grid lines that could couple the deployment of fibre, being compatible with the infrastructure that supports it, posts, overhead cables and underground pipes.

Offering a service of fibre connectivity as an integral part of the site infrastructure adds value for MNOs, as we would have a better time to
market when launching services. Definitely, fibre deployment will better position towercos that invest in this asset, increasing their competitiveness.

TowerXchange: Next July, Telefónica will be back at the TowerXchange Meetup Americas in Boca Ratón. What are you most looking forward at the event?

Carlos Santiago Rodriguez Medina, Regional OPEX Budgeting & Efficiency Leader, Telefónica Centroamérica S.A: For us as operators, joining the event is a great opportunity as we can meet and share experiences that improve our relationship as partners with other MNOs and infrastructure providers. We want to hear new propositions and learn about more integrated and innovative services across the region. There are still plenty of differences between continents and in some regions, infrastructure providers are already providing centralised power under energy as a service models, and in some case, they even offer multi-operator fibre connectivity that can be used by all the clients collocated in the same site.

We also want to discuss and explore the huge collaboration possibilities between operators and towercos in order to present creative solutions for Latin America, where there are still plenty of barriers that are slowing down the much needed infrastructure development. Finally, we want to explore new solutions that can highlight the real importance and positive impact that infrastructure makes in the evolution and development of society, in order to strongly position ourselves in front of regulators and social groups.

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See you at our future events!
Telefónica apuesta por las renovables, la eficiencia y colaboración con torreros en Centroamérica

El gigante español persigue la optimización y el uso total de renovables—y sus socios pueden jugar un papel fundamental

Durante años, Telefónica se ha posicionado como uno de los líderes mundiales del sector de telecomunicaciones gracias a su presencia global y su política de innovación. La compañía está apostando muy fuerte por el ahorro energético, la optimización de su infraestructura y el uso de fuentes renovables para su suministro eléctrico, y su división de centroamericana es un gran ejemplo.

Desde Panamá, la dirección de Planificación y Control Económico gestiona, entre otros aspectos, la eficiencia y optimización de la infraestructura del operador en Centro América. En esta entrevista, Carlos Santiago Rodríguez Medina, subdirector de la división, aborda la ambiciosa apuesta de la compañía por la energía renovable y comenta cómo nuevos modelos de negocios, la innovación tecnológica y la colaboración entre torreros y operadores de telefonía pueden ayudar a desbloquear las diferentes barreras que todavía ralentizan el desarrollo de infraestructura en la región.


Lea este artículo para conocer:
- La estrategia de Telefónica en Centroamérica
- Los desafíos operativos y financieros de los operadores en CALA
- ¿Cuáles son las necesidades y prioridades energéticas de Telefónica?
- El futuro de la compañía: energía renovable, fibra y nuevas tecnologías
de estos y bajo las condiciones comerciales que se han negociado y establecido anteriormente en acuerdos marcos entre las compañías.

En Telefónica Centroamérica apostamos por el modelo Build-to-Suit (BTS) para el desarrollo de nuestra red, con el objetivo de focalizar las inversiones en nuevos equipamientos tecnológicos de última generación para liderar el mercado y ofrecer el mejor servicio posible a nuestros clientes. Confiamos el despliegue a nuestros socios de infraestructuras ya que, durante una larga relación en la región, han demostrado la experiencia y capacidad necesaria para este desarrollo. Actualmente, el 80% de nuestra red de Centroamérica está ubicada en infraestructuras de torreos.

**TowerXchange: ¿Cuáles son los principales desafíos operacionales y financieros que afronta la compañía en el desarrollo y mantenimiento de su infraestructura?**

Carlos Santiago Rodríguez Medina, Subdirector de Planificación y Control Económico, Eficiencias, Telefónica Centroamérica S.A:

El IASB (International Accounting Standard Board) emitió en enero de 2016 una nueva norma de contabilidad de contratos de arrendamiento denominada Norma Internacional de Información Financiera (NIIF) 16, que sustituye a la actual Norma Internacional de Contabilidad (NIC) 17 y a la Interpretación 4 (IFRIC 4). Esta norma entró en vigor el 1 de enero de 2019 y tendrá importantes efectos contables y económicos en los operadores. En resumen, al incrementarse el activo y la deuda de las empresas, numerosas métricas o ratios se verán afectadas—desde el Return of Assets (ROA) hasta el nivel de EBITDA. En general, las empresas aparecerán como más endeudadas y como consecuencia, pueden incumplirse numerosos convenios relacionados con el volumen de apalancamiento. Además, pueden darse importantes cambios en el mercado de los contratos de arrendamiento, donde se espera que se firman menos operaciones de sale and lease-back y que los contratos de arrendamiento tengan menores plazos de compromiso.

En cuanto a los aspectos operativos relacionados con el mantenimiento de infraestructura, esperamos un crecimiento de servicios integrales que vayan orientados a modelos as a service para energía, clima y accesos que garanticen la continuidad y disponibilidad de los servicios que son soportados por las infraestructuras.

**TowerXchange: ¿Cuál es la estrategia energética de Telefónica en Centroamérica?**

Carlos Santiago Rodriguez Medina, Subdirector de Planificación y Control Económico, Eficiencias, Telefónica Centroamérica S.A:

Tanto Telefónica Centroamérica como Telefónica Global centran sus esfuerzos de eficiencia en dos aspectos: la reducción del consumo energético y el uso de energías renovables. Para ello, se han fijado una serie de iniciativas generales que se aplican en todas las operaciones de la compañía y que se basan en cuatro pilares fundamentales para los próximos cinco años: reducción y control del consumo energético y del opex, reducción y control de las emisiones, autogeneración y consumo de energía renovable. De estos pilares se derivan varias acciones en diferentes campos.
Gestión de la energía:
- Estamos unificando las bases de datos de consumo y gastos de energía y mejorando la gestión de la facturación proveniente de las empresas de servicio eléctrico.
- Optimización de la gestión de los sitios creando un perfil de consumo basado en datos teóricos.
- Auditorías en sitios de alto consumo y utilizando herramientas de análisis basados en Big Data.

Compra de energía:
- Estamos gestionando compras de energía bajo la figura de acuerdos de compraventa de energía o PPA (Power Purchase Agreement) en aquellos países donde la regulación nos lo permite. En particular, este año realizamos la firma de un contrato de 4.850 Mwh anuales para la central telefónica más importante de Panamá, que utilizará energía solar con respaldo hidroeléctrico, lo que implica un ahorro del 18% sobre el histórico de consumo en la factura eléctrica.
- Además, se han implementado sistemas híbridos de energía en lugares rurales o de difícil acceso en países como Nicaragua. Estos sistemas utilizan paneles solares, baterías y motogeneradores, donde la energía solar es el principal recurso, siempre respaldado por las baterías y en última instancia por los generadores, que permiten la continuidad de la operación y la recarga de estas baterías.

Modernización de equipamiento:
- Estamos apostando por la consolidación de Data Centers y la virtualización de nuestras plataformas.
- Además, estamos modernizando los equipos de climatización, sustituyendo terminales obsoletas e instalando equipos de alta eficiencia, sustituyendo además equipos con refrigerante R-22 por R-410A. También estamos instalando equipos free-cooling en sitios en los que la temperatura ambiente permite la combinación de aire externo y aire acondicionado para la reducción de consumo de energía.
- Estamos modernizando nuestros equipos de energía y respaldo por alternativas de mayor eficiencia e instalando moto generadores con menor consumo de combustible.
- Por último, estamos apostando por el uso de baterías con tecnologías de litio en lugar de baterías de plomo ácido, lo que mejora el rendimiento de respaldo y la vida útil de las baterías, además de reducir desechos contaminantes.

Sistemas unificados de supervisión de infraestructura:
- La dinámica del crecimiento de los sistemas y la red hacen necesaria la implantación de sistemas de supervisión en tiempo real, que nos permiten tener una visión del consumo de energía y combustible y observar cualquier fallo en las operaciones. Estos sistemas unificados de supervisión nos permiten automatizar actividades basándonos en tickets e informes. Además, permiten comunicar órdenes de trabajo al personal de campo y la interacción entre los sitios y los sistemas centralizados a través de aplicaciones en los teléfonos del personal técnico. Finalmente, estos sistemas permiten la creación de estructuras de segundo nivel, así como la asistencia remota y apoyo al personal de campo.
- Por otro lado, la supervisión de edificios administrativos u operativos y sus diferentes componentes—desde los equipos de refrigeración y rectificación hasta los sistemas de respaldo—nos permite el control de los puntos de mayor consumo logrando la automatización de esas variables para la reducción del consumo de energía. Un buen ejemplo es la variación del punto de ajuste de temperatura de los equipos de aire en oficinas, tiendas o sitios donde la demanda de refrigeración es una parte importante del consumo general de los emplazamientos.

Apagado de equipos legacy:
- El apagado por obsolescencia o sustitución de equipos de red y refrigeración por otros más eficientes y modernos forma parte de esta estrategia de optimización del consumo de energía. Podemos destacar aquí la evolución en los equipos de la red de acceso de gabinetes, donde equipos de radio internos se han sustituido por equipos de instalación en intemperie, lo que reduce la carga calórica y por ende la necesidad de refrigeración reduciendo notablemente la factura eléctrica.
- A esto hay que añadirle las estrategias de compactación de centrales TDM y/o conversión a IP, donde hemos reducido considerablemente la cantidad de gabinetes en centrales telefónicas.

TowerXchange: Telefónica ha establecido unos objetivos muy ambiciosos en cuanto a la implantación de energía renovable. ¿Cómo está contribuyendo su departamento a esta estrategia corporativa y qué iniciativas han puesto en marcha?

Carlos Santiago Rodríguez Medina, Subdirector de Planificación y Control Económico, Eficiencias, Telefónica Centroamérica S.A: A nivel global, Telefónica se ha comprometido a que el 50% del...
total del consumo energético de la compañía a nivel global provenga de energía renovable en el año 2020 y que alcance el 100% en 2030. En Alemania, ya se ha alcanzado ese 100%. En Centroamérica llevar a cabo esta iniciativa es un poco más complejo debido a las regulaciones de algunos países que no permiten suscribir contratos con generadores o comercializadores de energía renovable, a pesar la gran presencia de generadores hidroeléctricos y solares.

En el caso de Panamá, la regulación sí permite suscribir contratos con los generadores, pero manteniendo los acuerdos de transporte y distribución regulados. En este contexto, Telefónica Panamá cerrará un contrato PPA con una empresa generadora de energía solar, que contará además con el respaldo de energías hidroeléctrica y eólica, lo que supone una apuesta por las energías renovables a través de la generación. Como mencioné anteriormente, este contrato tendrá una duración de cinco años y supondrá un 40% de ahorro en la fracción de generación dentro de los tres componentes de la factura—generación, transporte y distribución— y un 18% en el cargo total. Además, lograremos sumar un 8% de energía renovable al consumo energético total de Telefónica Panamá.

En Costa Rica, según la matriz energética del país, estamos consumiendo un 99% de energías renovables. Adicionalmente, tenemos los objetivos por unidad de producción, que se basan en la cantidad de energía requerida por unidad de datos. Telefónica Global fijó una reducción del 50% de mWh/Pb (Mega Watts hora / Peta Bytes).

Por otro lado, pretendemos reducir el OPEX de energía en 109 millones de dólares en el período 2016-2020, correspondiéndole a Centroamérica unos 10 millones acumulados para el año 2020. Otro objetivo fundamental es la reducción de emisiones de Gases de Efecto Invernadero (GEI), que tendrá que reducirse un 30% en el año 2020 y un 50% para el 2030. Además de la autogeneración de energía renovable y suscripción de contratos, la reducción del consumo de combustible en sitios y flotas de automóviles de la empresa jugará un papel fundamental. En cuanto a los moto generadores, estamos implantando proyectos de tipo Energy as a Service para la sustitución de estos en sitios con servicio de energía basados en baterías de litio.

**TowerXchange: La eficiencia es una prioridad absoluta para los operadores en CALA. ¿Qué otras opciones están explorando en Telefónica para optimizar sus activos en la región?**

Carlos Santiago Rodríguez Medina, Subdirector de Planificación y Control Económico, Eficiencias, Telefónica Centroamérica S.A: Además de las iniciativas mencionadas anteriormente, estamos buscando equipos de menor tamaño, sistemas radiantes y tecnologías más eficientes. También estamos explorando acuerdos con otros operadores para compartir equipos de acceso radio (RAN sharing), plataformas centralizadas y soportes multivendor. Esto es una evolución natural de los nuevos modelos de despliegue que tendrán que ir extendiéndose en el mercado de las telecomunicaciones latinoamericano.
¿Cuál es su visión sobre el papel de la fibra y cómo su integración puede beneficiar a los torreros?

Carlos Santiago Rodríguez Medina, Subdirector de Planificación y Control Económico, Eficiencias, Telefónica Centroamérica S.A: El despliegue de fibra óptica es uno de los ejes fundamentales para el desarrollo de las telecomunicaciones y un elemento clave para la implantación de nuevas tecnologías como el 5G. Estas tecnologías van a demandar una mayor capacidad de transmisión y gran capilaridad en la conectividad entre las estaciones bases, que serán soportadas por las infraestructuras. Por ello, disponer de fibra óptica para la conectividad de las infraestructuras toma una relevancia mayor, tan relevante como disponer de energía. Esta apreciación es un factor a tener muy en cuenta, pues para la construcción de nuevos emplazamientos pueden existir sinergias en la realización de los tendidos eléctricos, que podrían acompañar el despliegue de los cables de fibra óptica, siendo compatibles con las infraestructuras que los soportan, los postes tendidos aéreos y los ductos soterrados.

Ofrecer el servicio de conectividad de fibra óptica como parte integral de las infraestructuras de los sitios aporta un mayor valor para las telcos al tener un mayor plazo de lanzamiento a la hora de iniciar sus servicios. En definitiva, el despliegue de fibra va a posicionar de forma privilegiada a aquellos operadores de infraestructuras que apuesten por este activo incrementando su valor competitivo.

¿Cuáles son sus expectativas para el evento?

Carlos Santiago Rodríguez Medina, Subdirector de Planificación y Control Económico, Eficiencias, Telefónica Centroamérica S.A: Para nosotros como operadores es una satisfacción participar en la cumbre, ya que nos permite conocernos y compartir experiencias que mejoran nuestra relación como socios, tanto con otros operadores como con las compañías de infraestructura. Queremos conocer nuevas propuestas sobre la evolución de servicios más integrales y novedosos en la región. En este sentido, existen aún diferencias entre mercados de los distintos continentes y en algunas regiones los proveedores de infraestructura ya proporcionan de forma centralizada la energía bajos modelos energy as a services, y en algunos casos, incluso se ofrecen conectividad con fibra óptica multi-opera dor para ser utilizado por todos los clientes cubicados en un mismo sitio.

También queremos discutir y profundizar en las enormes posibilidades de colaboración entre operadores y torreros para poder presentar soluciones creativas en Latinoamérica, donde todavía existen numerosas barreras que frenan el necesario desarrollo de infraestructuras. Por último, queremos explorar nuevas soluciones que resalten la verdadera relevancia y el impacto positivo que tiene la infraestructura en la evolución y desarrollo de sociedades para posicionarse con fuerza ante órganos regulatorios y grupos sociales.

El próximo mes de julio Telefónica volverá a estar presente en la cumbre TowerXchange Meetup Americas en Boca Ratón.
Reducing energy consumption is one of the main corporate priorities for Claro in Brazil and the company has started an ambitious auto generation initiative to reduce its operational cost and improve efficiencies. The operator has already developed nine green energy plants to power its operations and when the initiative is completed, 80% of its total energy consume will be sustainably auto-generated by the MNO. TowerXchange has spoken with João Pedro Correia Neves, Director of Financial Support to find out about the project’s details and discuss Claro’s infrastructure strategy in the country.

Keywords: Access Control, Americas, Americas Insights, Batteries, Brazil, Capex, Claro, Claro Brasil, DAS, Energy, Energy Efficiency, Infrastructure Sharing, Insights, Monitoring & Management, MNOs, Opex Reduction, Renewables, South America

Read this article to learn:
- How is Claro developing the biggest private renewable generation project of Brazil
- Main infrastructure management challenges for Brazilian MNOs
- Claro’s views on fibre, collaboration and future plans

TowerXchange: João Pedro, could you please introduce your role at Claro Brasil?

João Pedro Correia Neves, Director of Financial Support, Claro Brasil: My role consists in offering financial support to our technical operations, marketing and customer care as well as managing payments for our infrastructure fees. Additionally, I deal with our infrastructure vendors and providers and manage the company infrastructure assets.

My main goal is to improve efficiency across all company processes through simplification and automation. Moreover, the company is strongly committed to implementing digital solutions in our infrastructure in order to optimise our resources and improve sustainability. Our department is playing a key role overseeing the implementation of this initiative.

Specifically, we aim to improve our towers’ efficiency, reduce our energy cost and minimise our rental fees. We are implementing a digital initiative in our sites that aligns with those corporate goals.

TowerXchange: How many towers does Claro operate in Brazil and what is the company infrastructure strategy?

João Pedro Correia Neves, Director of Financial Support, Claro Brasil: At the moment we have around 14,000 actives sites and our priority is to improve the profitability of those assets.

During 2019, we will continue to build new sites but
the current priority is to reduce the operating cost of the towers and facilitate access to other operators in order to increase revenue. We are trying to develop and implement a simple process within the company that will allow other MNOs to access our sites. We are promoting communication with other operators in the market and exploring collaboration possibilities and potential synergies to optimise the use of technical solutions and minimise the costs associated with the maintenance and operation of our infrastructure.

Regarding towercos, we have a very good relationship with them and we will continue to use their infrastructure.

TowerXchange: What are the main challenges that the company is facing when deploying and maintaining its infrastructure in the country?

João Pedro Correia Neves, Director of Financial Support, Claro Brasil: The main challenges are related to energy cost and security, two variables that have historically been big issues for the Brazilian telecom industry.

In order to reduce energy consumption, we are developing a project for our low voltage sites and we have already started the construction of our own power plants that allow us to autogenerate and meet the necessary demand of those sites. Additionally, for medium voltage and bigger capacity sites, we are exploring all the energy purchase options in the free market and we are also betting on renewable energy.

On the other hand, we are working closely with all the company technical areas and developing different efficiency initiatives. On this note, consumption control is key and we are using telemetry to monitor it. We are also implementing several analytic and comparison tools to determine what would be the ideal consumption in each site and observe which specific aspects can be improve in each tower to reduce that energy cost.

Regarding security, we have a specific department that deals with that and we work very closely with them. As it happens in most Latin American markets, we suffer from vandalism and theft, which is a big issue for the company. We are using modern access control and surveillance systems that guarantee theft reduction and allow us to efficiently control and monitor our assets.

TowerXchange: Claro Brasil is one of the industry leaders in renewable energy integration to power its towers. Could you talk about your energy strategy, the role of renewables and your goals?

João Pedro Correia Neves, Director of Financial Support, Claro Brasil: We are indeed pioneers in developing alternative energy in Brazil and we have now the biggest distributed renewable generation project as a private company in the country. As mentioned above, we are developing several renewable generation plants to power our

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operations. We have a specific department that develops and oversees that initiative and we are collaborating with different national and global leaders.

We have already developed different wind, solar and hydro generation solutions as well as using biogas in order to secure power supply for our network. Our own development on this initiative is allowing us to long-term plan our energy strategy as well as generate energy in a sustainable and affordable manner.

By the end of the project, 80% of the total of Claro’s energy consume in the country will be generated and managed by the company.

TowerXchange: On top of tower deployment, is Claro considering new solutions and technologies such as small cells, DAS, fibre and other alternatives?

João Pedro Correia Neves, Director of Financial Support, Claro Brasil: Fibre is already a pivotal element for us to increase capacity and is playing a key role in both the company’s current and future growth plans. We are probably the operator with the largest fibre investment and portfolio in the country and we are now connecting all our towers.

We are also open to explore all those technologies and solutions and our investments are always driven to deliver the best solutions and offer an efficient telecom network to our customers.

See you at our future events!

Meetup Europe 2019
9-10 April, London

Meetup Americas 2019
9-10 July, Boca Raton

Meetup Africa 2019
8-9 October, Johannesburg

Meetup Asia 2019
3-4 December, Singapore

Meetup MENA 2020
28-29 January, Dubai

www.towerxchange.com
Claro se embarca en el mayor proyecto privado de autogeneración renovable de Brasil

El operador busca mejorar la eficiencia y reducir los costes energéticos a través de las energías alternativas y la apertura de su infraestructura

Reducir el consumo energético es una de las principales prioridades corporativas de Claro en sus operaciones de Brasil y la compañía ha decidido embarcarse en una ambiciosa iniciativa de autogeneración renovable para optimizar sus gastos operativos. La empresa ha desarrollado ya nueve centrales de generación alternativa para suministrar electricidad a sus operaciones y al final del proyecto, el 80% del total de su consumo será generado por el propio operador de manera sostenible. TowerXchange ha hablado con João Pedro Correia Neves, Director de Soporte Financiero de Negocio de la compañía para conocer los detalles de este proyecto y los planes del operador para su infraestructura en el país.

**Keywords:** Access Control, Americas, Americas Insights, Batteries, Brazil, Capex, Claro, Claro Brasil, DAS, Energy, Energy Efficiency, Infrastructure Sharing, Monitoring & Management, MNOs, Opex Reduction, Renewables, South America, Insights

Lee este artículo para conocer

- Cómo Claro está desarrollando el mayor proyecto privado de autogeneración en Brasil
- Los principales desafíos en la gestión de infraestructura de los operadores brasileños
- El enfoque de Claro para la fibra, la colaboración con otros operadores y sus planes futuros

TowerXchange: João Pedro, ¿puede por favor introducir su rol en Claro Brasil?

João Pedro Correia Neves, Director de Soporte Financiero de Negocio, Claro Brasil: Mi rol en la compañía consiste en ofrecer apoyo financiero a nuestras operaciones técnicas, marketing y atención a nuestros clientes, así como gestionar los pagos de las rentas de la infraestructura. Además, me encargo de la gestión de proveedores para la infraestructura y el mobiliario de la compañía.

Mi principal objetivo es incrementar la eficiencia en todos estos procesos a través de su simplificación y automatización. Además, la compañía está haciendo una apuesta fuerte por el uso de recursos digitales en toda nuestra infraestructura con el objetivo de optimizar nuestros recursos y mejorar la sustentabilidad y nuestro departamento está jugando un papel importante, supervisando la implementación de esta iniciativa.

Específicamente, queremos mejorar la eficiencia en nuestras torres, reducir los costes energéticos y las tasas de alquiler. Estamos implementando una iniciativa digital en nuestros sitios que se alinea con estos objetivos corporativos

TowerXchange: ¿Cuántas torres opera actualmente Claro en Brasil y cuál es la estrategia de la compañía respecto a su infraestructura?
João Pedro Correia Neves, Director de Soporte Financiero de Negocio, Claro Brasil: Ahora mismo tenemos más o menos 14,000 sitios activos y la prioridad es incrementar la rentabilidad del portfolio.

Durante este año continuaremos construyendo, pero la prioridad actual es reducir los costes de nuestras torres y facilitar el acceso a otros operadores para aumentar los ingresos y reducir los costes. Actualmente pretendemos desarrollar e implementar un proceso sencillo en la compañía para que otras empresas puedan acceder a estos sitios. Estamos promoviendo la comunicación con los otros operadores del mercado y explorando posibles colaboraciones y sinergias para optimizar el uso de soluciones técnicas y reducir los costos asociados al mantenimiento y operación de nuestra infraestructura.

En cuanto a las torreras, tenemos una buena relación con ellas y seguiremos usando su infraestructura.

TowerXchange: ¿Cuáles son los principales desafíos que afronta la compañía en el desarrollo y mantenimiento de su infraestructura en el país?

João Pedro Correia Neves, Director de Soporte Financiero de Negocio, Claro Brasil: Los principales desafíos están en los costos de energía y seguridad, variables que históricamente han sido un problema para la industria en Brasil.

Para reducir el consumo de energía estamos desarrollando un proyecto para sitios de baja tensión y ya hemos empezado a construir nuestras propias plantas energéticas que nos permiten autogenerar la energía necesaria para cubrir la demanda en estos sitios. Además, para los sitios de media tensión y mayor capacidad, exploramos todas las opciones de compra de energía en el mercado libre, donde también apostamos fuerte por las energías renovables.

Por otro lado, estamos trabajando con las áreas más técnicas de la compañía en el desarrollo de diferentes acciones de eficiencia energética. Aquí el monitoreo y control del consumo es fundamental y estamos controlando este consumo a través de telemetría. Estamos implementando además varias herramientas de análisis y comparación para controlar cuál sería el consumo...

Los varios proyectos de autogeneración desarrollados por Claro Brasil

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Fuente: Claro
ideal de cada sitio y comprobar qué aspectos específicos podemos mejorar en cada torre para reducir ese gasto energético.

En cuanto a la seguridad, tenemos un departamento específico que se encarga de esto y con el que trabajamos mano a mano. Como en muchos otros mercado de Latinoamérica, sufrimos numerosos actos de vandalismo y robos en las torres, lo que es un gran problema para la compañía. Aquí estamos apostando por sistemas modernos de control de acceso y vigilancia que garanticen la reducción de hurtos y faciliten un control eficiente de nuestra infraestructura.

TowerXchange: Claro Brasil es uno de los líderes en integración de soluciones renovables para suministrar energía a sus torres en el sector. ¿Podría hablarnos de su estrategia energética, el papel de las renovables y sus objetivos?

João Pedro Correia Neves, Director de Soporte Financiero de Negocio, Claro Brasil: En efecto, somos pioneros en el desarrollo alternativo de energía en Brasil y tenemos el proyecto más grande de generación distribuida renovable de una empresa privada en el país. Como comentaba anteriormente, estamos desarrollando varias centrales de autogeneración de energía renovable para autoabastecer a la compañía. Tenemos un departamento específico que desarrolla y supervisa esta iniciativa y estamos colaborando con empresas líderes nacionales e internacionales.

Hemos desarrollado ya diferentes soluciones de generación eólica, solar e hidráulica además de utilizar biogás, con el objetivo de asegurar el suministro de energía a nuestra red de infraestructuras. El desarrollo propio de esta iniciativa nos permite planear nuestra estrategia energética a largo plazo, además de generar energía de manera sostenible y económica.

TowerXchange: Además del desarrollo de torres, ¿está Claro considerando la implementación de nuevas soluciones y negocios como small cells, DAS, fibra u otras alternativas?

João Pedro Correia Neves, Director de Soporte Financiero de Negocio, Claro Brasil: Claro Brasil En efecto la fibra es un elemento fundamental para desarrollar capacidad y ya está jugando un papel fundamental el crecimiento actual y planes futuros de la compañía. Somos probablemente el operador con mayor inversión y extensión en fibra y ya estamos conectando todas nuestras torres

Estamos además abiertos a explorar todas esas tecnologías que mencionas e invertimos siempre buscando las mejores soluciones para ofrecer la red de telecomunicaciones más eficiente a nuestros usuarios.
Argentina needs to build 50,000 towers in the next five years

A new initiative by the Agencia Argentina de Inversiones could remove crucial barriers to ease infrastructure deployment

 currently, Argentina has 16,000 active towers. With a 44mn population and a huge geographical extension, the country needs to duplicate that number, but bureaucratic barriers, social opposition and its complex economic situation have stopped the development of telecoms infrastructure in the country. Now, the Agencia Argentina de Inversiones y Comercio Internacional - alongside the Secretaría de Modernización and the Ente Nacional de Telecomunicaciones (ENACOM) - have started a collaborative initiative between towercos, investors and MNOs, which aims to eliminate the barriers that are slowing down the industry development and attract an investment of US$5bn to deploy the 50,000 towers that the country needs.

In this interview, Andres Tahta, Executive Vice President of the Agency, analyses the sector opportunities and discusses how this initiative can help unlocking one of the most promising markets in Latam for telecoms infrastructure deployment.

Keywords: Agencia Argentina de Inversiones y Comercio Internacional, Americas, Americas Insights, Argentina, CALA, Country Risk, ENACOM, Infrastructure Sharing, Investors, Investment, Market Forecast, Market Overview, Meetup Preview, MNOs, Network Rollout, Secretaría de Modernización, South America, Tower People, Towercos

Read this article to learn:
- The role of the Agencia Argentina de Inversiones y Comercio Internacional
- The new initiative to boost the development of the telecom infrastructure sector
- An updated overview of the Argentinian market and its opportunities
- How international investors look at Argentina

TowerXchange: Could you introduce the Agencia Argentina de Inversiones y Comercio Internacional and your role in the telecoms sector?

Andres Tahta, Executive Vice President, Agencia Argentina de Inversiones y Comercio Internacional: The Agencia Argentina de Inversiones y Comercio Internacional was founded in February 2016 after President Macri took office. The institution has two fundamental goals: on one side, we want to recover our SMEs’ export capacity and the other objective is to incentivise national and international investments. The Agency promotes the country’s opportunities and supports global investors throughout the whole investment process, from the first due diligence to the results examination.

We offer strategic support to investors and work closely with the central government, ministers and other key institutions to pave their way. Furthermore, we also offer administrative support by easing bureaucratic procedures and supporting enterprises with all the barriers that arise during their business venture in the Argentinian market.

Focusing on TMT, the Agency promotes data centres development as well as telecoms infrastructure deployment. So far, we have worked with 15 companies in the data centres initiative and some of them have already announced important investments in Argentina. In the tower deployment project, we work to eliminate the social and regulatory barriers that are slowing down the flow of investments. We are currently collaborating with 12 tower companies that are very keen in investing in the country to ease their activities.
TowerXchange: Argentina needs a considerable telecoms infrastructure effort in order to face the current demand and improve coverage and capacity. How many towers are needed? And how can that growth be achieved?

**Andres Tahta, Executive Vice President, Agencia Argentina de Inversiones y Comercio Internacional:** Argentina has 16,000 active sites. According to our estimates - based on conversations with towercos, MNOs and the Secretaría de Modernización - Argentina needs to duplicate that number in order to improve coverage, and even triple or quadruple it to reach the quality and service of most developed countries. Therefore, we estimate that the country needs to build between 20,000 and 50,000 towers over the next five years.

Greater Buenos Aires - formed by the Capital Federal and its huge province - presents huge opportunities due its high density and big population. The big province houses 16mn residents with a mobile penetration over 120%. The population is principally concentrated in the Capital Federal and other five big cities, where the existing infrastructure does not support the current demand.

Argentina is also the eighth biggest country in the world, but it has a very low population density so there is a big gap between rural and remote areas where there is no infrastructure. For instance, the popular and touristic Ruta 40, which crosses the country from north to south through the Andes, or the connection between Mendoza and Santiago, offer very bad coverage and require a huge investment to deliver a good 4G signal.

Moreover, last year the Secretaría de Modernización launched the National Telecommunications Plan that presents other specific opportunities for the industry. This initiative is driving infrastructure deployment and digital inclusion as well as seeking a regulatory framework improvement. The Plan is increasing the number of homes connected, doubling internet speed and improving 4G presence by 50% among many other progresses. However, there is still a long way ahead. The actual home speed in Argentina is around 14Mb/s, far away from European countries and the United States, and infrastructure deployment will have to play a huge role in the growth and development of telecommunications in the country.
TowerXchange: What are the main challenges that the industry is facing and what can regulators and MNOs do to enable its development?

Andres Tahta, Executive Vice President, Agencia Argentina de Inversiones y Comercio Internacional:
If we focus on infrastructure deployment, the bureaucratic barriers are the main obstacle, mainly on a municipal level and in a smaller extend at a provincial level. The approval process for an antenna installation is time-consuming, arduous and very expensive because it sometimes includes prohibitive fees. Currently, 70% of the country’s towers are somehow breaching some municipal or provincial requirements. Argentina is a federal country, where the municipalities have strong power and they are now slowing down and even stopping infrastructure development, so it’s necessary to eliminate those bureaucratic barriers and accelerate the approval processes.

At the agency, we are offering our support to operators to drive collaboration and dialogue with the Government, the Secretaría de Modernización and the ENACOM, aiming to eliminate those investment inhibitors. The Government has to understand the challenges that both MNOs and towercos are facing, as well as the benefits that infrastructure development generates. We want to educate society and municipalities and eliminate mistaken conceptions.

TowerXchange: At the Agency, you are in direct contact with a number of international and local towercos. What are their vision and ambitions in Argentina and what is stopping their irruption in this market?

Andres Tahta, Executive Vice President, Agencia Argentina de Inversiones y Comercio Internacional: As mentioned, we are working and speaking with 12 tower companies, including big international players, regional and local towercos as well as some investment funds that recognise the opportunity and are evaluating how to enter the Argentinian telecoms markets. Towercos’ vision is simple: Argentina offers a huge opportunity as the country needs to double or triple its current number of sites. Infrastructure providers understand that, despite bureaucratic obstacles and market challenges, investing in Argentina is a great move for them. Hence, they have hired very experienced teams to address this opportunity and some of them are already negotiating sale and leaseback contracts with local operators to enter the market with scale.

Despite the current situation, all these companies are willing to invest, they want to double their bets and have the financial means to do it. They have big capitals ready, but there are still some obstacles that difficult the last step that will not just multiply international investment in the country, but will also change the life of the Argentinians by driving connectivity across the business sector, as well as improving coverage, digital services, education and eliminating the digital divide among many other advantages.

The investment opportunity ranges between US$2bn and US$5 bn and we are in conversations with two entities that could invest a thousand million each. Currently, neutral tower penetration is 2% so the opportunity is obvious. As I mentioned earlier, those bureaucratic barriers and difficult permitting processes are slowing down the deployment, and that is stopping investors, but we are convinced that this dynamic will change this year.

TowerXchange: On top of administrative and strategic support, the agency is developing an ambitious initiative to overcome the sector barriers and help operators, towercos and investor to unlock the market. Could you explain the project, its goals, results and expectation?

Andres Tahta, Executive Vice President, Agencia Argentina de Inversiones y Comercio Internacional:
Indeed, we have launched an initiative that, as part of the national plan led by the Secretaría de Modernización, is developing three deployment pilot tests that aim to educate regulators, the industry and society on the benefits of telecoms infrastructure sharing as well as creating a precedent in the dialogue between towercos, MNOs, local institutions and social groups.

Argentina is a country that works mainly by contagion and we think that, if we succeed on these three pilot tests, we will convince and spread this to other provinces while we keep progressing at a national level.
The first test was launched in Mendoza and now we are launching a similar initiative in Jujuy. Buenos Aires province will welcome the third test and we are now talking with some institutions in order to secure political support.

To understand the project it is necessary to analyse its seven phases:

1. First, as we did in Mendoza, we need to review different municipal and national laws and in some cases, modify them to create a regulatory framework that does not stop or slow down deployment. We do not want to take the power away from the municipalities, but we want them to use certain standards that drive investment. We have analysed best practices from other regional countries and the U.S., and selected the most positive aspects of them. Additionally, on a national level, we have created a unique window at the ENACOM so towercos can start approval processes for their municipal sites through the national government.

2. We are also designing an optimal tower installation process, eliminating obstacles and unnecessary barriers as well as reducing fees and approval deadlines.

3. Moreover, we want to drive dialogue between provinces, municipalities and the ENACOM, and align the provincial projects with the national plan objectives.

4. We are proactively sharing the project with the key industry stakeholders, so they can observe the initiatives progresses. And of course this interview helps us on that front!

5. The fifth aspect is one of the most important ones. We want to hear the neighbours’ views and understand why in many cases they are against infrastructure deployment. We are preparing an educational campaign on the benefits of towers for local groups. Despite what many people think, towers do not cause cancer and ironically, having your phone next to your ear while it is searching for a signal is way more harmful. There’s plenty of options to avoid landscape disruption such as camouflaged towers and we have already deployed one with a palm tree shape that perfectly integrates with the environment in Mendoza.

6. We also want to help intendentes and local mayors - responsible for final decision - who sometimes can feel high-pressure from local groups. We have designed a value proposition that they can use to increase awareness on the benefits of towers and the value that towercos can bring to municipalities through free Wi-Fi systems or security cameras.

7. Finally, we have prepared a proactive contact plan and value proposition for the press, as journalist can play a key role on educating society through the media.

TowerXchange: Some international investors are still reluctant to invest in Argentina. What is the current economic situation of the country?

Andres Tahta, Executive Vice President, Agencia Argentina de Inversiones y Comercio Internacional: 2018 was certainly a bad year for all emerging markets and Argentina faced a tough situation. We had high commercial and fiscal deficits and we suffered the biggest drought in the last 50 years, which massively affected the agricultural sector, one of the main drivers of our economy. Until then, Argentina had a 3-4% growth and we are confident that we will go back to that growth after the second semester of 2019.

The government has a very serious economic programme, which seeks to resolve the imbalance in external accounts and public finances. It has taken very specific steps and the international market is putting its trust back to Argentina. They have prepared a new monetary plan to stabilise the exchange rate and they have stopped the flight of capital. Moreover, we see an inflation decrease and we have reached an agreement with IMF that guarantees the necessary resources for 2019.

During this year we’ll reach zero fiscal deficit and we will achieve surplus next year. Thanks to the exchange rate adjustment, Argentina has achieved its greater level of competitiveness in the last seven year and it has cleaned up its balance sheet, so we aim to return to that 3% growth that we had before the 2018 crisis. The exchange rate will also favour exports and some key sector for the country’s economy such as agriculture, tourism and oil and gas will massively increase during the year, generating a very positive impact in the financial situation of the country.
Argentina necesita construir
50,000 torres en los próximos cinco años

Una iniciativa de la Agencia Argentina de Inversiones podría eliminar las barreras al desarrollo de infraestructura

En la actualidad, Argentina cuenta con 16,000 torres activas. Sus 44 millones de habitantes y su enorme extensión requieren al menos duplicar esta cantidad, pero las trabas burocráticas, la oposición social y su compleja situación económica han frenado el desarrollo de infraestructura de telecomunicaciones en el país. Ahora, la Agencia Argentina de Inversiones y Comercio—en conjunto con la Secretaría de Modernización y el Ente Nacional de Telecomunicaciones (ENACOM)—han puesto en marcha una iniciativa que, a través de la colaboración con torreros, inversores y operadores, pretenden eliminar las barreras que frenan el desarrollo del sector y atraer una inversión total de 5,000 millones de dólares para desplegar las 50,000 torres que necesita el país.

En esta entrevista, Andrés Tahta, Vicepresidente Ejecutivo de la Agencia, analiza las oportunidades que alberga el sector y comenta cómo esta iniciativa conjunta puede ayudar a desbloquear uno de los mercados más prometedores de Latinoamérica para el despliegue de infraestructura.

Keywords: Agencia Argentina de Inversiones y Comercio Internacional, Americas, Americas Insights, Argentina, CALA, Country Risk, ENACOM, Infrastructure Sharing, Investors, Investment, Market Forecast, Market Overview, Meetup Preview, MNOs, Network Rollout, Secretaría de Modernización, South America, Tower People, Towercos

Lea este artículo para conocer:
- El papel de la Agencia Argentina de Inversión y Comercio Internacional
- El nuevo proyecto para impulsar el desarrollo del sector de infraestructura de telecomunicaciones
- Un análisis del mercado argentino y sus oportunidades
- ¿Cuál es la posición de los inversores internacionales frente a Argentina?
15 empresas en la iniciativa de los data centers y algunas ya han anunciado fuertes inversiones en Argentina. En el proyecto de despliegue de infraestructura, trabajamos para eliminar las barreras regulatorias y sociales que ralentizan la inversión en el sector, y actualmente estamos colaborando con 12 torreras que están muy interesadas en invertir en el país.

TowerXchange: Argentina necesita un fuerte desarrollo en su infraestructura de telecomunicaciones para hacer frente a la gran demanda actual de los usuarios y mejorar la calidad y cobertura de sus servicios ¿Cuántas torres estiman que requiere el país y dónde identifican las mayores oportunidades para el sector?

Andres Tahta, Vicepresidente Ejecutivo, Agencia Argentina de Inversiones y Comercio Internacional:
Argentina tiene 16,000 sitios activos. Según nuestras estimaciones, basadas en conversaciones con torreros, operadores y la Secretaría de Modernización, Argentina necesita al menos duplicar esa cifra para mejorar la cobertura e incluso triplicarla o cuadricuplicarla para alcanzar los niveles de calidad de servicio de muchos países desarrollados. Por tanto, estimamos que el país necesita construir entre 20 y 50mil torres y antenas en los próximos cinco años.

El gran Buenos Aires -formado por la Capital Federal y su enorme Provincia- presenta grandes oportunidades debido a su alta densidad y su gran concentración de población. La gran provincia alberga 16 millones de habitantes con una penetración celular que supera el 120%. La población está principalmente concentrada en la Capital Federal y otras grandes cinco ciudades, y la infraestructura existente es incapaz de cubrir la demanda actual.

Argentina es además el octavo país más grande del mundo, pero tiene una densidad de población muy baja, por lo que hay una carencia en zonas rurales y remotas donde no hay todavía la infraestructura necesaria. La popular y turística Ruta 40, por ejemplo, que cruza el país de norte a sur por la Cordillera de los Andes, o la conexión entre Mendoza capital y Santiago de Chile, ofrecen muy mala cobertura y requieren una fuerte inversión para poder desarrollar una buena señal de 4G.
Por otro lado, la Secretaría de Modernización lanzó el pasado año el Plan Nacional de Telecomunicaciones que presenta otras oportunidades específicas para la industria. La iniciativa está impulsando el desarrollo de infraestructura y la inclusión digital, además de perseguir una mejora del marco regulatorio del sector. El plan está generando numerosos avances, aumentando el número de hogares conectados, duplicando la velocidad de internet y mejorando el despliegue de 4G a más del 50%, entre muchos otros progresos. Sin embargo, todavía queda un largo camino por recorrer. La velocidad actual en hogares argentinos es de 14Mb/s, muy lejos de los países líderes de Europa o Estados Unidos, y el despliegue de infraestructura jugará un papel clave en el crecimiento y mejora de las telecomunicaciones en el país.

TowerXchange: ¿Cuáles son los principales desafíos que enfrenta la industria y qué pueden hacer los reguladores y carriers para favorecer su desarrollo?

Andres Tahta, Vicepresidente Ejecutivo, Agencia Argentina de Inversiones y Comercio Internacional: Si nos centramos en el despliegue de infraestructura, las trabas burocráticas son el principal escollo, principalmente a nivel municipal, y en menor medida a nivel provincial. El proceso de aprobación para instalar una antena es largo, arduo y muy costoso, ya que incluye unas tasas a veces prohibitivas. Actualmente, un 70% de las torres del país están de alguna manera incumpliendo ciertos requisitos municipales o provinciales. Argentina es un país federal, donde los municipios tienen un gran poder y están ahora mismo ralentizando e incluso frenando en ocasiones el desarrollo de infraestructura, por lo que es imprescindible eliminar estas barreras burocráticas y acelerar los procesos de aprobación.

Desde la Agencia, estamos ofreciendo nuestro apoyo a los operadores para facilitar la colaboración y diálogo con el Gobierno argentino, la Secretaría de Modernización y con el Ente Nacional de Telecomunicaciones (ENACOM), con el objetivo de eliminar esos inhibidores de la inversión. Es fundamental que el gobierno comprenda los desafíos que los operadores y torreros están enfrentando, así como los beneficios que genera el desarrollo de esta infraestructura. Pretendemos educar a la población y a los municipios y eliminar concepciones erróneas.

TowerXchange: Desde la Agencia están en contacto directo con numerosas torreras nacionales e internacionales ¿Cuál es su visión y ambiciones en Argentina y qué está frenando su irrupción en este mercado?

Andres Tahta, Vicepresidente Ejecutivo, Agencia Argentina de Inversiones y Comercio Internacional: Como comentaba, estamos trabajando y conversando con 12 torreras, entre las que hay grandes compañías internacionales y otras compañías regionales y locales, además de algunos fondos de inversión que reconocen la oportunidad y están evaluando cómo entrar en el mercado de telecomunicaciones argentino. La visión de torreras es simple: Argentina ofrece una grandísima oportunidad, ya que el país necesita duplicar o triplicar el número actual de torres. Los proveedores de infraestructura entienden que, a pesar de las trabas burocráticas y los desafíos del mercado, merece la pena apostar por Argentina, por lo que han contratado a equipos muy experimentados para abordar esta oportunidad y algunas ya están negociando acuerdos de sale and lease back con los operadores locales para entrar al mercado con buen volumen.

A pesar de la coyuntura actual, todas estas empresas están dispuestas a invertir, quieren duplicar la apuesta y cuentan con el financiamiento para ello. Las empresas tienen grandes cantidades de capital preparadas, pero aún hay algunas trabas que dificultan ese último paso que no solo multiplicaría la inversión extranjera en el país, sino que va a cambiar la vida de los argentinos, facilitando la conectividad del sector empresarial, mejorando la cobertura, los servicios digitales, la educación y eliminando la brecha digital, entre muchas otras ventajas.

Hay una oportunidad de inversión que oscila entre los dos mil y cinco mil millones de dólares, y estamos en conversaciones con dos entidades que podrían llegar a invertir hasta mil millones cada una. Actualmente, la penetración de las torres neutrales es del 2% por lo que la oportunidad es clara. Como señalé con anterioridad, esas trabas burocráticas y la dificultad para obtener permisos están ralentizando el despliegue de torres, y esto está frenando a muchos inversores, pero estamos convencidos de que la dinámica cambiará este año.
TowerXchange: Además de su apoyo administrativo y estratégico, la Agencia está desarrollando una ambiciosa iniciativa para superar las barreras del sector y ayudar a operadores, torreros e inversores en el desbloqueo del mercado. ¿Podría explicar el proyecto, sus objetivos, resultados y expectativas?

Andres Tahta, Vicepresidente Ejecutivo, Agencia Argentina de Inversiones y Comercio Internacional:
En efecto hemos lanzado una iniciativa, que, enmarcada dentro de un plan nacional liderado por la Secretaría de Modernización, está desarrollando tres pruebas piloto de despliegue de infraestructura para convencer a reguladores, industria y población de los beneficios de compartir infraestructura de telecomunicaciones y crear un precedente en el diálogo entre torreros, operadores, instituciones locales y grupos sociales.

Argentina es un país que funciona en gran medida por contagio, y creemos que, si logramos el éxito en estos tres proyectos piloto, lograremos convencer y contagiar a otras provincias mientras seguimos avanzando a nivel nacional.

La primera de las pruebas piloto se lanzó en la provincia de Mendoza y ahora estamos lanzando una iniciativa similar en Jujuy. La provincia de Buenos Aires albergará la tercera prueba, para lo que estamos ya conversando con las instituciones pertinentes para garantizar que el proyecto tendrá todo el apoyo político.

Para comprender el proyecto es necesario analizar sus siete macro fases de trabajo:

8. En primer lugar, como ya hemos hecho en Mendoza, hay que revisar las diferentes leyes y regulaciones nacionales y municipales y en algunos casos modificarlas para garantizar una normativa que no frene o ralentice el despliegue. La idea no es quitarles el poder a los municipios, pero al menos lograr que se muevan dentro de ciertos estándares que incentiven la inversión. Para ello, analizamos las mejores prácticas de los países de la región y de Estados Unidos, escogiendo los mejores aspectos de cada uno. Además, a nivel nacional, hemos creado una ventanilla única en el ENACOM para que los torreros puedan iniciar los trámites de aprobación de sitios (que son municipales) a través del gobierno nacional.

9. Estamos también diseñando un proceso óptimo de instalación de torres, eliminando trabas y trámites innecesarios, llevándolo al mundo online, mejorando las tasas y reduciendo los plazos de aprobación.

10. Además, queremos fomentar el dialogo entre las provincias y municipios y el ENACOM, y alinear el proyecto provincial con los objetivos del plan nacional.

11. También estamos comunicando proactivamente el proyecto a los principales actores del sector, para que puedan observar que hay avances en la resolución de los inhibidores a la inversión, ¡y obviamente esa entrevista por ejemplo nos ayuda con ese fin!

12. El quinto aspecto es uno de los más importantes. Queremos conocer la postura de los vecinos y comprender los motivos por los que en muchas ocasiones se oponen a este despliegue. Estamos diseñando una campaña educacional que resalte los beneficios de las torres para los grupos locales. A pesar de lo que mucha gente cree, las antenas no generan cáncer y paradójicamente es mucho más nocivo tener el teléfono pegado a tu oído intentando buscar una señal que no llega o llega con dificultad. Además, los avances tecnológicos permiten camuflar las torres, y en el caso de Mendoza por ejemplo se ha colocado una con forma de palmera que se integra perfectamente en el entorno.

13. También queremos ayudar a los intendentes —encargados de la decisión final— que en ocasiones pueden sentirse muy presionados por grupos locales. Hemos diseñado una propuesta de valor para que puedan compartir los beneficios de las antenas y el valor que las compañías de torres pueden aportar a los municipios a través de wifis gratuitos o cámaras de seguridad.

14. Por último, hemos desarrollado un plan de contacto proactivo y una propuesta de valor para los periodistas, ya que juegan un gran papel en la educación de la población a través de los medios.

TowerXchange: Algunos inversores internacionales todavía tienen ciertas reticencias a la hora de apostar por Argentina. ¿Cuál es la situación actual?

Andres Tahta, Vicepresidente Ejecutivo, Agencia Argentina de Inversiones y Comercio Internacional:
2018 fue un año muy complicado para todos los
mercados emergentes y la situación en Argentina fue dura. Enfrentamos un alto déficit comercial y fiscal y sufrimos la mayor sequía de los últimos 50 años, lo que afectó duramente al sector agrario, que es uno de los pilares de la economía del país. Hasta entonces, Argentina venía creciendo entre un 3 y 4% y estamos convencidos de que vamos a retomar ese crecimiento a partir del segundo semestre del 2019.

Para ello, el gobierno tiene un programa económico muy serio, que busca resolver los desequilibrios en cuentas externas y finanzas públicas. Ha tomado medidas muy concretas y el mercado internacional está depositando de nuevo su confianza en el país. Se ha armado un nuevo plan monetario para estabilizar el tipo de cambio y se frenó la fuga de capitales. Además, ya vemos un sendero decreciente de la inflación y se ha llegado a un acuerdo con el Fondo Monetario Internacional que garantiza el financiamiento necesario para hacer frente a 2019.

Durante este año alcanzaremos un déficit fiscal cero y apuntamos a un superávit para el próximo año. Gracias al ajuste en el tipo de cambio, Argentina ha alcanzado su mayor nivel de competitividad en los últimos siete años y ha saneado sus cuentas, por lo que esperamos retornar al 3% de crecimiento que estábamos experimentando antes de la crisis de 2018. El tipo de cambio también favorecerá las exportaciones y algunos sectores clave de la economía del país como la agricultura, el turismo y el petróleo experimentarán un gran crecimiento durante este curso, generando un impacto muy positivo en la situación financiera del país.

### See you at our future events!

#### Meetup Europe 2019
9-10 April, London

#### Meetup Americas 2019
9-10 July, Boca Raton

#### Meetup Africa 2019
8-9 October, Johannesburg

#### Meetup Asia 2019
3-4 December, Singapore

#### Meetup MENA 2020
28-29 January, Dubai

[See you at our future events!](www.towerxchange.com)
With Laura Graves now on maternity leave we must temporarily say goodbye to our Managing Director for EMEA and introduce the man trying to replace her: Matthew Edwards. Matthew joined in January this year and has started work on the TowerXchange Meetup Africa.

This year the TowerXchange Meetup Africa will be co-locating with FTTX Council Africa’s annual conference, and we are pleased to feature an interview with Helios Towers and their South African fibre-partners Vulatel. We also take a look at their 2018 financial results.

In Kenya, Airtel have announced a merger with Telkom Kenya, and in Tanzania Airtel have resolved their ownership dispute with the country’s government. This eases the way for an IPO later this year, and we thank Fitch Solutions for an analysis of Airtel Africa’s five remaining tower markets.

Then, we zoom in on one of Airtel’s remaining markets with an interview with the owner of Towerco of Madagascar and Madagascar’s fourth MNO. We also take a look at the South African tower market.

Finally, in the first installation of our African middle-market Who’s who we interview Pan African Towers of Nigeria, and update our reporting on Atlas Towers as they expand into Kenya and Botswana.

Don’t miss:
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How Helios Towers broke through the 50% EBITDA margin and 2.0x tenancy ratio thresholds in the last year

Kash Pandya speaks about what is driving continued growth, and Helios Towers plans for small cells and edge datacentres

On the 25th February Helios Towers announced results for the 12 months to 31 December 2018. The big picture story remains one of continued organic growth through co-locations, amendment revenues and built-to-suit, driving margin improvements through Helios Tower's Lean Six Sigma approach to operational efficiencies. The next big step for Helios Towers is the recently announced expansion into South Africa, through a partnership with Vulatel and acquisition of SA Towers, which provides the infrastructure platform to enter into one of Africa’s largest and most attractive markets. TowerXchange interviews Helios Towers CEO Kash Pandya on the activities behind the figures.

Keywords: C-Level Perspective, Congo Brazzaville, DRC, EBITDA, Edge, Fibre, Ghana, Helios Towers, Interviews, SSA, Small Cells, South Africa, Tanzania, TheFutureNetwork, Towercos

Read this article to learn:
- What is driving Helios Towers’ financial performance?
- The trends in their existing markets which will drive consistent revenue growth into 2019
- Aims and targets for Helios Tower’s South African expansion
- EBITDA targets for the medium and long-term
- Plans for small cells, edge datacentres and the future network

TowerXchange: Before we dig a little deeper into the numbers, please give us your initial thoughts on your 2018.

Kash Pandya, CEO, Helios Towers: We’re very pleased with what we have achieved and the continued growth we’ve seen in 2018. We’ve had four years and 16 consecutive quarters of adjusted EBITDA growth. Our 2018 average was 50% across the whole year, but 52% in Q4, so we’re well on our way to hit our unofficial target of 55% EBITDA over the next year or two. We’ve come a long way from our Q1 2015 EBITDA margin which was just 25%.

The numbers have been driven by a couple of things, including our Lean Six Sigma approach to operations, but we’ll get to that later. I want to highlight the strong macro performance and potential of the markets in which we operate. DRC, Congo Brazzaville and Tanzania all have low mobile penetrations versus their high populations but mobile revenues are consistently growing. They also have good overall demographics with 70% of the population under 30. In Tanzania and DRC, 4G licences were only issued last year and handset costs are coming down rapidly which is good for uptake.

In addition to macro factors, we are the only independent towerco in three of the markets in which we operate. And in Ghana, where we face more competition, we won an open tender to become the towerco of choice following the Tigo/Airtel merger, which will be the country’s number two operator. All the countries we operate in are
dynamic and young and we’ve seen strong revenue performance so far and importantly there’s a lot of potential for more tenancies and more organic growth in each of our now five markets.

**TowerXchange: As you say, you started 2019 by entering your fifth market, South Africa, please tell us more about your partnership with Vulatel and your acquisition of SA Towers.**

**Kash Pandya, CEO, Helios Towers:** We have signed a partnership with Vulatel and have signed an acquisition of SA Towers. Vulatel are a major player in the fibre-optic market in South Africa and SA Towers are a leading small independent towerco. Together as Helios Towers South Africa we expect to be publishing our first tower count at the end of April. At that time we expect to own a portfolio of around 100 towers with a pipeline of about 500 more. So our initial plans are to bed-in the partnership and hit the ground running with our pipeline of towers. The South African model is very different to our other markets as there is no power management included in tower contracts, but we are happy to offer power management if any customer or site requires it.

In the medium term, we’re really excited to bring together SA Towers management team and their local planning and permitting experience with our technological expertise and our Lean Six Sigma approach. The organic growth opportunity of South Africa is great and we hope to build and own 1,000 of the 7-8,000 towers South Africa needs over the next 3-4 years. There’s 30,000 towers in South Africa with only 10% sitting in independent towerco hands, so the potential for acquisitions is healthy too. It’s also the African market with the most established 4G market, and it’s predicted there’ll be 4mn 5G users within five years. This means there’s all sorts of opportunities for us, and we’re now in a good position to make the most of them.

**TowerXchange: Last year Helios Towers stopped its IPO process, do you think there’s anything in these results which will affect your plans to IPO?**

**Kash Pandya, CEO, Helios Towers:** We planned to IPO in Q1 2018, around a year ago, but I don’t think any of the fundamentals of the business have changed since then. Potential investors who look at these results will see the same business delivering a good margin as was outlined at the time. Many companies were looking to list in early 2018 and a big proportion of companies, just like us, decided the dynamics in the equity markets at that time weren’t right.

What the results do show for a future IPO is that we have time on our side. Our current shareholders see a business delivering consistently, with strong margin and EBITDA growth. Unlike some other companies looking to IPO, we have positive operating cash flow and good debt facilities to raise money. Plus, because we have publically listed debt we have a lot of the governance and reporting in place already that is required of a public company, so we can go to market at a time that suits our shareholders, when market conditions are right.

**TowerXchange: Revenues increased 3% year-on-year, can you break that down for us so we can understand the balance of growth in sites, growth in tenancies, and to what extent tenancy losses or consolidation reduced revenue?**

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**The bottom line**

- Revenue for the 12 months increased by 3% year-on-year to US$356mn (FY 2017: US$345mn)
- Adjusted EBITDA up 22% year-on-year to US$177.6mn (FY 2017: US$146mn) with FY 2018 Adjusted EBITDA margin at 50% (FY 2017: 42%), up 8ppts
- Q4 2018 Adjusted EBITDA up 13% year-on-year to US$46.5mn (Q4 2017: US$41.1mn) with Q4 2018 Adjusted EBITDA margin at 52% (Q4 2017: 46%), up 6ppts
- Cash and cash equivalents of US$89mn at the end of the year (FY 2017: US$119.7mn)
- US$100mn term loan facility raised to fund future expansion in current markets and opportunities in new markets, specifically South Africa
- Increase in colocations of 5% year-on-year to 6,804 colocations (FY 2017: 6,468 colocations)
- Increase in total sites of 3% year-on-year to 6,745 total sites (FY 2017: 6,519 total sites)
- Tenancy ratio increased by 0.02x to 2.01x (FY 2017: 1.99x)
In the DRC last year we built two new backbones, one for Vodacom and one for Orange, of a combined 1800km in length. These only went live in the second half of 2018, so the revenue is only beginning to show. We’re actively talking about a third 500km backbone for another MNO. So while there is uncertainty, investment is continuing and we’re seeing results.

But since the election passed largely peacefully, we have seen things pick up again. We saw a strong Q4 in DRC with 200 new tenancies and I think the revenue impact of a weak first half of 2018 won’t have any long-term effects. The international business community has been very wary of political instability in DRC, but in terms of telecoms we’ve seen the market to be very robust. In 2017/18 our customers saw 15% growth and earlier in February Orange cited its DRC operations as a principal contributor to its 17% subscriber growth.

So even as there are risks for a slowdown in organic growth the strong macro fundamentals hold up. Mobile penetration continues to grow and DRC remains one of the best markets. There are 85mn people with 40% SIM penetration and only 50% of the geography is covered. There’s huge potential. In the DRC last year we built two new backbones, one for Vodacom and one for Orange, of a combined 1800km in length. These only went live in the second half of 2018, so the revenue is only beginning to show. We’re actively talking about a third 500km backbone for another MNO. So while there is uncertainty, investment is continuing and we’re seeing results.

TowerXchange: Q4’s margin of 52% is a long way from your starting point of 25%, but what is the limit for you, how high can you push your EBITDA margin, and do you have an internal target you are working towards?

Kash Pandya, CEO, Helios Towers: In the medium term, by which I mean the next year or so, we want to break through 55% for a full year. Over
the longer term, around 3-5 years, we’re hoping to break through and hit a 60% EBIDTA margin. Those figures are based on our existing markets, of course if we make a significant new acquisition we might have a lot of work to get the margins aligned on our new assets and existing assets.

**TowerXchange: How do you approach improving the opex performance and margin of individual sites?**

**Kash Pandya, CEO, Helios Towers:** We have a bit of a machine-like approach here to driving performance, and I mean that in a good way. We take it very seriously, down to things like me receiving a daily measure of our uptime and performance versus SLAs. We are geared towards providing exceptional power up-time. 92% of sites in existing markets are at Six Sigma levels, that’s 99.99966% uptime, which translates to 2 second of downtime per tower per week. That is much better than what is required in our SLAs, and we’re proud of that.

So I’d say we were very much focused on the 8% of towers which are not achieving Six Sigma levels of performance. A big part of that improvement has come, and will come, from investing in people on the ground level. Over the last three years we have really invested in developing local staff and we are going to continue doing that. 96% of our staff locally are nationals of the countries they operate in, and 99% of staff in the operating companies are native Africans. As well as training individual staff members and teams we are applying analytical tools to understand why poor margin sites are not performing.

We also ensure our new sites are up to performance and achieving good margins, low capex and high rates of lease up. We have a geospatial tool which we use to recommend build-to-suit sites to our customers which use population density, school and university placements and some other criteria to help us identify the best sites. We know those sites are best because we get lease up rates of 27% on build-to-suit towers which compares favourably with the 17% we achieve on sale and leaseback towers.

**TowerXchange: You have entered your fifth market with a joint venture with fibre-experts Vulatel, are you looking at more non-macro tower technologies for future growth options?**

**Kash Pandya, CEO, Helios Towers:** Because of our partnership with Vulatel we are interested in the potential of dark fibre and bringing fibre to more areas in South Africa. We’re also looking at edge datacentres, in fact, in the coming months we are going to begin development work in South Africa. Outside South Africa, we are building a small cell network in Ghana and hope to run trials on an active network soon. So we have excellent prospects within our existing markets, but we are also actively looking at new options complementary to our core business too.
Introducing Vulatel, Helios Towers’ new South African spouse

Helios Towers and their new partner Vulatel discuss their shared ambitions to build towers and fibre across South Africa

TowerXchange speaks with Helios Towers’ CCO, Alex Leigh and their new South African partner Tlhabeli Ralebitso, Chairman and CEO of Vulatel. Local majority black-owned Vulatel are the 34% owner of the joint venture Helios Towers South Africa as well as being a key player in the building and maintenance of South Africa’s rapidly growing network of fibre. In our interview we discuss the background of both firms in South Africa and how they plan to work together, the size, quality and potential for the fibre and tower markets of South Africa, and plans for expansion.

Keywords: Backhaul & FTTT, Business Model, C-Level Perspective, Capex, Core Network, Data Centre, Edge, Fibre, Helios Towers, Insights, Leasing & Permitting, Masts & Towers, SSA, Small Cells, South Africa, TheFutureNetwork, Towercos, Vulatel

TowerXchange: To begin with, please tell us a little bit about Vulatel and how you fit into the telecoms infrastructure ecosystem in South Africa.

Tlhabeli Ralebitso, Chairman and CEO, Vulatel: There are two key elements to what Vulatel do. First of all, we are subcontracted by the large operators to design and implement new build fibre-optic and wireless projects. But we are also contracted to do maintenance on existing assets all across the country. For example, we maintain Vodacom’s broadband connect wireless network alongside other operators’ national networks. By offering services and maintenance to existing players, Vulatel has built up a strong knowledge base of where assets are and are not across South Africa. Together with really strong local knowledge it produces a winning combination. The founding team all previously worked at Vodacom and came together through 2016 and 2017 to establish Vulatel, and that expertise has given us skills and expertise, and an understanding of the MNO business case for fibre and wireless infrastructure.

A strong service proposition and good understanding of what South Africa’s operators want has given Vulatel two key advantages. It has meant we have been able to establish ourselves quickly and start offering our services at scale because we can navigate South Africa’s operators. And we also understand the requirements of the market: where the gaps are which need filling and what is needed to reach scale and to build on top of existing networks.

Read this article to learn:

- Find out about Helios Towers’ new joint venture partner Vulatel
- Next steps for investments by Helios Towers in South Africa, including SA Towers
- Estimates on how many towers, business and homes are fibre-connected in South Africa
- Permitting challenges for fibre and towers in South Africa
- Potential plans for edge datacentres overlaid on regen sites
TowerXchange: Last month you announced your joint venture plans with Helios Towers to create a new infrastructure platform, Helios Towers South Africa, what specifically appealed to you about Helios as a partner? And vice versa?

Tlhabeli Ralebitso, Chairman and CEO, Vulatel: Lots of things attracted us to Helios. We felt there was a true meeting of minds between the management teams – there’s an eagerness to get started and a positive approach to doing things which are similar across the two teams. Plus, South Africa’s MNOs are looking for infrastructure and service provisions together. They don’t want to lease infrastructure separately to retaining services and together Helios and Vulatel can fulfil that need. And the appeal of working with an experienced towerco, with significant scale, access to long-term funding, and with a long-term commitment to the South African market was obviously also very attractive. A good partnership requires a clear vision and a consistent cultural approach and throughout the discussions leading up to agreeing the deal both sides shared the same can-do attitude.

Alex Leigh, Group Chief Commercial Officer, Helios Towers: We both share a common vision for what needs to happen in South African telecoms, and our discussions around this vision helped us to form a clear strategy for what to do next. Vulatel have done a great job understanding what their customers want and developing a compelling proposition which Helios is excited by too.

Helios Towers South Africa is a new entity, it will be controlled by Helios Investment Partners though a 66% stake, and Vulatel will hold the other 34% stake.

It’s through Helios Towers South Africa that we will build our South African infrastructure platform. We recently announced the acquisition of SA
Towers. HTSA will hold an 85.9% stake in SA Towers once the transaction is finalised. The SA Towers management team is probably the best in the country for planning, permitting and constructing new towers, so we’re really excited about them joining. So far SA Towers have focused on the big cities but as Helios, Vulatel and SA Towers work together we’ll expand that footprint through organic growth.

**TowerXchange: South Africa will require both significantly more mobile tower infrastructure and significantly more fibre-optic investment, please explain how these complement one another.**

Tlhabeli Ralebitso, Chairman and CEO, Vulatel: MNOs in South Africa are prioritising organic growth and that implies building out their networks and densifying in places, but they also have licence conditions which require them to enter more marginal markets too. On most of those towers they are going to require fibreisation because without fibre you can’t offer real 4G services, and certainly not 5G. And Vulatel is in a good position to offer the maintenance as well as the infrastructure build out.

**TowerXchange: How do the challenges of permitting and building fibre, small cells and macro towers compare? Are there efficiencies possible from bringing these together?**

Alex Leigh, Group Chief Commercial Officer, Helios Towers: Towers take a long time to build in South Africa. There is a long lead time on permitting – it can be anywhere up to two years – because of a long period of consultation and different phases with various stakeholders. This is inconvenient initially but once you start building sites and have a pipeline and a good foundation of effective permitting, this can help drive the value proposition of large speed to market improvements for customers.

One of the things that motivated Helios to acquire SA Towers, beyond its existing portfolio of towers, is its pipeline of permits and the great property team that combined with the Helios Towers process and systems will be a fantastic growth engine. It really goes to show the big benefits possible from the right bolt-on acquisitions for our joint venture platform.

Tlhabeli Ralebitso, Chairman and CEO, Vulatel: Towers are much harder to permit than fibre. It is more straightforward to get permission to dig up the street in South Africa. Municipalities are interested in improvements to fibre optic connectivity and are happy to engage to get fibre deployed. From submitting the paperwork to closing the road to install the fibre can take just two weeks, depending on what other work is required in that area, so it is about 50 times faster than permitting a tower. The benefit from combining the two comes largely from talking to the same sorts of people and combining the delivery of fibre and tower. You can rationalise the human resources you put into planning and coordinate installations better.

**TowerXchange: How do you suggest overcoming the challenge of backhauling small cells, particularly in developing markets where fibre remains scarce?**

Tlhabeli Ralebitso, Chairman and CEO, Vulatel: The fibre roll-out to high density, particularly in...
relatively affluent residential areas, is accelerating organically and growth of fibre in those areas will partially meet the challenge of supplying backhaul to small cells and a densified network. But in a South African perspective, for the urban township areas which are less affluent and are unable to support a fibre deployment economically, we will still need to use microwave backhaul instead of fibre. But the economics of less well-off, but still dense areas, still struggles to justify fibreisation, even combining a fibre and wireless roll-out.

Alex Leigh, Group Chief Commercial Officer, Helios Towers: Helios Towers tends to refer to “smart solutions” rather than focus narrowly on bringing fibre and small cells together. There’s a spectrum of different deployments all trying to achieve the same thing and it doesn’t make sense to narrowly define a small cell. If you can bring fibre to a structure, like a lamppost, which is fibreised and connect an antennae to it then it makes a lot of sense economically to think of it as a small cell.

But the basic story across Africa is that infrastructure is coming on strongly in some areas and is not in others. But there are two opportunities to try to move things along. One is looking for partnerships in areas which already have developed fibre infrastructure and build small cells or smart solutions on top of that existing network. Then there are the solutions which involve providing new fibre in partnership with property developers. But for most of South Africa, at the present time, it isn’t small cells which are the pressing problem, it is towers that need to be fibreised and the towers that need to be built for infill.

TowerXchange: What proportion of South Africa’s towers, businesses and homes are connected to fibre optic? What progress can be expected towards full coverage?

Tlhabeli Ralebitso, Chairman and CEO, Vulatel: I cannot give you accurate figures, but I am happy to guestimate. In my view, less than 50% of towers are fibreised and in many areas 4G is being supported by microwave. Running 4G on microwave backhaul obviously limits its performance and offers a big opportunity for us to provide that fibreisation. South Africa is not going to reach 100% fibreisation any time soon, and we have lots of deep rural areas which are going to keep their microwave backhaul for a long time.

But there is a big chunk of tier two towns which require fibreisation and many of these towns have national fibre networks running past them, so the opportunity to fibreise relatively easily is there. And as operators like Liquid Telecom deploy more long distance fibre, more and more cities will become accessible. Without making any promises, I think we’re looking at least a 3-5 year programme before tower fibreisation reaches a critical mass. Businesses are less well connected than towers. Around 40% of South Africa’s businesses are connected to fibre, but even major businesses
outside main urban areas will be working off wireless. Fibre to the home is even rarer: only 300-500,000 homes are fibreised, so there's a huge opportunity there too.

What happens next is not clear though. Capex requirements can change quickly in developing markets. The recent withdrawal of legislation for South Africa’s Wholesale Open Access Network could lead to more spectrum being available and that will change the balance of capex for spending on fibre, towers or spectrum. Significant demand for fibre isn't going away, but its magnitude isn't easy to predict.

**Alex Leigh, Group Chief Commercial Officer, Helios Towers:** It's easy to talk about whether something is connected to fibre or not, but you can't forget that not all fibre is created equal. And there are big variations in satisfaction and service quality. A key reason we're so happy to be working with Vulatel is their commitment to delivering a good product. The design, maintenance and quality of assets are all high and the fibre installed performs with minimum downside and minimum breaks and will consistently put us in the top quartile of quality. I think Tlhabeli is braver than me to put a figure to it, because data on how many assets are connected to fibre are difficult to collect and verify, but he's right there's a significant need still out there.

**Tlhabeli Ralebitso, Chairman and CEO, Vulatel:** The priority for me is to hit the ground running and get the business going. There's a huge number of opportunities over the next few months to build and provide the product they're so excited by. As I've mentioned, there's more opportunities than there's capex to fund them, so we're focusing on the best options.

**TowerXchange: The fibre market in South Africa is highly fragmented. What is the origin of this fragmentation and do you now have plans to consolidate the market?**

**Tlhabeli Ralebitso, Chairman and CEO, Vulatel:** There's more than enough new build opportunity that there's no need to acquire or replicate existing routes. Recent consolidation of existing operators haven't appeared to create much value and Vulatel and Helios are concentrated on their existing strategy. There's a limit to the capital available for any investment in South Africa and there's no sense in acquiring existing assets where there's as good, and often much better, opportunities elsewhere that play to your existing strengths.

**TowerXchange: Please summarise your vision for the future of your partnership.**

**Tlhabeli Ralebitso, Chairman and CEO, Vulatel:** The focus for me is to hit the ground running and get the business going. There's a huge number of opportunities over the next few months to build and provide the product they're so excited by. As I've mentioned, there's more opportunities than there's capex to fund them, so we're focusing on the best options.

**Alex Leigh, Group Chief Commercial Officer, Helios Towers:** Helios Towers plans to invest around US$100mn over the next 3-4 years in South Africa and we are reviewing all angles to do this.

Regulatory hurdles sometimes restrict what we can do to market, so we will select projects on a case by case basis but we will consider all approaches in all markets. For example, there are lots of fibre assets laid down in Ghana by operators and fibre providers such as CSquared and they may represent an opportunity for Helios Towers. In Tanzania, TCCL has a mandate to own fibre assets and in the DRC Liquid Telecom is making investments. Helios Towers is working to understand the best way to play in those markets, and our excellent partnerships in South Africa can only support our understanding. So we are actively tracking opportunities, but we don't have a defined pan-African fibre strategy.

In South Africa, as Tlhabeli mentions, we are selecting the best projects to accelerate tower growth and lay fibre across the network. We're also thinking about the market for edge datacentres. Vulatel manage regen sites on their fibre network – where fibre signals are boosted as they travel long distances – where they already have an air conditioned space, with racks, guaranteed power and pre-existing customer relationships. This is the perfect base to build an edge datacentre, so we're really excited about the long-term possibilities to become South Africa's digital infrastructure problem solvers beyond our already excellent core business plan with Vulatel.
Fitch Solutions: How attractive are Airtel Africa’s remaining towers?

A deeper look into the five key African markets in which Airtel Africa retains ownership and control of its towers

Four years ago Airtel Africa successfully sold its towers in eleven markets but, conspicuously, failed to sell its passive infrastructure in Chad, Gabon, Madagascar, Malawi and Tanzania. With an IPO in the offing, the arguments for disposing of its capex-intensive towers are as strong as the arguments for keeping them, even if only in the short term. The five markets in which it tried and failed to sell its towers are fiercely price-competitive, but there are other industry- and country-risk factors it should consider when drawing up its options. This article was contributed by Fitch Solutions.

Keywords: Airtel Africa, Chad, Country Risk, Fitch Solutions Analysis, Gabon, Investment, Madagascar, Malawi, Market Forecasts, Market Overview, Masts & Towers, Research, SSA, Tanzania

Read this article to learn:
- Airtel’s market position across Africa
- The macro context in terms of Industry and Country Risk and Reward
- The relative attractiveness of Airtel’s towers in Chad, Gabon, Madagascar, Malawi, Tanzania
- Implications of a tower sale for Airtel Africa’s IPO

Airtel has options... but not many

Growing demand for mobile data services, supported by the proliferation of low-cost smartphones and the introduction of innovative mobile data offerings, will encourage higher data consumption. This provides an upside risk to Fitch Solutions’ forecasts for 3G/4G adoption. However, heightened political and economic challenges in these markets pose a downside risk to the uptake of advanced services. Operator efforts in this regard remain a long-term investment, one that would be less risky if not burdened by infrastructure expenses.

Airtel Africa had 94.1mn mobile subscribers at the end of September 2018, up by 19.5% year-on-year. The number of data-consuming customers grew by 32.1% over the same period and data usage per customer improved by 12% to 1,113MB per month. However, intense price competition kept blended ARPU in the region of US$3 per month and data ARPU at just US$2.3 per month. Although premium data services such as streaming are available, users tend to focus on lower-value offerings such as messaging and mobile money.

While we anticipate monetisation improvements will continue to be seen, we believe they will still be modest and incremental in nature. Meanwhile, Airtel will need to continue rolling out mobile broadband-enabled towers and base stations and this will offset any gains in revenues. Selling some, or all, of its remaining towers increasingly looks to be an option for the company.
The upcoming IPO poses a dilemma, however. Selling its remaining towers ahead of listing would inflate its cashflow, reduce its capex requirements and allow the company to position itself as a higher-margin service-centric player. On the flip side, retaining the towers would inflate its valuation, enabling it to command a premium from investors. The towers could then be sold on at a later date, further inflating cashflow.

Airtel Africa had its equipment on 20,060 towers as of September 2018, but only 4,449 of these towers were directly owned and controlled. Some of these are located in markets where regulators are yet to consider separately licensing infrastructure and service and some are in markets where dedicated tower companies are reluctant to tread because of macro-economic and political risks or where the market is simply not big or dynamic enough to justify operational costs.

Fitch Solutions’ macro research unit regularly surveys the competitive landscapes in 38 of Sub-Saharan Africa’s telecoms markets and utilises its proprietary Risk/Reward Index to determine the fundamental investment attractiveness of those markets relative to one another. Each market is assessed in terms of Risks (Industry Risks and Country Risks), weighed against Rewards (Industry Rewards and Country Rewards) to arrive at an overall score out of a maximum potential of 100 points.

In 25th, 29th and 30th positions, respectively, Madagascar, Malawi and Chad are the three Airtel Africa markets that fall in the bottom half of the league table with scores of 36.9, 36.3 and 36.2 points out of 100. Subscriber and revenue growth are underwhelming and macroeconomic risks are significant. Tanzania sits in 11th place (43.4 points out of 100), but is held back by growing industry

**Fundamental investment attractiveness of Airtel Africa’s remaining tower markets**

<table>
<thead>
<tr>
<th>Market</th>
<th>Telecoms score</th>
<th>Attractiveness scored out of 100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub-Saharan Africa average</td>
<td>38.2</td>
<td></td>
</tr>
<tr>
<td>Gabon</td>
<td>45.9</td>
<td></td>
</tr>
<tr>
<td>Tanzania</td>
<td>43.4</td>
<td></td>
</tr>
<tr>
<td>Malawi</td>
<td>36.3</td>
<td></td>
</tr>
<tr>
<td>Madagascar</td>
<td>36.9</td>
<td></td>
</tr>
<tr>
<td>Chad</td>
<td>36.2</td>
<td></td>
</tr>
</tbody>
</table>

Source: Fitch Solutions
Chad 3G and 4G subscribers and overall penetration rate

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<table>
<thead>
<tr>
<th>Year</th>
<th>3G Subscriptions ('000)</th>
<th>4G Subscriptions ('000)</th>
<th>Total Mobile Phone Subscribers/100 Inhabitants (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018 (e)</td>
<td>4,000</td>
<td>3,500</td>
<td>3,000</td>
</tr>
<tr>
<td>2019 (f)</td>
<td>3,900</td>
<td>3,400</td>
<td>2,900</td>
</tr>
<tr>
<td>2020 (f)</td>
<td>3,800</td>
<td>3,300</td>
<td>2,800</td>
</tr>
<tr>
<td>2021 (f)</td>
<td>3,700</td>
<td>3,200</td>
<td>2,700</td>
</tr>
<tr>
<td>2022 (f)</td>
<td>3,600</td>
<td>3,100</td>
<td>2,600</td>
</tr>
<tr>
<td>2023 (f)</td>
<td>3,500</td>
<td>3,000</td>
<td>2,500</td>
</tr>
</tbody>
</table>
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Source: Fitch Solutions

The opportunities offered by the country’s low mobile penetration and the lack of affordable mobile broadband services are diminished by heightened operational risks facing operators. This is largely due to recent tax hikes aimed at the mobile sector as the state seeks to plug budgetary shortfalls brought on by sustained economic deterioration. Facing shrinking margins and an increased tax burden, operators lack the incentive to invest in advanced technologies and network expansions, opting to focus on upgrading existing customers instead. We also would not rule out the eventual exit of one of the two larger players,

we believe that 3G and 4G uptake will fail to keep pace with population growth, accounting for only 15.2% and 20.2% of the population by 2023.

Chad supported just 6.559mn mobile subscribers in September 2018, for a penetration rate of only 42.7%, and the uptake of value-added services (VAS) remains muted.

This is further exacerbated by the lack of disposable incomes (estimated at GDP per capita of US$760 at end 2018) which weighs on demand for more than the most basic low-value prepaid services, hindering operators’ efforts to migrate users to premium services. As such, we believe that 3G and 4G uptake will fail to keep pace with population growth, accounting for only 15.2% and 20.2% of the population by 2023.

The regulator’s attempts to entice a fourth entrant into the market have thus far been unsuccessful.

Chad
Chad is one of the most challenging markets in Airtel’s operational footprint, reflected by its low score on the Index. Despite the presence of two experienced international players, Airtel and Tigo, risks including service taxes and mandatory listing of telecoms businesses. Gabon is in sixth place, a result of a very favourable economic growth outlook and improving consumer spending power that sits well with operators’ efforts to upsell value-added services, despite muted subscriber growth in recent times.

In some markets, therefore, retaining ownership of key infrastructure assets may be seen as insulating against sudden risk.

Chad
Chad is one of the most challenging markets in Airtel’s operational footprint, reflected by its low score on the Index. Despite the presence of two experienced international players, Airtel and Tigo,
especially if their profitability continues to be squeezed.

**Gabon**
Airtel and Gabon Telecom Mobile are the two main mobile network operators in Gabon. Third player Azur had its licence revoked for poor quality of service in 2017, and it appears to be dormant at present; its owners or creditors could yet sell it outright or carve out assets such as towers in an effort to recoup investments.

Gabon ended September 2018 with 2.889mn mobile subscribers and we only expect the market to grow by 0.7% in the five years to 2023. Nevertheless, Gabon is the sixth most attractive market on our Index. This is owing to a high demand for advanced services which we estimate at 1.552mn 3G/4G users in 2018 as well as estimated ARPUs of US$10, one of the highest in the region. Additionally, years of underinvestment in the country’s fixed line services presents operators with an opportunity to exploit the growing demand for cheaper and more accessible mobile alternatives, among most consumers and small businesses. Operators are also looking to bolster their value added service offerings in response to growing demand for mobile money and media content in the region.

The main risk to our forecast is the country’s economic reliance on exports of commodities. This makes it particularly vulnerable to volatility in oil prices which could impact customer spending on advanced services. The country is also facing increased risks of political violence as ailing president Ali Bongo fends off threats to his rule. A state-imposed internet shutdown in response to an attempted coup in the country in January 2019 highlights a growing trend in the region and may further impact investment appetites.

**Madagascar**
Fitch Solutions believes there were 10.283mn mobile subscribers in Madagascar in September 2018, a penetration rate of only 39.2%. There remains scope for natural expansion, although reaching the country’s small, isolated communities makes this endeavour more costly. High network expansion costs, coupled with the lack of economic growth means that the service offerings have mainly been limited to 2G and CDMA technologies for a large part of the population.

However, Gulfsat Madagascar’s 2016 entrance as the fourth mobile network operator under the brand Blueline, spurred intense price competition and investment in 3G/4G technologies as incumbents Airtel, Orange and TELMA sought to protect their market shares. The resultant uptake of 3G/4GLTE services has been fairly muted but this has not stopped operators from expanding their networks in the country. Price competition and low per capita income continue to put downward pressure on ARPUs, which we estimate stood at around US$3 in September 2018.
Madagascar mobile market

We believe that as the use of 3G/4G services becomes more widespread, it has the potential to lift user spending on networks. Additionally, Fitch Solutions’ Country Risk team forecasts real GDP growth of 4.0% for 2019. However, the elevated risk of political instability following the December 2018 elections may lead to subdued economic activity, placing downward pressure on disposable incomes and discretionary spending powers.

The state also increased excise tax on telecoms services from 7% to 10% in 2016 and would not rule out additional taxation measures should it need to consolidate on the back of slow growth in government revenues. Both scenarios would further extend the time-frame for which operators can begin to recoup their investments into advanced technologies.

Malawi mobile market

Malawi

Malawi’s mobile market served 6.906mn mobile subscribers at the end of September 2018 but is highly skewed to the prepaid segment which has led to lower ARPs and multiple inactive subscribers. It remains at risk of volatile subscription growth in the coming years, as the regulator has embarked on an aggressive SIM registration drive, the most recent of which led to the disconnecting of around 1mn SIMs in October 2018.

Nonetheless, we are positive about the prospects for 3G/4G growth as operators focus on advanced and value-added services, mainly mobile financial offerings, as a differentiator. The market ended
September 2018 with 3G and 4G users amounting to 3.656mn and 625,000 respectively.

Publicly-listed Telekom Networks Malawi (TNM) invested almost US$26.2mn towards its LTE network expansion in 2017, after spending around US$12.6mn the previous year. Airtel responded by allocating over US$20mn to bolster its high-speed data services over the course of 2017 and launched a 4G LTE network in the country in January 2018. The ongoing capital investments by Airtel and TNM will support a faster uptake of these services despite the network deployment challenges in a country where the rural base accounts for 83% of the population.

**Tanzania**

With a total mobile subscriber base of 42.12mn at the end of September 2018, Tanzania is by far the largest of Airtel’s remaining markets. Additionally, an estimated mobile penetration rate of only 71.3% for the same period highlights the market’s considerable growth potential.

Vodacom acquired a majority stake in Safaricom in May 2017 and has been bolstering the latter’s VAS offerings in the country, expanding beyond its current Mobile Financial Services (MFS) portfolio into data-centric VAS such as e-commerce and music and video content streaming services. Unwilling to be left behind, rival operators will also look to drive uptake in their VAS services to diversify revenues.

3G/4G uptake has also been robust, on the back of high demand for data services. 3G/4G users numbered 22.87mn in 2018 and Fitch Solutions forecasts this figure to grow to just under 40.72mn in the five years to 2023.

Seven operators currently compete in a market dominated by regional players Vodacom, Airtel and Tigo. However, recently licensed Azam Mobile is expected to launch services soon.

Operators face increasing saturation and competitive pressure among Tanzania’s urban users which only account for 33% of the population. We believe that operators have thus far been reluctant to expand their services into underserved areas, owing to the significant expansion costs, low consumer purchasing power and heightened risks from increasing political involvement in the sector.

In January 2019, Airtel ceded 9% of its share in its Tanzanian unit to the government in a hopefully final settlement to resolve a long-running ownership dispute between the parties. This development comes as telecoms companies face increased operational costs with complying with regulatory rules which aim to have them list 25% of their shares on the Dar es Salaam Stock Exchange.
Meet the man shaking up Madagascar’s telecoms market

Hassanein Hiridjee is one of Madagascar’s most successful businessmen; we discuss his plans for Towerco Of Madagascar, Telma and international expansion

Hassanein Hiridjee is the chief executive officer of the Axian Group, since 2011 owners of Towerco Of Madagascar (TOM). The group operates the island’s leading telco and owns and operates 55% of the island’s towers. TOM is operated at arm’s length from Telma and hosts tenancies from all of the island’s other operators: Orange, Airtel and Blueline. Hiridjee is also expanding into West Africa as one of the investors acquiring Tigo Senegal from Millicom and has ambitions for TOM as a national champion, spreading economic development across the Indian Ocean and Africa. TowerXchange discussed the background of the group, details of TOM’s operational and organisational set up, and plans for expansion.

Keywords: Axian Group, C-Level Perspective, Energy, MNOs, Madagascar, Masts & Towers, Off-Grid, Renewables, SSA, Senegal, Telma, Towerco Of Madagascar, Towercos, Urban vs Rural

Read this article to learn:
- How to manage an arms’ length relationship between an MNO and a towerco
- Plans for increasing coverage in Madagascar
- How Towerco Of Madagascar manages power at its rural sites
- The Axian Group’s plans for investment across Africa

TowerXchange: First, please introduce yourself – tell us a bit about your history and how you got into the telecoms business?

Hassanein Hiridjee, CEO, Axian Group and Chairman, Towerco Of Madagascar: I have run Axian for more than a decade now. Originally, we were a traditional family business that needed to reinvent itself, diversify and become more international. We started by investing primarily in the telecommunications market, and we have since made Telma the leading operator in Madagascar. Then, we invested in other markets, still in telecoms: Comoros and Reunion in particular. Today in this sector, we are present in the Indian Ocean and also in West Africa in Senegal. And we will not stop there!

TowerXchange: Many of our readers will have heard of Towerco Of Madagascar and Telma, but for those who don’t know, can you please tell us a little about the Axian Group and how its various lines of business interrelate?

Hassanein Hiridjee, CEO, Axian Group and Chairman, Towerco Of Madagascar: Today at Axian, we build the group around the notion of impact on economic, social and societal issues. It is our vision that we deploy throughout the African continent. We are present in telecoms, and our expertise is recognised in this sector, but we are also in finance, services, real estate, as well as being involved in energy through Jovenna. Naturally, we seek to create synergies between all activities.
and we actually do it! For example, the link is obvious between our operator Telma and our MVola mobile banking service, which has been very successful with more than one million customers in Madagascar.

The common denominator of all our activities is our purpose: contributing to an inclusive and sustainable development through reliable and world class infrastructures and services such as hydroelectric production plants, telecoms towers and nano-saving services. At the same time, we invest in different funds (Partech, Amethys II) in order to contribute to the emergence of an African ecosystem of SMEs, which also allow us to strengthen our footprint across the African continent.

TowerXchange: Please introduce the Madagascar telecom market to us, with a particular focus on network infrastructure.

Hassanein Hiridjee, CEO, Axian Group and Chairman, Towerco Of Madagascar: In Madagascar, Telma has more than 4.5 million subscribers and is the first converged operator in Madagascar. We offer our customers – individuals and businesses – quality services based on the best international standards and at the best price. In Madagascar, as everywhere, our customers want to benefit from an increasingly efficient and reliable network. We were the first to bring 4G to the island, and we invested hundreds of millions of dollars in infrastructure to deploy fibre, renovate metropolitan networks and connect Madagascar to Europe and the rest of the world with the Eastern Africa Submarine Cable System (EASSy) project.
connect Madagascar to Europe and the rest of the world with the Eastern Africa Submarine Cable System (EASSy) project.

**TowerXchange: Congratulations on Telma’s status as market leaders in Madagascar, with coverage above 90%. What are your principle remaining challenges both in terms of coverage in rural areas and densification / 4G rollout in cities?**

**Hassanein Hiridjee, CEO, Axian Group and Chairman, Towerco Of Madagascar:** Thank you for your congratulations and your encouragement, we work hard for our customers to benefit from the best technologies and these congratulations must directly go to our great and dedicated teams.

Our objective is obviously to reach 100% coverage, to achieve our inclusion goal. Telma currently covers nearly 1,300 cities, including more than 50 with 4G, and we have installed 10,000 km of fibre optics. We must continue to invest in infrastructure as this will allow us to remain leader on our market, build customer loyalty and win new ones. We are currently investing in a new submarine optic fibre cable project to reinforce Indian Ocean’s connection to the rest of the world. We are also reinforcing synergies between telecoms and energy with the deployment of antennas and the energy infrastructure needed to power them.

**TowerXchange: What motivated the establishment of Towerco Of Madagascar as an independent towerco? What have been some of your greatest successes with TOM?**

**Hassanein Hiridjee, CEO, Axian Group and Chairman, Towerco Of Madagascar:** Towerco Of Madagascar is an essential asset for us because it allows us to be present in the whole chain of values of the sector. We thus master the infrastructure, the network engineering and services ensuring quality and safety for our customers. We deploy to the world’s best international standards. In addition, it seemed to me strategic that a country like Madagascar could have on its territory a national champion able to control these technologies and develop the network. Since its creation, we have built or renovated nearly 1,200 telecom towers and we are investing to build at least 100 new towers every year. We have ambition and we invest to achieve our goals.

Finally, and to return to the notion of impact that is crucial to me: TOM also acts to open up the territories. Today, when we install a new tower, it is not only about bringing the network to a geographical area, we also bring our customers the possibility to be connected to the rest of the world, to open a mobile money account and sometimes even provide them with a new source of energy.

**TowerXchange: How have you devised governance strategies to ensure Towerco Of Madagascar operates in an independent manner from Telma? What is the relationship like between Towerco Of Madagascar and Madagascar’s three other MNOs?**

**Hassanein Hiridjee, CEO, Axian Group and Chairman, Towerco Of Madagascar:** TOM has operated in a fully independent manner since its creation in 2011. The towerco has its own team of professional staff, its own tools, offices and governance. Services provided and tariffs are mutually agreed with each of TOM’s clients, the MNOs, in a contractual document signed by both parties, defining all terms and obligations of each party. The relation with MNOs are therefore clear, cordial and transparent. Telma remains the major customer of TOM, with a large number of hosted positions and volume of orders for build-to-suit towers and expansion of capacity at existing sites, more so than Madagascar’s other operators.

**TowerXchange: What assets do TOM have on the ground? How successful have you been in leasing up the towers to third parties?**

**Hassanein Hiridjee, CEO, Axian Group and Chairman, Towerco Of Madagascar:** With more than 1,200 towers in the territory, TOM operate 55% of the country’s towers. This is essential for Telma as the leader, but it also provides amazing opportunity for infrastructure sharing and to allow others players to grow their presence. The competition is open and every new tenant is more competition for Telma, but competition stimulates me, encourages me to innovate and invest to maintain our leadership.
We have all operators – Orange, Airtel and Blueline – engaged in infrastructure sharing on TOM’s towers, and all of them salute the quality of service and operational efficiency we provide them. We have constant discussion with them on how to improve our businesses and the way forward to the future, and we are confident they will engage more tenancies on our sites on a win-win basis. Again, mobile penetration and technology development gives rise to opportunities across all the country, enabling synergies and infrastructure sharing between all actors of the industry, in order also to optimise and reduce their financial investment.

TowerXchange: When we last spoke with Gilles Kuntz he emphasised the importance of energy management and opex discipline at Towerco of Madagascar. What forms does this take today?

Hassanein Hiridjee, CEO, Axian Group and Chairman, Towerco Of Madagascar: Operational efficiency, mainly in terms of energy management, and cost control, are still the main objectives for TOM and a key factor of our success today. We consider also the green environmental aspect of our solutions and we act responsibly to reduce carbon emission and limit all form of pollution. Energy operations are scrutinised and we closely study our processes to ensure optimum efficiency and maximum lifetime for our equipment, as well as controlling spend. We’re also cautious about using the right energy solutions as the landscape of Madagascar varies greatly, with very difficult accessibility to some of our sites. Because many sites are hard to reach, all our sites deployed in rural areas are run on a pure solar solution, this represents 60% of our sites.

TowerXchange: What lessons would you share with other MNOs considering carving out a towerco?

Hassanein Hiridjee, CEO, Axian Group and Chairman, Towerco Of Madagascar: We can feel proud of TOM’s success and the economic business model we have set up and put in place over the past years. TOM is seen today as a very efficient operation based on its model, its operational and its financial efficiency. I would therefore recommend any MNO’s or stakeholder carving out a towerco to visit us, or to engage our services!

TowerXchange: Please summarise your vision for the future of Axian Group within Madagascar and beyond.

Hassanein Hiridjee, CEO, Axian Group and Chairman, Towerco Of Madagascar: For the next few years, my goal is simple: to have Axian make a leading impact on the entire African continent. We already operate in 34 African countries, directly through our companies or indirectly through our participation in several investment funds I mentioned early, making us the first “venture” private African investor. When we decide to grow in an activity or a country via Axian brands and services or through our participation in funds, we do so according to a common denominator: that of delivering a positive and lasting impact and contributing to better financial, energetic and digital inclusion for all people on the continent.
Blueline were launched in 2015 by local internet service provider Gulfsat Madagascar and are an LTE-only operator. Madagascar’s voice market has been almost stable with little recent growth, however the market has been shifting towards higher data usage, especially in the urban areas which account for over 70% of the mobile market. Blueline own and operate some of their own towers and rooftop sites and lease space on shared towers in Madagascar. TowerXchange asked Blueline CEO Mohib Pirbay what life is like for a small MNO on a big island.

**Keywords:** 4G, Blueline, C-Level Perspective, LTE, MNOs, Madagascar, Masts & Towers, Rooftop, SSA, Unreliable Grid

Read this article to learn:

- The state of voice and data markets in Madagascar
- Prospects for an LTE-only operator in urban markets
- How independent infrastructure management improves capex efficiency for MNOs
- Blueline plans to surf the growth of 4G to scale rapidly

TowerXchange: Please introduce yourself and Blueline’s current tower strategy in Madagascar.

Mohib Pirbay, CEO, Blueline Madagascar: Blueline are the fourth MNO in Madagascar. We are specialists in 4G/LTE connectivity.

We tend to build our own towers and enjoy the independence it gives us to direct our network strategy. We also find there is a cost advantage in building our own towers because we are mainly a data operator and can build towers and rooftop structures which suit our needs. We own around 120 towers and around 60% of those are rooftop installations.

As we focus on urban markets, our sites tend to be on grid, but we still require a backup in case grid unreliability strikes. We’ve experimented with solar too, but not to a great extent as none of our sites are hard to reach – we can refuel and maintain our gensets easily.

TowerXchange: What can you tell me about how the Madagascan mobile market is evolving?

Mohib Pirbay, CEO, Blueline Madagascar: It is a fact that the voice market is almost stable with little if not zero growth. However, the market is shifting quickly towards a higher data usage especially in urban areas which account for over 70% of the current market. This is why we are investing in the growth of our 4G infrastructure. Coverage across the country is around 35-40%. There’s still a lot of potential for expansion in the market. The growth of coverage is limited by the actions of the major
operators and neither Airtel nor Orange have significantly expanded their tower portfolios or network reach in recent years.

**TowerXchange: How do you see Blueline’s network developing and do you have plans to work with independent towercos or share towers in the future?**

**Mohib Pirbay, CEO, Blueline Madagascar:** Blueline already shares some towers where it makes sense to do so but has no plans to share towers more than the limited amount we already do until we see an increase demand for 4G services. Blueline are lucky to own three times more spectrum than our competition and that gives us a big edge. Once cheaper phones and economic development arrive, Blueline would see an independent towerco as a very important partner to improve capex efficiency to enable Blueline to rapidly grow its 4G services and market share across the country.

Coverage across the country is around 35-40%. There’s still a lot of potential for expansion in the market. The growth of coverage is limited by the actions of the major operators and neither Airtel nor Orange have significantly expanded their tower portfolios or network reach in recent years.

We own around 120 towers and around 60% of those are rooftop installations.
Understanding the tower markets of Southern Africa

Opportunities to build, buy and service towers in South Africa, Botswana and Angola

Any review of opportunities in Southern Africa tends to commence with a look at South Africa, simply as a function of the size of the market. With a stock of around 29,000 towers, a competitive MNO landscape with four established prospective tenants and new entrants Rain, South Africa would seem at first glance to be an ideal market for towercos, yet a significant majority of the country’s towers remain trapped on MNO balance sheets.

Tensions run high between the country’s MNOs and American Tower, which has the largest independent portfolio of some 2,608 towers. Many stakeholders attribute these tensions to the relatively high leaseback rate agreed by Cell C when they sold their towers back in 2010, and as a result Cell C are seeking to rebuild their own tower portfolio. These tensions also translate to significant downward pressure on lease rates in South Africa – challenging since the cost of land continues to increase.

South Africa has also seen the carve-out of the African continent’s first operator-led towerco of scale, Telkom’s Gyro Towers, which markets co-locations on around 6,500 structures. Vodacom also have an in-house towerco boasting an impressive tenancy ratio, believed to be around 1.8x. International towercos have long coveted MTN’s ~11,000 South African towers, but rumors of a potential sale and leaseback of those assets have not resurfaced for several years.

Keywords: ANTOSC, American Tower, Angola, Atlas Tower, Botswana, Build-to-Suit, Carve-Out, Country Risk, Energy, Fibre, Market Overview, Namibia, PowerCom, Pula Towers, Research, SSA, South Africa, Zimbabwe

Read this article to learn:

- Why operators are increasingly behaving like (and competing with) towercos
- How and where build to suit towercos are thriving
- How leading towercos diversifying into fibre in South Africa
- A review of cell site energy requirements in South Africa, Angola, Namibia and Zimbabwe
- Ten tips for tower entrepreneurs

Pioneering towercos from South Africa, Botswana and Angola joined current and prospective suppliers and partners at the Southern Africa roundtable at the TowerXchange Meetup Africa 2018. The resultant discussion provided intriguing and contrasting snapshots of opportunities for towercos, and their partners, in five Southern African countries. TowerXchange has supplemented what we learned at the roundtable with additional market research to build the following analysis.

South Africa

Keywords: ANTOSC, American Tower, Angola, Atlas Tower, Botswana, Build-to-Suit, Carve-Out, Country Risk, Energy, Fibre, Market Overview, Namibia, PowerCom, Pula Towers, Research, SSA, South Africa, Zimbabwe

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South Africa is home to several smaller private towercos including International Tower Corp, Eagle Towers, Coast to Coast, Blue Sky Towers, Pro High Site Communications and Comco. Broadcast towerco Sentech also markets 300 sites for co-location by MNOs.

By far the fastest growing towerco in South Africa is Atlas Tower, which has over 700 sites in the country, with a healthy pipeline of further sites secured. Atlas are confident they will have over 1,000 South African towers by the end of 2019, representing a significant share of the 1,000-1,500 new sites being built per year in the country.

Africa’s third largest towerco Helios Towers recently entered South Africa through the acquisition of private towerco SA Towers, and in a partnership with fibrecos Vulatel, with a goal to deploy R1.4bn into communications infrastructure, including 10,000km of fibre and both macro towers and small cells along those fibre routes. American Tower has similar aspirations to diversify into fibre, having already signed a partnership with fibrecos Frogfoot.

Spectrum is in short supply in South Africa – which could suppress demand for densification sites. The controversial Electronic Communications Amendment Bill (ECA) will not be passed before the country’s 2019 general election. The ECA included a framework for the creation of a wholesale open-access operator. While this may seem a daunting prospect for South Africa’s emerging tower industry, similar open-access models have been proposed and seldom realised in several other countries, while in Mexico the open-access operator ALTAN Redes quickly became the towercos’ number one customer.

**Botswana**

Both Pula Towers and the aforementioned Atlas Tower have secured licenses to build towers in Botswana – they both describe the licensing process as relatively quick and easy.

While the ~850 towers in Botswana remain on the balance sheets of the three MNOs (Orange, Mascom and incumbents BTC), there does seem to be a gap in the market for independent tower companies.

The caveat of course is that Botswana is a small country (566,730 sq km) with a population a little over two million, but the country does not lack liquidity for good investments, and the towerco model makes sense to local financiers. While 4G rollouts commenced as long ago as 2015, there is still need for densification sites.

**Angola**

There are around 1,000 towers in the capital Luanda and ~3,000 nationwide in Angola. That inventory of towers needs to be doubled to achieve coverage targets – reports suggest less than 50% of the country’s administrative divisions currently have mobile coverage.
Market leader Unitel owns the majority of Angola’s towers, challenger Movicel’s network includes around half as many structures. In late 2017, fixed line incumbent Angola Telecom was awarded a license enabling them to launch a wireless service, but no launch seems imminent, while a fourth operator is expected to be announced shortly. Unitel has deployed 4G to Angola’s largest cities, but the majority of subscribers remain on 3G platforms.

Tower ownership has transferred from government to Angola’s MNOs, but the government remains an engaged stakeholder: regulator the Institut Angolias Des Communications (INACOM) has created a committee to create basis of common basis of sharing towers, indeed INACOM arranged for a substantial delegation of stakeholders to attend the TowerXchange Meetup 2018. INACOM objectives include to promote a culture of infrastructure sharing and to accelerate permitting. There is also an enthusiasm to reduce opex, both in terms of lease costs and power. Independent towercos are recognised as a potential means of bringing down opex, and for accelerating rollout for new entrant operators.

ANTOSC are Angola’s first independent towercos in the process of building 30 sites with a further 70 sites planned for 2019. The towercos expect to have around 400 sites within three years.

Prospective towercos entrepreneurs/investors continue to maintain a watching brief over the Angolan market, monitoring the streamlining of permitting processes to make a local tower industry viable, and the potential creation of an investible towercos license regime, supported by rule of law to enforce contracts. The identity and rollout strategy of the fourth MNO will be critical to the investibility of Angolan towers.

"The identity and rollout strategy of the fourth MNO will be critical to the investibility of Angolan towers"

Namibia and Zimbabwe

The roundtable covered Namibia and Zimbabwe only briefly as there was finite appetite among participants to invest in the countries’ tower markets.

While Namibia is seen as an attractive potential tower market, extensive government participation, including in the country’s two leading MNOs and in the country’s only towercos, mean international towercos have struggled to secure a license in the country. Two state-owned MNOs MTC and Telecom Namibia lead the market, with privately owned new entrant Paratus stimulating competition. MTC is currently extending its 3G network into rural areas, with plans to build 524 rural towers in 2018-19.

Telecom Namibia owns Namibia’s sole towercos, PowerCom, which has around 300 sites with tenancies from all three MNOs as well as a number of non-traditional tenants.

“Namibia may be too small for two towercos,” concluded one roundtable participant.

At time of writing, unrest and inflation continue to headline a level of country risk which makes international investment difficult in Zimbabwe.

“While Zimbabwe interesting country, there are obviously substantial macro economic and political issues to consider,” said one roundtable participant. “Historically they’ve required 51% local ownership, which effectively rules international tower investors out of the market.”

There are around 2,700 towers in Zimbabwe, ~1,500 of which are owned by market leaders Econet Wireless. There has been pressure to share infrastructure, particularly directed at Strive Masiyiwa’s Econet Wireless, which at one point saw...
Ten tips for tower entrepreneurs

One of the tower entrepreneurs TowerXchange most respects in Africa – in fact worldwide – is Atlas Tower CEO Nathan Foster. While moderating the Southern Africa roundtable, Nate shared a few pearls of wisdom applicable to towerco entrepreneurs globally.

1. “Every tower site is its own profit centre – you can make good money on ten towers”
2. If you seek to scale beyond that “be careful from SG&A perspective.”
3. “We’ve invested in countries where there is good rule of law – where we can enforce your contracts.”
4. You won’t be first to market for long: “We started in Alaska – there are six towercos there now.”
5. “We have to get increasingly creative to get vertical real estate into dense urban areas.”
6. “We’re building smaller towers on average than in the past – we call them small macros – we have a patented Clean Site that is 10-20m.”
7. “Towercos must be faster and better at acquiring real estate than MNOs - a lot of our staff are former town and city planners.”
8. “If you can control the four corners of a rooftop (and increasingly the sides of buildings) it’s an asset you can lease back to operators.”
9. How do Atlas identify new sites? “We use third parties, RF engineers... we have a great speculative programme”.
10. “While we acquire sites speculatively, only a very small percentage of our actual build is speculative – naked towers in advance of a lease”.

The operator seemingly on the brink of carving out a towerco. That seems less likely in the immediate future, but Econet has created their own Energy Services Company (ESCO) Distributed Power Africa, which does provide power to third parties.

State-owned Telecel, could be part-privatised. Each owns around 600 towers.

Cell site energy in Southern Africa

While distributed generation is not as widely deployed in Southern Africa as West Africa, there are significant pockets of demand.

While perhaps as few as 100 of South Africa’s sites are off-grid, there is a growing demand for towercos to provide backup power as a service in the country, driven by load shedding, itself a symptom of finite generation capacity. It should be noted that power-as-a-service is not yet the norm – most South African towercos provide ‘steel and grass’ only.

In Angola’s capital Luanda main electricity grid power is widely available but not 100% reliable. “You need backup power to achieve Service Level Agreements”, said one roundtable participant. As many as 85% of Angola’s sites have a degree of reliance on distributed generation – mostly diesel gensets, with some battery hybridisation, and with increasing adoption of renewables, particularly at remote rural sites.

Namibia’s extensive grid means most sites need only rectifiers and battery banks, with backup diesel gensets only on critical sites. PowerCom report that less than 1% of their towers are off-grid.

The vast majority of Zimbabwe’s towers are on-grid, and the country has plenty of generation capacity.

The general reluctance of many Southern African towercos to take on power (“power cash flow is not consistent and long term, like tower cash flow, so I’m worried about value creation,” said one towerco at the roundtable) may mean an increased appetite to partner with ESCOs. “Not all MNOs require us to manage power,” said one towerco “and where we do provide it, we prefer a pass through model.”
Meet one of Nigeria’s most ambitious private independent towercos

Pan African Towers have towers in Nigeria and Ghana and are already preparing for 5G

As part of TowerXchange’s who’s who in middle-market towercos we spoke to Karo Akaba, Chief Commercial Officer at Pan African Towers. Mrs. Akaba has lots of experience in the tower industry having previously worked at SWAP Towers and HTN Towers. Pan African Towers is one of a number of Nigerian privately owned, independent “middle-market” towercos including Seal Towers, BCTek, Communications Tower Nigeria and Hotspot Networks. In this interview, we discuss their plans within Nigeria and international expansion, power strategy, and plans for 4G and 5G.

**Keywords:** 5G, Africa, C-Level Perspective, DAS, Ghana, IBS, Interviews, Masts & Towers, Nigeria, Pan African Towers, Renewables, Rooftop, SSA, SWAP Telecoms & Technologies, Small Cells, Towercos

TowerXchange: First please introduce yourself and the history of Pan African Towers:

Karo Akaba, Chief Commercial Officer, Pan African Towers: Pan African Towers was licenced by the Nigerian Communications Commission (NCC) in the last quarter of 2017. Shortly thereafter, we signed a managed service and co-location agreement with SWAP Towers for about 700 towers. Since 2017, we have expanded our portfolio to over 1,000 towers in Nigeria. Primarily, our expansion was from new build-to-suit sites for an anchor tenant, one of the mobile network operators (MNOs) in Nigeria. In addition, we have some monopoles and some billboards, but that isn’t a big part of our portfolio. Outside of Nigeria, we have an arrangement to manage 300 towers in Ghana. We have ambitions beyond Ghana and Nigeria, but our priority now is to build a solid footprint in these two markets.

In Nigeria, we work with all mobile network operators and the major broadband operators. Our tenancy ratio has been quite stable, in spite of the increase in tower portfolio because we are committed to growing the number of tenants per site. In addition to traditional MNOs, we also have non-traditional tenants like local wholesale internet service providers.

TowerXchange: What kind of growth opportunities exist and what challenges are faced by middle-market towercos operating in Nigeria and Ghana?

Read this article to learn:

- What it is like operating in Nigeria as a middle-market towercos
- Pan African towers plans for embracing solar and hybrid power solutions
- Targets sites for acquisition and organic growth
- How a mid-market African towercos is preparing for 5G
Karo Akaba, Chief Commercial Officer, Pan African Towers: We are planning to grow organically, adding build-to-suit towers for our existing clients. But as everyone knows, towercos require scale to reach their full potential so we are looking for non-organic growth opportunities. We are speaking with one company about acquiring a portfolio of 400 sites, which would bring our total managed sites up to around 2,000 by the end of the year.

At the moment, we are about to sign an infrastructure sharing agreement with MTN. We are aware that they have an exclusivity agreement with the biggest towerco in the market and this places a limit on the number of sites they can release to other towercos. We are having more luck with Airtel, they have no exclusivity so they are willing to give business to whoever can deliver towers at a good cost, speed and with excellent operations. We are delivering around 60 towers a quarter for Airtel and we are hopeful that the relationship will continue to grow. We recently agreed commercials with 9mobile and our agreement is almost ready. Due to the issues faced by 9mobile, they’ve not been able to do deals, but we’re confident they’re coming and we are poised to work with them. So we have the potential to add over 300 sites this year.

TowerXchange: How would you characterise your energy strategy – what is reliability like at your sites and are you exploring renewable energy options?

Karo Akaba, Chief Commercial Officer, Pan African Towers: Power is still a major challenge in Nigeria at the moment. Some sites are grid-connected but the grid is not very reliable, there are many urban sites where you have high demand but lack 24-hour reliable power. Where possible we connect to the grid, but we require diesel gensets to power our sites. We are exploring solar and hybrid solutions as energy saving is important.

Pan African Towers recently signed an agreement with Watts Renewable, a Canada-based energy solution company, for an Infrastructure Investment Partnership worth N7.2 billion (around US$20mn) and we are now at the initial phase of implementation in northern Nigeria. The partnership entails Pan African Towers leveraging Watts Renewable’s green solutions to power its sites instead of relying on diesel-powered conventional generators, thus ensuring environmental sustainability whilst helping solve Nigeria’s energy problem.

TowerXchange: What’s the blend of macro towers versus rooftops, DAS, small cells and IBS in your portfolio, and how is that changing?

Karo Akaba, Chief Commercial Officer, Pan African Towers: To be honest, nobody cares what their antennae is attached to, they care about height and whether the antennae is secure and accessible. For a towerco the only concern with billboards and other non-macro sites is that they are smaller structures which can take fewer tenants. For example, there are some water stanchion sites we are planning to acquire and we will need to fortify them, increase their height and possibly attach an additional pole to make sure they can hold a suitable number of tenants. But the space will be available in the location the tenants want, so it works for us. We are currently working on a proof of concept for small cell deployment and will share more information subsequently. We also have a few work-in-progress IBS/DAS locations in our portfolio.

TowerXchange: What are your plans beyond increasing your tower count? Are you exploring any new opportunities?

Karo Akaba, Chief Commercial Officer, Pan African Towers: We have organic and non-organic expansion plans, but we’re also looking beyond macro-towers. Small cells are one area we are exploring. 4G is here in Nigeria and network densification is going to be required. Small cells can play a big role in solving the problem of densification. Investing in small cells now also gets us ready for 5G. It won’t be in Nigeria as soon as other markets, but we want to be ready for when it does, so we are talking with the electricity board who own Nigeria’s street lighting to get permission to do trial small cells on lampposts. That small cell trial, plus our plans to expand our tower footprint, is giving us plenty to work on.
Maintaining focus on the core towerco business model

An update from Africa’s fastest growing towerco on organic growth, power, fibre and geographical expansion

Atlas Tower continues to hold the reputation of South Africa’s fastest growing towerco, with 200% year on year growth, attributing its success to remaining true to their core organic growth towerco business model. As the South African market evolves and Atlas establishes its presence in new countries, TowerXchange speak to Atlas Tower’s CEO, Nate Foster to understand the way forward for the towerco.

**Keywords:** Africa, Atlas Tower, Botswana, Build-to-Suit, C-level Perspective, Energy, ESCO, Kenya, Masts & Towers, Multi-Region, Network Rollout, South Africa, Tower Count, Towercos, Who’s Who

Read this article to learn:
- Atlas Tower’s history and YoY growth in the South African market
- Why the towerco has chosen to focus on organic growth and the core business of towers over diversification into other forms of infrastructure
- How the towerco differentiates itself from competitors in the market
- Details of towerco's recent expansion into Kenya and Botswana
- Atlas' attitude to power in markets outside of South Africa

TowerXchange: Atlas Tower are gaining an increasingly prominent presence in the African tower industry, can you give a bit of background to the company to those less familiar with the organisation?

Nate Foster, CEO, Atlas Tower: Atlas Tower built its first towers in 2007 in Alaska, USA. Following eight years of tower development in nine other US states, the company expanded to South Africa in 2014, and in 2018 moved to Kenya and Botswana. My wife and I started the business and are currently still retain majority equity of the Atlas Tower Group. We have a dozen Limited Partners who make up the company’s Capital Fund. We are a builder of wireless infrastructure not a buyer. We are the largest organic tower company on the continent and have ambitions to continue this position.

TowerXchange: Atlas has been the fastest growing towerco in South Africa, can you explain some of the dynamics at play in the South African market, what kind of growth opportunities exist and what challenges are faced by towercos operating there?

Nate Foster, CEO, Atlas Tower: Atlas is a town planning towerco; I was a town planner, some of the key managers are town planners or land use attorneys. That’s how we have developed our business, through organic growth and not the sale leaseback entry method, I don’t believe the returns on that kind of model are exciting.

Atlas have built a portfolio of 771 towers in the
South African market (figure one) with this number expected to surpass 800 by the first quarter of 2019. We built 270 last year and bought 35 towers and plan to reach over 1000 towers by end of the year. This should be our best year yet.

In South Africa, there is a roughly equal market share between MTN and Vodacom with Telkom and Cell C’s respective market shares considerably smaller. The percentage breakdown by operator of our tenants is pretty much in line with this split. We have seen a lot of demand from Vodacom and MTN in the past twelve months.

Helios Towers have recently entered the South African market and whilst they represent a competitor to us, we believe they will help mature the market. Some smaller towercos who don’t have the understanding of this business occasionally make mistakes that negatively impact all of us. When we purchase small tower portfolios in South Africa, we too often see value destruction from poorly written contracts, mistakes that lower the water level for us all.

One internationally significant factor that is also important in South Africa is the planning process. At the moment getting permit approval can be very hit and miss, and there’s a lack of certainty in the process. More specifically to South Africa there is a problem with land ownership and property deeds that makes safe and secure leases difficult or impossible to negotiate.

TowerXchange: Whilst 5G still feels a little while away, how do you see the towercos business model needing to adapt in South Africa to support the increased densification required. How do you see this impacting on Atlas Tower’s strategy?

Nate Foster, CEO, Atlas Tower: Simply stated our model is to quickly build infrastructure that is necessary to meet MNOs’ customers’ increasing data needs. Our model doesn’t change in South Africa, the US or anywhere else. We are effectively building the network infrastructure, the roads and the bridges to support high speed travel of many different types of data. So until antennas can float, our business will have a long and successful journey ahead.

Whilst we have seen American Tower and Helios do deals with fibrecos, Atlas have talked to some of the dark fibre owners in the country and don’t see the story playing out as they might. We are paying attention to those buys and will adjust our investment strategy appropriately as we learn more.

TowerXchange: In much of Africa, arguably the most important, or at least the most talked about, KPI for a towercos centres around their ability to deliver power uptime on sites. In South Africa, where power pass through arrangements are more common, what do you see as the most important KPIs, performance against which set towercos apart from each other?

Nate Foster, CEO, Atlas Tower: Fast, easy access to high sites is what MNOs demand. We focus on leasing and build speed, we focus on site access and control through creative partnerships and
programs. We have more than 2,400 high quality, mostly urban sites in our possession. Power is certainly a prime concern in our other African markets, but in our mature South African market it’s speed, creativity, and customer service that make us rise to the top.

**TowerXchange:** Atlas has recently expanded into new countries, can you tell us more about this? What enticed you to go into such markets and how do you see the challenges (such as power) and opportunities comparing to South Africa?

**Nate Foster, CEO, Atlas Tower:** Atlas has invested in several African countries, but the markets we will build towers in this year are Kenya and Botswana.

We are currently building in Kenya and in the single digits in terms of tower count. But we have 100s of sites in process and should be building around 10 per month soon. The situation is in some ways similar to South Africa, the permitting and environmental review process can delay tower construction or make start dates unpredictable. In Kenya we are speaking with all 4 MNOs. Not all have signed leases with us yet, but we are very confident of good lease up rates. Our initial focus is downtown Nairobi which has lots of places with really good density. In Botswana we should be starting this March and hopefully have high single digits of towers complete by the end of the year.

Both of these markets have a great deal more power management than South Africa, but I find the concerns over power management slightly overblown. Yes it’s a challenge, yes it needs to be analysed with creative implementation and clear strategy, but I have said this year after year – the tower business is valued on consistency of cash flows over a long period of time. Therefore, I want to make sure unstable or fluctuating cash flow is as little as possible to do with our success. Whilst we have seen some towercos making significant margins on power, we don’t see power as valuation driver of the business, rather we choose to cover costs and maintain a smooth expenses line. At present, most of the sites we have been building have been on relatively good grid. We are however keen to better understand the ever changing power technology landscape at the next TowerXchange Meetup.

Whilst power is a challenge, starting a tower business as a foreigner in any African market, using a low cost build as you go model is ten times more challenging than any issues over power generation on self-designed sites.

**TowerXchange:** Do you plan for further geographic expansion and if so, how do you assess and look to enter a market?

**Nate Foster, CEO, Atlas Tower:** Of course! So far the only market where we can boast of success is South Africa, with 200% year on year growth, but we have certainly invested enough money to suggest we are bullish on our good markets. I am not, however, a believer in unfettered aggressive expansion; I want to see results first, then obtain debt and then we move on to the next projects.
In this edition of the TowerXchange Journal, we offer our readers an initial coverage of the last edition of the TowerXchange Meetup Asia 2018. The live poll report provides interesting insights into the trends affecting the Asian telecom infrastructure industry as gathered via the votes of leading experts in attendance of the event – a real time source of information and data.

The Meetup coverage includes Suresh Sidhu’s keynote on the sustainable towerco, latest from the Philippines, an overview of fibre dynamics across Asia as well as updates from Bangladesh and Myanmar. Plus do not miss a newly conducted interviews with edotco’s Gayan Koralage, Director, Group Strategy and Wan Zainal, Chief Regional Officer, Malaysia on the company’s data collection strategy and updates from their homeland.

Don’t miss:

273 Tower industry survey: live poll results from the TowerXchange Meetup Asia 2018
280 TowerXchange Meetup Asia 2018 report: edotco’s keynote, fibre across Asia, Philippines, Bangladesh and Myanmar
299 edotco 360: data collection and utilization and an update on Malaysia
Tower industry survey: live poll results from the TowerXchange Meetup Asia 2018

During the fifth edition of the TowerXchange Meetup Asia in December 2018, we engaged the audience through a live poll to find out what executives in the room thought about the Asian market, its future expansion and upcoming trends. Between 55 and 75 respondents voted in the poll and, given that the majority of people in the room were senior management at towercos and MNOs, the results are based on a valid and substantial sample. In this article, TowerXchange offers its readers insights into the poll results.

Q1 Towercos currently own 58.3% (643,467 / 1,102,885) of the towers in Asia (excluding China, which is 100% towercos). What proportion of the region’s towers do you think towercos will own by next year’s event?

Over 54% of the respondents agreed that by next year, towercos will own between 60-62% of the regional towers. This growth could be fuelled by BTS in Myanmar, the divestiture of Globe’s towers in the Philippines, as well as possible sale and leaseback deals currently being negotiated in Indonesia, Bangladesh and Pakistan.

Q2 Do you anticipate the volume of new build towers increasing, decreasing or staying about the same in the markets in which you operate?

Projections suggest that BTS is still expected to grow across Asia, with 56% of respondents agreeing on a modest increase of new builds. While this modest growth is continuing in relatively mature tower markets such as Indonesia and Vietnam, cell site densification is still a trend in several Asian countries including Myanmar, Cambodia and Bangladesh.

- **Increasing significantly**: 22%
- **Increasing a little**: 56%
- **Staying about the same**: 12%
- **Decreasing a little**: 6%
- **Decreasing significantly**: 4%
Q3 What has been the % of macro towers versus other types of sites (e.g. urban poles, rooftops, billboards, DAS, BTS hotels) in your new build over the last two years?

Confirming how diverse and multifaceted Asian countries are when it comes to their tower markets, 45% of respondents were still focused on building macro-towers over the past couple of years but a solid 30% have been mostly engaging in alternate site typologies.

Q4 Similar question but this time what is the % of macro towers versus other types of sites (e.g. urban poles, rooftops, billboards, DAS, BTS hotels) you anticipate building in the next two years?

When it comes to future projections for new builds, the audience was again split with 38% agreeing they’ll mostly focus on alternate site typologies and 37% on macro towers but with a strong portion of innovative sites too. Interestingly, only 17% of respondents will focus on building prevalently (75%+) macro towers over the next couple of years - a testimony of the push towards network modernisation and urban densification happening even in emerging markets.
Q5 Is tenancy ratio growth accelerating, slowing, or are tenancy ratios falling in the markets in which you operate?

The majority of respondents (50%) is confirming a positive outlook in tenancy ratio growth, while 21% forecast a slow-down. TowerXchange assumes that the negative outlook mostly comes from Indian players, currently affected by the restructuring of the MNO market, causing tenancy churn for towercos between 15% and 46% in 2017-18.

Q6 Do you think we will see more operator-led carve-out towercos in Asia in the next year? Operator-led carve outs are new towercos where the parent MNOs still maintain a majority stake, e.g. Indus Towers, CTC, edotco)

The trend of operator-led entities has become an attractive alternative to MNOs historically not inclined to divest their tower portfolios. The likes of Telenor, Globe and Viettel are rumoured to be assessing potential carve outs, and 55% of respondents agreed that we'll see more of these types of entities in the future.

Yes I expect more operator-led carve-outs

55%

No new carve outs, but I expect to see existing carve out towercos like edotco and/or CTC entering new countries

27%

No I won’t expect to see significant growth in operator led carve outs

18%
Q7 If you had US$500mn to invest in any mature Asian tower market today, and had to choose one of the following, where would you invest?

In terms of “mature” markets, 31% of respondents confirmed that Myanmar is the most attractive market to invest in but closely followed (28%) by Indonesia. The attractiveness of Myanmar remains obvious, with MyTel re-stimulating build volumes. Indonesia remains a solid tower market, exhibiting continuing organic BTS growth, with the likes of Protelindo not only growing inorganically by consolidating tower portfolios, but also diversifying into fibre. And if towercos have been under price pressure over the past couple of years, the outlook for the Indonesian market is still positive.

Q8 If you had US$500mn to invest in any emerging Asian tower market today, and had to choose one of the following, where would you invest?

Unsurprisingly, the Philippines is currently being eyed as the most attractive potential new tower market, since the announcement of a third MNO and the strong regulatory push to create a more competitive telecom sector and promote infrastructure sharing. 66% of respondents agreed that, in December 2018, the Philippines looks like the most investible emerging tower market in Asia.

![Pie chart showing investment preferences for mature markets.](chart1)

- Myanmar: 31%
- Indonesia: 28%
- India: 19%
- China: 15%
- Malaysia: 7%

![Pie chart showing investment preferences for emerging markets.](chart2)

- The Philippines: 66%
- Bangladesh: 15%
- Thailand: 17%
- Nepal: 2%
- Malaysia: 7%
Q9 Which of these is an immediate concern for your business, or your clients business, today? (multiple choice)

Once again showing how diverse and eclectic the Asian tower scenario really is, 69% of respondents expressed their concerns towards ensuring energy efficiency and availability across their sites while 63% are currently focusing on diversifying their activities beyond macro towers. A clear indication of the existing gap between emerging markets where energy is still a major issue and modern markets trying to innovate and improve their networks.

- Cell site energy efficiency: 69%
- Cell site security: 10%
- Collecting and utilising data on the performance of your assets: 37%
- Diversifying beyond macro towers, e.g into small cells, DAS, BTS hotels and/or fibre/satellite: 63%

Q10 What are the greatest threats to the Asian tower market and its growth?

MNO consolidation in India has forced the country’s towercos to redefine their business models, with commentators suggesting their reliance on traditional wireless operator revenues could fall to 50% within five years. Concerns about MNO consolidation in India and beyond are reflected in this answer, with 44% of respondents identifying it as their number one threat.

- MNO consolidation and the associated churn of tenants: 44%
- Unsustainable terms agreed by certain towercos with MNOs: 6%
- Rising ground lease costs: 13%
- Lack of permits / underlying paperwork on legacy towers: 10%
- Overcrowded markets / too much competition: 8%
- Permitting / zoning concerns at Municipal level: 6%
- Regulatory / tax concerns at Federal level: 13%
Q11 Which of the following statements most closely represents the readiness of the Asian tower industry for 5G?

Taking a look at 5G, the audience split with 42% already focusing on 5G but still strategising rather than having a final plan, and 32% of respondents agreeing that their attention is yet to shift to 5G, remaining very much on 3G/4G rollouts.

We have a clear understanding of changing operator needs and a roadmap to fulfil those needs  
42%

Our understanding of 5G is a work in progress, but we are already developing some thinking in this area  
10%

We don't think 5G is going to change much  
32%

Our clients’ focus remains on 3G/4G rollout and overlays at the moment  
69%

Honestly, no-one really knows what 5G is going to mean yet!  
16%

Q12 Which of these do you think will be significant inhibitors to 5G rollout? (multiple choice)

While a large majority of respondents (69%) agreed that 5G rollout might get inhibited by permitting and deployment challenges, 44% thinks that the limitations will derive by the MNOs’ financial capabilities and 42% by the increased power requirements caused by cell site densification. While only 17% were concerned about the size and weight of massive MIMO, this may simply reflect the fact that towercos could benefit from increased lease fees, rather than representing operators’ concerns about the affordability of that incremental spend.

Ability to permit and deploy sufficient infill sites for densification  
69%

MNOs having the financial capability to lease the necessary sites  
44%

The size and weight of massive MIMO  
17%

Power requirements rising from an average of 2KW to 4-6KW  
42%
Conclusions

Launched this past June in occasion of the TowerXchange Meetup Americas, live polls offer deeper insights into the key challenges and trends affecting tower markets across the globe.

In this edition of the poll, we’ve once again confirmed how diverse and complicated the Asian tower ecosystem really is. From the coming of age of Myanmar, whose BTS landscape has been refuelled by the entrance of Mytel, to the newly licensed towercos in Bangladesh, encompassing virgin markets on the brink of opening up (Nepal and the Philippines) and mature markets such as India and Indonesia, the challenges they face couldn’t be more different.

In spite of this complexity, we’ve identified a few key takeaways. Firstly, Asian towercos are still expected to acquire considerable volume of existing towers as well as grow organically. While the majority of players in attendance of the TowerXchange Meetup Asia have focused on building macro towers over the past couple of years, future new build is likely to include more ‘alternate site typologies’ (lampposts, small cells, IBS, BTS hotels) than traditional macro sites.

In terms of MNOs’ strategy, while they are still expected to do plenty of business with towercos, they could also opt to carve out their tower portfolios and create operator-led entities - a trend which is increasing in popularity in Asia and beyond.

Parts of Southern and Southeast Asia remain focused on 3G and 4G rollout, others are gearing up for 5G, where concerns about site permitting and affordability must be overcome to accelerate its deployment and the associated economic benefits.

Lastly, Asian towers remain a highly investible asset class, with markets such as Myanmar, Indonesia and the still virgin Philippine market at the top of the list. And the Indian market, despite fundamental restructuring, remains an attractive destination.

Asia is not a straight-forward market but a diverse conglomerate of multiple realities. Doing business in Asia can be challenging but Asian towers remain one of the most attractive and fastest growing infrastructure asset classes in the world. If you want to know more about the local industry, make sure you subscribe to www.towerxchange.com and join us next year for the sixth annual TowerXchange Meetup Asia (www.towerxchange.com/meetup/meetup-asia)!
edotco: the sustainable towerco

Suresh Sidhu talks about how towercos can remain relevant amidst rapidly changing industry dynamics

How should towercos keep innovating while achieving their targets in today’s ever-changing telecom landscape? This was the broad theme of edotco’s CEO, Suresh Sidhu, keynote at the fifth annual TowerXchange Meetup Asia. This year’s keynote by Suresh Sidhu complemented the speech delivered last year on the importance of unleashing skills across multiple countries and operations. This year, the CEO highlighted an equally relevant factor for the success of modern towercos: the importance of marrying structure with agility to create a sustainable organisation capable of navigating through this volatile industry.

Keywords: 3G, 4G, ARPU, Asia, Asia Insights, Build-to-Suit, C-Level Perspective, Change Management, edotco, Energy, Fibre, IBS, Indonesia, Lease Rates, Malaysia, Market Overview, Myanmar, O&M, Regulation, Sale and Leaseback, Small Cells, South Asia, Southeast Asia

Read this article to learn:
- The continuous evolution of towercos across the region
- What has changed in RoE, ARPU and more since 2013
- Innovation, scale, skills: the recipe for towercos’ success
- edotco’s “to-do list” for the future

The expansion of the towerco business model across Asia

The towerco business model has been expanding swiftly across South and Southeast Asia and has become more dynamic. From the MNO perspective, towercos are now a necessity, and the tower transaction deal flow across Asia has been exciting, presenting plenty of opportunities for the future.

Whilst Asian tower markets do share some common features, each country presents its own set of challenges and local issues, making a multi-country operation like edotco’s complex and unique.

Towerco penetration (defined simply as the proportion of towers owned and operated by towercos in the region) over the past four years has grown from 59% to over 67% and Asia enjoys a vibrant build-to-suit (BTS) industry across many countries. On the other hand, while the flow of sale and leaseback (SLB) transactions is quite considerable in Asia, tower deals present a high degree of “emotional complexity” and procedural hurdles which require time to come to fruition, making SLBs slower in nature.

In the countries where edotco operates, the majority of MNOS prefer not to build their own towers, which allows the towerco to have a very strong pipeline of BTS orders. Another positive factor strengthening its operations is that the tailwinds of 4G densification are stronger than the headwinds MNOS are facing. For example, in the markets where edotco is present, ARPU has held up at an average of US$6.18-6.11. And the tailwinds aren’t going to diminish anytime soon, with 4G and...
smartphone penetration still in the early phases with a long runway for growth.

**New challenges for the Asian tower industry**

There is widespread agreement that 4G is a top investment priority for MNOs across the region. This is also pushing countries to look at the spectrum availability and assess ways to rationalise it.

Malaysia for example is currently undergoing a spectrum rationalisation effort which could potentially see a shut down of 2G or 3G in order to free up much needed 4G-suitable bands. Sidhu noted that while 2G is very much a necessity in many rural areas, questions are arising as to whether 3G will survive as a viable technology.

At the same time, operational challenges such as power, and diversification opportunities such as fibre and small cells are becoming a reality for towercos. Sidhu cited the case of Indonesia where MNOs have started to put pressure on towercos to adopt a tower and power model while towercos are very much focused on expanding portfolios and entering the fibre business. Or India, where fibre is a necessity and towercos are also heavily involved in green energy initiatives.

edotco has recently taken over the energy management of Ooredoo’s assets in Myanmar and carved out Celcom’s O&M business in Malaysia along with its staff to augment its business and better serve captive towers.

In Malaysia, edotco deployed in-building solutions in stadiums ahead of the Asian Games and Sidhu noted how that project was deployed in just four weeks, when the organisers realised that due to the high volume of data expected during the event, networks were likely to congest, and stadiums could be left with no coverage.

edotco is increasingly focused on partnerships and collaboration such as the one sealed with Huawei to deploy the world’s first multi-operator small cell in the high traffic area of KL Sentral - a busy transit hub.

**How to ensure returns in a changing (and maturing) landscape?**

While the drivers are positive for edotco and for the towerco business model as a whole across in Asia, partner MNOs continue to feel the pressure. In fact, the Return on Equity (RoE) has been going down considerably from 2013 to 2017, with figures shifting from 52% to 22%. This reflects the huge investments MNOs made in 4G for which they are yet to reap the desired returns. In addition, the continued shift to spending by customers to Over The Top services is also pressurising revenues. edotco has seen customer demands on cost increase with the lease rates applied to new BTS having decreased up to 9% in certain markets between 2014 and 2018. And the question for towercos is how they can successfully operate and achieve the expected returns if the MNOs’ RoEs never recover to previous levels?

Sidhu highlighted some of the challenges faced by Indonesian towercos, as an example of the evolution of a mature industry now looking to re-energise itself. In Indonesia, towerco valuations have dropped from 10.8x to 8.4x since 2016. Additionally,
many tenancies are now towards the end of their timeline and some are not being renewed, while MSAs are being renegotiated. As previously mentioned, MNOs have been putting pressure on towercos to take over power while also pushing back on US Dollar indexation and to reduce lease rates.

So how can towercos deal with times like this?

**The sustainable towerco: scale and skills**

The answer is for towercos to combine scale and skills, to marry structure and agility to remain relevant. While edotco has been leveraging its multi-country scale and know-how to gain new business, ensure customer satisfaction and achieve good economics, the company has embarked on developing a skilled organization that is able to adapt and respond to the ever-changing landscape in a timely manner.

Sidhu reinforced that the best way for towercos to create a long-term sustainable organisation is to look beyond traditional methods and find ways to marry structural initiatives with agile ones. He highlighted the importance of equipping the workforce with the right tools and ensuring they understand the organisation’s drivers so that they can think on their feet and make quicker decisions when required. This will in turn result in more empowered, motivated employees who will be driven to add value to the company’s overall mission.

Sidhu shared how centralising the procurement operations at edotco was challenging at the beginning but once realised, eliminated many overlapping tasks and led to an increase of productivity as well as considerable savings. He also shared how the company ensures teams are equipped with the right skills to achieve continuous improvements in customer management.

He went on to share that to future proof, towercos should acquire the necessary skills to work with Artificial Intelligence (AI) and machine learning (e.g. to analyse large amounts of data), robotics (such as drones), automation and digital predictive analytics as this ensures that the workforce has accurate sets of data to enable them to make the quicker decisions and removes manual tasks allowing for employees to focused on more skills based, value added areas.

He reminded us that while towercos play a key role in consolidating sites and making sure that tower networks are increasingly efficient and not overlapping, they should also start analysing their data to predict demand for future sites as well as densification requirements.

In conclusion, Suresh Sidhu reminded us all that the towerco business is continuously evolving and we should embrace this change by finding the right mix of structure and agility that gives everyone the right context and mandate to get things done. Clear guidelines to ways of working, web-based platforms, a common cloud system and business automation initiatives should not be viewed with paranoia but with positivity.

Sidhu concluded by citing Jeff Bezos and challenged us all to keep innovating because “what’s dangerous in business is not to evolve.”
Asian towercos are eyeing opportunities in fibre, with towercos in markets like Indonesia and India more advanced than others but in general, they are still looking for the right formula to successfully invest in this segment. In the meantime, fibre deployment efforts by operators, neutral hosts, small cell players and fibercos are intensifying, as everyone is gearing up for 5G and striving to enhance the quality of service of existing 4G networks.

New fibre alliances are being formed on a global basis, and the M&A pipeline is healthy. On the operators’ front for example, Vodafone has been partnering with Dense Air among others for metro fibre as well as last mile, while independent fibreco Zayo has already acquired multiple fibre networks and small cell player Extenet is actively scouting metro networks and has already added the metro fibre across New York to its portfolio. While the business case for towercos to invest in fibre is there, the game is getting tougher as various specialised players are strengthening their positions.

Given the involvement of so many other stakeholders, why should towercos start deploying fibre?

There are some straightforward drivers as to why towercos should get involved in fibre.

Returns: First of all, fibreised towers ensure better returns than those on microwave and the revenue incrementally grows for fibreised towers utilised as hubs for small cells, 5G and enterprise connectivity.
(FTTB). 5G and small cells require fibre so, while fibre as an asset might be less easily replicable than towers and scale harder to achieve, it soon won’t be an option but a critical need. Additionally, 5G is expected to increase the tenancy demand by as much as 6x compared to 4G.

**Access to capital:** MNOs lack the capex availability to invest in fibre while towercos have access to cheaper capital and connections with infrastructure funds. In light of this and their experience in enabling infrastructure sharing, towercos could have a positive influence in bringing the cost of fiberising sites down.

**Bundled products:** Towercos own and manage tower portfolios and are able to assess the demand for fiberised towers before investing in the deployment. Additionally, towercos can bundle fiberised towers with more products such as small cells and 5G nodes. And they can emulate the tower opex model in their fibre operations and incorporate fibre in their MLAs on a “consumption basis”, with bolt-ons for small cell connectivity.

**Familiarity with the opex model:** Towercos already utilise recurring opex based models and can leverage this know-how in their fibre contracts too. Towercos can charge a monthly opex per pair per km, based on the distance of the tower from the operator’s metro fibre ring, or per site with a flat rate for all towers in the city and finally per GB, applying a flat rate on consumption.

**Negotiation skills:** Additionally, towercos are quite used to negotiate with real estate providers, and can use those partnerships also to expand their fibre network. They can target a variety of customer segments including large and medium enterprises, small businesses and SoHo (small office, home office).

**Towercos still need to define what 5G means to them**

Given the above, towercos might seem simply “slow” in embracing fibre but this could also be related to the fact that they are still trying to figure out what 5G means for them. Will 5G simply entail additional loading or a full new tenancy? Are existing towers able to accommodate 5G equipment at the required height and do they have enough capacity? Towercos need to find correct answers before they can fully embrace the fibre game.

5G planning is essential and that should define the use cases for last mile and metro fibre. But while 5G is still being tested, fibre is already required to improve the quality of service of 4G, which remains a priority for many operators and one of the reasons why fibre is still seen as a competitive advantage.
The opportunities for towercos (perhaps better defined as infracos) to provide fibre extend to areas such as cloud RAN, where fronthaul will require fibre to function and ensure the necessary low latency.

**Depending on who deploys fibre, a certain business model and pricing structure apply**

The chosen network architecture will depend on the business model and who deploys it.

1) **Tower centric fibrecos**

Fibrecos focus on connecting business customers and predominantly serve enterprise and data centres with long-term contracts and revenue visibility. They are mostly B2B players providing either metro fibre or including last mile connectivity. Examples include Reliance Jio, Lightower as well as most towercos.

2) **Carrier-neutral fibrecos and/or metro fibre providers**

This segment mainly connects operator-captive towers to the access or metro ring. They utilise already connected towers as hubs to deploy small cells and work in both residential and commercial environments. Examples include Eurofiber and operator enterprise businesses.

3) **Operator fibrecos**

Predominantly focused on connecting residential households, thus their deployments depend on household needs, affordability et cetera. Examples include ACT, operator FBB and third-party regional providers.

Similarly, the pricing structure can be adjusted depending on the business model and network architecture with options including end-to-end provisioning with monthly payments per node / small cell, IRU based pricing, bandwidth sale chargeable on a consumption basis or dark fibre monthly opex payments per km with escalators.

The payback of fibre is similar to the tower economics, only the EBITDA is generally a little lower. The upfront yield can be challenging with a single tenant on fibre but usually, when one opts in, the others follow. And as MNOs densify their presence through small cells, fibre owners are likely to enjoy returns close to those given by amendment revenue on towers.

Towercos can leverage their ability to invest capex at lower cost of capital and can already bundle macro-towers with fibre networks to create attractive pricing options for their clients. Additionally, given their existing relationship with mobile network operators, the MNOs themselves may stop deploying scarce capital into fibre if towercos offer an attractive (and less capital intensive) alternative.

However, towercos shouldn’t forget that while there are some similarities with the tower model, fibre deployment is fundamentally different and requires a whole new set of skills and know-how.Towercos being able to skilfully take over fibre projects could be very attractive to MNOs, who have found the efforts to acquire trained manpower quite burdensome and they are likely to prefer to outsource instead. Towercos on the other hand wonder if they should wait for the demand for fibre to ramp up before investing in new manpower and training.

Once they have decided to enter the fibre game, towercos should pick their target segment and business model (B2B or B2C), select a technocommercial architecture and a pricing structure. The opportunity for organic growth combined with the possibility to expand inorganically by consolidating existing fibre portfolios is creating an attractive scenario for towercos.

Across Asia, fibre reaches 30-35% penetration across a few markets (eg. Indonesia) but in emerging markets such as Myanmar it still sits at 10%. The disproportion with broadband penetration – which generally reaches 70-80% across most Asian markets – is still considerable.

India

In the case of India, the country is home to several fibre players, but sharing isn’t common yet. Reliance Jio has pushed fiberisation across its sites to 60%, with the country’s average sitting at around 20%. MNOs are swapping fibre pairs with each other but haven’t created a scalable sharing system, which only towercos would be able to properly pitch.

While a rationalisation effort would be required in India, with tens of players including government agencies, MNOs and cable operators all actively deploying fibre, parts of the MNO community remain against sharing fibre. An attitude that recalls the inception of the towerco era, when owning a tower portfolio was still seen as a competitive advantage by MNOs.

Indonesia

Indonesia has an uneven distribution of fibre capacity, with upper class areas enjoying relatively reliable access to fibre, especially due to competing cable TV providers. Fibre is still largely owned by operators but there’s considerable efforts by towercos such as Protelindo and STP to enter the business. The acquisition of iForte by Protelindo was driven by the desire to acquire the necessary technical skills as well as existing relationships in the fibre sector. Protelindo found that while the effort to acquire a fibreco with a solid track record and credibility was quite complex, the first couple of years delivered great results especially in the corporate market segment.

In fact, at the time of the acquisition, Indonesian MNOs were still focused on squeezing what they could out of the existing microwave, while now they are getting more serious about fiberising towers. Protelindo also found that the returns on building a tower are quite similar to those delivered by fibre, although much depends on whether the project requires digging or aerial deployment.

Australia

In Australia, fibre often isn’t shared as it is still seen as a competitive advantage. But MNOs are starting to open up to neutral hosts as they can invest in fibre and pairing out fibre strands for each MNO, without them needing to deploy.

Pakistan

In Pakistan, Jazz for example runs its fibre projects in three different ways. On one hand, the MNO sealed pair-for-pair barter agreements with other operators, it also runs 30-year lease agreements and short-term leases of fibre pairs that last one year.
The imminent irruption of a tower industry in The Philippines

Appointment of third MNO and Duterte’s Common Tower Policy are creating an inviting opportunity for international towercos and investors

In late 2017, the Philippines stole the tower industry spotlight when President Rodrigo Duterte announced his intention of developing a Common Tower Policy for the country. Last September, his collaborator and advisor Ramon Jacinto presented the first policy draft in front of key national and regional industry stakeholders. Finally, last November, the Department of Information and Communications Technology (DICT) appointed Mislatel as the new third operator to challenge Globe and Smart’s duopoly, making the business case for towercos even more compelling. ISOC Infrastructures, a local business conglomerate engaged in cold chain logistics, property and energy development, is one of the 12 telecom infrastructure companies that have signed an MOU with the Department of Information and Communications Technology (DICT) aiming to obtain a towerco license to operate in this market.

Keywords: Asia, Asia Insights, Construction, Department of Information and Communications, DICT, Globe, Infrastructure Sharing, Insights, Investors, Investment, ISOC, Market Entry, Market Overview, Mislatel, Network Rollout, New Market Entrant, Regulation, Risk, Philippines, PLDT, Smart

Mislatel and the urgency of tower deployment

On November 7th, DICT selected Mislatel, a consortium led by local businessman Dennis A. Uy and state-owned China Telecom Corp, as the Philippines’ provisional third operator. Eliseo Rio, DICT Acting Secretary, declared that the company was the only bidder able to match selection requirements, while The Philippine Telephone & Telegraph Corp. and Sear Telecom Consortium were disqualified as they failed to submit participation security and technical capability certification.

The telco is expected to obtain the necessary certification and frequencies to operate soon and will have five years to roll out its infrastructure. DICT requires the company to begin operations within one year after final award. Therefore, by the end of this year or early 2020 at the latest, Mislatel will require equipment on a decent number of towers to be up and running if they don’t want to face the financial penalties set by the local government. Based on current numbers of towers owned by the operators and local experts’ estimations, the new operator will require at least 9,000 new sites to be on a par with the incumbents.

Read this article to learn:

- The prospects for a tower industry to emerge in the Philippines
- What are the regulatory requirements for the new Philippines MNO?
- Who is ISOC and what are their plans to become the first Philippines towerco?
- What are the opportunities and risks for towercos when entering the market?
Understanding the Philippines regulatory regime

At the beginning of the conversation, ISOC dissected the most relevant aspects of the initial draft tower policy that has been under public consultation since it first became public in September. MNOs won’t be able to own or build towers directly. Towercos will have to be independent—so MNOs cannot own a stake on those companies—and this initial draft limits the number of towercos to a maximum of two. Additionally, operators will have to share their rollout plans with the tower companies in advance.

Based on those premises, ISOC was the first company that submitted an unsolicited proposal back in July. After that initial overview, the discussion began, and questions started to cross the room.

Does it make sense to limit the number of towercos in such a big, diverse country?

Experienced tower developers, consultants and most industry experts agreed that a country like the Philippines, comprising of 7,000+ islands and an estimated population of 104mn+, would need at least two tower companies to deliver the necessary infrastructure to meet the current demand and industry requirements.

Some participants mentioned that it is very likely that we see several propositions from both local and international players. “Capacity to build is going to be a major issue and building cycles are going to be quite long. Even if you get the biggest constructor in the world, the Philippines is a tough logistical environment, so developing the necessary number of sites might require participation from more than two companies,” one of the participants stated.

Two months after this conversation took place, DICT had signed MOU with 12 tower providers and the limitation to two tower providers that appeared on the first policy draft might not apply.

Will Globe and Smart be forced to release their assets?

Under the draft policy, operators will not be required to sell their existing assets. The draft policy does encourage tower sharing, although Globe has publicly expressed its interest to sell, however, this won’t be an obligation. In other markets, market forces have driven operators to sell or share their tower assets.

Can foreign players enter the tower market?

Some industries have certain ownership limitations in the Philippines. Emerging tower companies will be considered construction businesses, and construction is one of the sectors where foreign ownership is limited by law, hence 60% of any emerging towercos would have to be owned by a local company. International infrastructure players are more than welcome into the Philippines, but entering the market requires a local partner. In the mid-term, infrastructure assets could potentially sit within a 100% foreign-owned company, but the towers have to be built by a company with a
minimum of 60% local participation. Currently, this is one of the main points under debate, as deploying such a large number of towers would require significant capex, scale and expertise which might be difficult to source locally.

However, that handicap could be turned into an advantage and having a local partner might end up helping international players to enter the market by deploying local investment, boosting social license and facilitating engagement with key, local industry stakeholders.

Exploring different scenarios and risks: What happens if Globe does not sell?

Currently, the draft policy does not force operators to sell their towers and some experts question whether Mislalit could really enter the market if one of the operators does not release their assets. Most roundtable participants agreed on one sentiment: nobody has the capacity to build 9,000 new towers in two years. With that in mind, the ideal scenario would have Globe (and even Smart) selling their tower portfolios to one or two neutral players who would manage them independently and provide access to all three operators. The draft policy requiring that MNOs do not retain equity in towercos would seem to preclude any option for Globe (or Smart) to carve-out and keep a controlling stake their own towercos. If an independent towerco were not to acquire the legacy tower in The Philippines, the emerging towercos would have to build at least 4,500 towers in the first year, which seems to be almost an impossible mission, at least in eyes of the experts that joined the roundtable. Failing would also generate considerable penalties for the new operator.

On the other hand, even acquiring Globe’s assets would have some risks, as the structural capacity of the towers still needs to be evaluated to ensure they can handle two or three tenants.

Finally, the government has been the main driver for this initiative, as such, any political shift in the country could curtail or reshape this process, and those are all risks factor that any emerging company would have to take into account.

How is the government creating opportunities for the industry?

The government is aware of the risks mentioned above and has been proactive in creating guarantees and a favourable regulatory environment for the industry.

During the third MNO selection process, President Rodrigo Duterte himself rushed DICT to appoint an operator, stating that he would hand pick one
of the candidates if the institution does not. ISOC highlighted the proactive role of the executive and its positive outcome as Duterte didn’t hesitate to step in when it was necessary. “The government has taken all the necessary steps. Duterte’s team has promoted competition in the market by favouring the creation of a third operator, and now is introducing a positive legislation as a necessary and initial move to drive telecoms infrastructure sharing in the country.”

The draft policy recognised the negative impact of barriers that slow permitting and that is, based on ISOC testimony, one of the key developments on the law. “Regulators have included certain previsions that will help speed up permitting. They are opening a national single one stop shop for tower permits and they have hinted at the possibility of sharing government sites to tower companies, again to accelerate the site acquisition and permitting process.” Any meaningful progress on accelerating permitting could make Philippine towers relatively investible as in neighbouring countries such Sri Lanka, you need around six months to get private land access, while government land access permission could take up to a year.

A few more critical points were also addressed throughout the discussion including a potential timeline for the policy to be finalised and made official, and the investment climate in the Philippines. ISOC estimates that a final policy could be released during the first quarter of 2019 and also weighed on the cost of investment in the country: “Capital cost in the Philippines is pretty much comparable to the rest of Southeast Asia, but there have been some recent fluctuations. It has gone up this year due to the inflationary effects of new tax rules but it should go down again in 2019, which could be another incentive for international companies to enter the market.”

Why could the Philippines be the perfect match for a global player?

First, the need is there for a global towerco in the Philippines. The irruption of a third operator will massively drive infrastructure deployment, as we have recently seen in Myanmar with fourth operator Mytel. Globe and PLDT are two very strong, established customers and adding just one of them to a towerco’s portfolio through co-locations would represent a very bankable revenue stream.

An emerging new player in the country would also be in an advantageous position when negotiating contract conditions with Mislalatel, who will imminently require an enormous number of new towers or co-locations. Both demand and urgency are there, but a smart tower company should be able to negotiate and manage expectations to avoid over commitments. Mislalatel needs to work closely with an external partner for their rollout. There are risks for potential towercos, but that risk should be taken into account and priced in as part of the negotiation.
How regulation accelerated tower network deployment in Myanmar - and why the country is still one of hottest tower markets in Asia

PTD and towercos talk growth, consolidation and operational challenges

An audience survey at the 5th TowerXchange Meetup Asia proved again that Myanmar is the most attractive investible tower market in Asia, narrowly edging out Indonesia, India and China. In the last five years, the Myanmar telecom industry has evolved from a single stated-owned operator that monopolised an underdeveloped market, to a competitive and diverse landscape, where four operators and dozens of independent towercos are driving infrastructure deployment, generating the highest organic growth rate, and already one of the highest tenancy ratios in the region.

Keywords: 5G, Acquisition, Apollo Towers, Asia, Asia Insights, Build-to-Suit, Co-locations, Delmec, Editorial, edotco, Energy, Energy Efficiency, Hybrid Power, Investors, Ministry of Transport & Communications, Meetup Asia, MNos, Myanmar, New License, New Market Entrant, OCK, Off-Grid, Opex Reduction, Pass-Through, Post & Telecommunications Department, Regulation, Renewables, Small Cells, Solar, Towercos, Tower People, Wind

Telecommunications in Myanmar has come a long way and the government has played an instrumental role in pushing the industry forward. Key institutional reforms, the implementation of a modern telecom law and a transparent licensing process for both operators and tower companies has created a very favourable regime for local and international MNOs, infrastructure developers and investors. The country was again one of the most popular topics at the fifth TowerXchange Meetup Asia, where several panels, roundtable discussions and speakers analysed and highlighted the great opportunities that Myanmar holds.

The evolution of Myanmar’s regulatory regime

We were honoured to welcome Mr. Soe Naing, Director at the Post and Telecommunications Department (Ministry of Transport & Communications, Myanmar), who spoke at the event for the first time. Mr Naing provided an eloquent regulatory overview, which dissected how the government has boosted infrastructure deployment and tower sharing with its forward-thinking approach and policies.

Back in 2010, a few political reforms were the initial steps for the liberalisation of the country’s telecommunication industry. Then, in 2012, a foreign investment law eliminated several restrictions and paved the way for international companies to enter Myanmar. A Telecommunications Act in the following year, Telenor and Ooredoo’s licenses in 2014, and the creation of an independent regulatory body in 2015 were also critical steps ahead of the birth of a competitive and healthy tower market.
In 2013, Myanmar had one operator, less than 7mn phone users and 7,600 km of fibre. Now, the country has more than 52 mn phone subscribers and 68,000km of fibre with an internet penetration of 90%. Liberalisation has seen teledensity increase from 13% to 102.6% today. The reforms have improved internet speed (24 Mbps, second only to Singapore in the region), quality and overall coverage.

Stakeholders have recognised the importance of tower companies as Myanmar has licensed over 40 towercos who have built almost 10,000 towers in less than five years. The regulatory framework has encouraged tower sharing and colocations, has enforced zoning regulation to protect existing towers, and PTD projects tenancy ratios, already around two, to reach 2.5 by 2020. US dollar rents, with inflation related escalators applicable to 100% of rent, and non-cencellable contracts have all contributed to the creation of a highly investible tower industry in Myanmar.

Furthermore, the government has been working closely with the Central Bank and Myanmar Investment Commission, which has enable the entrance of international investors such as TPG. Now, the Ministry of Transportation and Communication has set very ambitious goals but the industry is still facing several challenges that will require more reform, considerable investment and collaboration across the telecom ecosystem.

**What lies ahead?**

Mr. Soe Naing perfectly summarised the future objectives for the industry. The government is already preparing new spectrum allocation to enable 5G deployment, while aiming to establish a fully independent regulator—the Myanmar Telecom Commission. Additionally, the once state-owned operator MPT needs to finalise its corporatisation process, while the telecoms industry has to increase its community engagement in order to continue expanding.

The goals are set but this dynamic market brings plenty of challenges for tower providers, MNOs and vendors. Power continues to be a key issue, with 65% of the towers in remote, off-grid locations, where communities can be reluctant and infrastructure deployment can be logistically challenging. Data consumption keeps increasing exponentially and 5G will push the industry to look beyond traditional towers and explore alternative technologies and solutions. The government has created a Universal Service Obligation Fund to facilitate investment in rural coverage, while significant progress has been made toward the enablement of mobile financial services and smart cities.

**Industry perspectives**

Right after PTD’s keynote, Myanmar’s panel discussion continued the conversation that TowerXchange started back in September, when...
we travelled to Yangon to explore this evolving market. Representatives from Apollo Towers, TPG, edotco, Delmec, MPC and OCK Yangon took the stage and weighed in on Mytel’s impact, key operational challenges, consolidation and more.

Hardiman Telecommunications’ Paul Carpenter set the scene. He suggested Myanmar now has 16,000 towers, 3,000 rooftops, and 25,400 tenancies, with an average tenancy ratio on towerco sites of 1.74x.

TPG, represented by David Goldstein, has been one of the most active private foreign investors in the market, and in Goldstein words, they are just getting started. The company entered the market through Apollo Towers in 2014 and consolidated its position as the second biggest tower portfolio with the recent acquisition of PAMEL: “The regulators have done a fantastic job. First, they’ve enabled foreign ownership and led a very transparent, pragmatic privatisation process that created an attractive scenario for us. Now data usage keeps increasing as users consume lots of content on their phones and this growth, plus the new operator, will keep driving the need of towers and tenancies,” Goldstein commented.

2018 has been a very positive year for towers in Myanmar and edotco has had been growing prolifically. The company has added 600 sites and added 1000 tenancies to its portfolio in the last year. They have done BTS for both Ooredoo and MPT as well as taking over the management of Ooredoo’s energy assets, including power as a fundamental change to the company’s business model in the country. Innovation is in edotco’s DNA and the company has been busy testing ground-breaking solutions such as carbon rooftop poles, and a combined solar and wind power site generating 8kW of power, as well as new builds in remote areas. edotco are also proud to have partnered with Energize the Chain, who they met at TowerXchange in 2016, to commission five sites with the Ministry of Health to aid in the distribution of vaccines.

In a similar move, Apollo Towers has also taken over management of Ooredoo’s energy equipment on their sites. The towerco has been dealing with power for other clients since they entered Myanmar and Ooredoo asked them to apply that expertise, which in the words of Apollo’s Chief Commercial and Strategy Officer Yves Monnier, is very challenging, especially due the high uptime SLAs of certain sites, that sometimes approach 100%. Monnier commented positively on the potential consolidation of power assets, as Mytel’s entrance and PAMEL’s acquisition will allow them to optimise power cost by managing all the assets with a single team.

Equally, OCK has been also working very closely with its main client Telenor in optimising energy consumption in order to reduce opex, which is a pass through model. The Malaysian tower company is increasing its utilisation of solar and wind solutions – increasing from 60-100 hybridised sites

Myanmar telecom towers sector – the results so far

![Graph showing # of Independent Towers and Tenancy Ratio Forecast]

Source: Company filings, Analysys Mason (2016)
Note: Forecasts based on independent tower companies only (excludes MNO-owned towers)
in the coming year. Renewables are reducing MNOs’ opex as well as minimising maintenance costs due reductions in genset runtime. While focusing on optimisation and energy saving, OCK has also increased its portfolio and the company is now working with all four MNOs, as mentioned by OCK’s Yangon CEO Omer Chappelart.

The demand is there, but does Myanmar have enough capacity? Delmec’s CTO, Spencer Crawford-White, who has been studying the market for the last five years, commented: “The market has massively expanded. We are seeing plenty of new infrastructure and less conditional issues but we still identify some limitations. Mostly, there is some redundant, old equipment not being removed from sites and that could have a negative impact on capacity for and speed of rollout of 5G. We are now working with OEMs on the implications and requirements of 5G. Structures are going to be heavier and bigger, so you need to plan ahead and start preparing your sites for future adoption.”

**New entrant towercos: competitors or acquisition targets?**

The emergence of a number of new, small tower companies and their potential consolidation are critical themes in Myanmar. MPC is one of those emerging players that will also play an important role in the industry. MPC’s new CEO Kieran Rabbitt came along and commented on the role they are playing in Myanmar’s tower industry: “We are playing our part and disrupting the industry in a very positive way. We obviously work with lower volumes but we can partner with established companies, while we also aim to collaborate with MNOs to cover hard-to-reach areas. We focus on opportunities that might be tough or too niche for traditional players such as remote, conflictive areas where you need to work closely with local communities,” he said. In the case of MPC, they feel they can achieve sustainable margins at a lower rate, ableit not pricing as aggressively as some competitors, and hoping to innovate and compete in urban scenarios.

What are the new entrant tower companies in eyes of the most established players? All panellist agreed that the market is big enough to support everybody’s existence – at least for now. Myanmar is a competitive, but also friendly environment with considerable growth potential. Both Mandalay and Yangon regions still face capacity issues and are in need of new sites, so there are plenty of new build opportunities ahead.

Unquestionably, the market will consolidate and big fish are very likely to absorb all many of the new small towercos in the next two to three years. edotco and Apollo are committed to Myanmar for the long-term and both companies are eyeing organic and inorganic growth opportunities: “When you merge, as we are just doing at the moment with PAMEL, you learn a lot from the other company and strengthen your team, which helps you in improving your service to customers. Colocations are indeed fundamental but we
still see strong BTS opportunities here,” Monnier commented.

TPG, edotco and MPC highlighted urban solutions, IBS, street furniture and small cells as the future alternative site typologies that will fuel continued impressive organic growth. Delmer’s Spencer Crawford-White added “Smart solutions and lamp post designs are evolving to fit into urban environments. We’re exploring leveraging AI to identify potential locations that offer the necessary elevation, with access to power and fibre. Densification via macro sites will be prohibitively expensive in Myanmar (and beyond) – we need to work together to accelerate dimensioning, planning and deploying infill sites and co-hosted solutions like BTS hotels.”

Data will keep booming and towercos will need to explore how to better integrate new technologies and solutions to increase coverage and capacity. The industry needs to continue educating the country on the benefits of infrastructure sharing, and investing time and resources in boosting social licenses is fundamental. Power will continue to be an operational headache and the use of renewable energy will increase to help the industry in reducing diesel consumption and energy expenditures. Consolidation is guaranteed and TowerXchange forecast a bustling 2019 in Myanmar. Stay tuned!
Unleashing the potential of towerco investment in Bangladesh

Newly licensed towercos poised to re-ignite telecom infrastructure deployment

This brief market update captures the current state of the restructuring tower market in Bangladesh. The licensing of four tower companies is about to re-ignite new tower build, but the regulator’s exploration of the competitive landscape could hinder the emerging sale and leaseback market in the country. Ultimately, the prohibition of tower build by MNOs, and the requirement to unwind their existing co-location agreements by 2023, will precipitate an efficient, towerco-driven communications infrastructure in Bangladesh.

Keywords: 4G, AB Hightech Consortium, Asia, Bangladesh, Banglalink, Build-to-Suit, edotco, iSON Tower, Grameenphone, Kirtonkhola Tower, Lease Rates, Leasing & Permitting, MLA, Market Overview, Network Rollout, New License, Research, Sale & Leaseback, TASC Towers, Towercos

Read this article to learn:
- Why new tower build slowed in Bangladesh in 2018 despite the launch of 4G
- Who the newly licensed towercos are, and when they will start building again
- The costs of the towerco license and revenue share obligations
- The potential impact of the regulator’s concerns about the competitive landscape in Bangladesh
- A vision of the future tower market in Bangladesh

New site build in Bangladesh slowed almost to a halt in 2018, but the hiatus was a necessary step in the re-organisation of the tower market. It had become clear that the Bangladesh Telecommunication Regulatory Commission (BTRC) intended to prohibit the country’s MNOs from continuing to build their own towers, while uncertainty surrounding the new towerco license regime inhibited towercos from building.

After several draft tower licensing regimes were painstakingly refined over a period of two years, in August 2018, the BTRC announced the four winners of the battle for towerco licenses in Bangladesh: edotco, Kirtonkhola Tower (iSON Tower), TASC Summit Towers and AB Hightech Consortium. By November those licenses had been received. Paperwork for new foreign investors has also created a time lag: FDI licenses are believed to take around four months.

Stakeholders who remain concerned that tower building has not yet resumed in Bangladesh can be partially re-assured: the pipeline of new site build is moving again, now awaiting only the new towercos to negotiate and agree Master Lease / Master Service Agreements with the MNOs; and awaiting the natural lag between permit application, securing permits and breaking ground. Permitting a new site takes several months in Bangladesh, with longer periods required for sites on the border. The new towercos are required to start operating within 180 days of being licensed.

The costs to setup and run a new towerco in Bangladesh are substantial – significantly higher,
for example, than in the thriving Myanmar tower market. Bangladesh’s tower license fee is US$2.97mn, with a US$2.37mn bank guarantee, a US$593k annual fee, plus a 5.5% revenue share and a 1% Social Obligation Fund contribution. Fees of this magnitude will of course compromise capital available to deploy into the network, but are obviously not prohibitive, otherwise Bangladesh’s four towercos would not have bid for their licenses.

However, a new layer of complexity continues to inhibit maximum investment in towers in Bangladesh. The BTRC are believed to be considering taking action against ‘Significant Market Players’ (SMP), which could affect Grameenphone, which owns around 7,800 of the country’s ~30,000 towers.

Grameenphone has been leasing up their towers on a commercial basis, effectively functioning as the country’s largest towerco. With new tower build by MNOs now prohibited, the SMP dialogue, combined with the BTRCs requirement that MNOs roll back all existing co-location agreements by 2023 (there are around 6,500 co-locations currently in Bangladesh) could result in pressure on Grameenphone to divest some or all of their existing towers. With Banglalink believed to be keen to monetise their ~6,000 towers, but with the threat that SMP review could extend to towercos as well, these competitive concerns could distort the investibility of prospective tower sale and leasebacks in Bangladesh.

While some commentators consider appetite and investment in sale and leaseback as a distinct issue from build-to-suit, others consider the two issues deeply linked. If one towerco cannot exceed, for example, 40-45% market share in Bangladesh without falling foul of SMP, then this may prohibit a single towerco from acquiring all the Grameenphone towers, and may also shrink the pool of prospective buyers of Banglalink towers (already narrowed by the license regime and – current – cap on four towercos in the country). Any country’s tower market is effectively in competition with other tower markets for capital, both from strategic investors – towercos – that could invest elsewhere, and from financial investors. If SMP concerns put a glass ceiling on the growth of a Bangladeshi towerco, that doesn’t necessarily make that towerco uninvestible, but it may make it less investible.

TowerXchange would contend that the tower market functions most efficiently with a light touch from regulators – including on the issue of competitive balance. TowerXchange would also

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**Bangladesh’s newly licensed towercos**

**Edotco Bangladesh** entered the market in December 2013, via the transfer of ownership of Robi’s towers for US$145mn. To date, edotco owns and manages more than 9,821 sites in the country and has been operating thanks to a no-objection certificate (NOC) while waiting for the licenses to be issued. With edotco Group as foreign shareholder, the firm partners with Greencon Tower for its local sharing.

**TASC Summit Towers Summit Corporation** is the largest fibre operator in the country and have so far connected hundreds of towers to its network. One of the towerco’s foreign shareholder, TASC Towers, is mainly active in the Middle East (Jordan, Lebanon and UAE) but has been eyeing opportunities in other regions such as Africa too. TASC Summit lists Global Holding Corporation Private Ltd. as an additional foreign shareholder.

**iSON Tower Bangladesh** (now renamed Kirtonkhola Tower) is part of the iSON Tower group, with operations in Africa, India and the Middle East where they are an established network deployment and managed service provider operating over 10,000 sites. iSON’s local shareholder is Confidence Tower Holdings while ECP Tower Singapore is its foreign partner.

**AB Hightech Consortium** is owned by various local shareholders including ADN Telecom, AB Hightech International, ZN Enterprise, Synergy Logistic and Orange Digital and by foreign shareholders China Communications Services International and Changshu Fengfan Power Equipment Company.
contend that a regulator should be less concerned about a towerco having a significant market share, for example 50% or higher, than an MNO as towers are a ‘natural monopoly’ – the most efficient hypothetical model is a pervasive network of towers with 3-4 tenants on every site and only such overlapping infrastructure as was required for densification. There is no reason a single towerco cannot provide such a network, and certainly no reason that four towercos cannot co-exist with one or two having significantly larger portfolios, especially given that the regulatory has to approve towerco tariffs.

In conclusion, the tower build hiatus in Bangladesh is drawing to an end – we’re now just awaiting contract negotiations and permitting to run their course. But the tower market in Bangladesh will only achieve optimum efficiency, attracting maximum funding to expand and densify the network, if the market can be refined to support the efficient sale and leaseback of existing MNO towers to the towercos. If this last inhibitor can be eased, TowerXchange foresee a relatively swift transfer of over 13,000 MNO-captive legacy tower assets to Bangladesh’s towercos, enabling the towercos to bring new efficiencies to the build, maintenance and operation of the country’s towers, and to release further efficiencies by decommissioning the country’s many overlapping and naked sites. With 4G being launched in 2018, Bangladesh’s towercos are poised to bridge the digital divide and enable the Digital Bangladesh vision:

The tower market in Bangladesh will only achieve optimum efficiency, attracting maximum funding to expand and densify the network, if the market can be refined to support the efficient sale and leaseback of existing MNO towers to the towercos.

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Innovative integrated communications infrastructure services leader edotco leverages data to focus on four areas: real-time efficient operations; advanced analytics; predictive capabilities and future proofing the company. In this exclusive interview, Director of Group Strategy Gayan Koralage describes the tools they use the collect data, the analyses and insights derived from that data, and the operational and commercial KPIs edotco measure.

**Keywords:** Access Control, Asia, Bangladesh, Data Collection and Utilisation, edotco, Hybrid Power, Interviews, Job Ticketing, KPIs, Malaysia, Operational Excellence, Opex Reduction, SLA, Site Visits, Tenancy Ratios, Towercos, Uptime

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**Read this article to learn:**
- What tools do edotco use to collect, analyse and visualise data?
- Example insights derived from data analyses
- What are the most important KPIs edotco manages, and what have been some of their success stories?
- Future objectives from big data analytics: RPA, AI, machine learning and moving order generation from being reactive to proactive

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**TowerXchange: How would you summarise edotco’s current data strategy, both operational and commercial performance data?**

Gayan Koralage, Director, Group Strategy, edotco

**Group:** Innovation is at the core of our operations, and we have embarked on a strategy that comprises of four focus areas, namely real-time efficient operations; advanced analytics; predictive capabilities and future proofing the company.

This model places a great emphasis on data collection and usage, to drive business efficiencies and operational excellence, enabling us to benefit from smart process automation, advanced data analytics and applications. Our current strategy is aimed at ensuring we receive the most accurate real-time data from our tower assets, further enabling us to drive a business that ensures our operational teams benefit from insights gathered and customers get the best out of the partnership, resulting in a shift from reactive orders to a proactive demand generation model.

**TowerXchange: What tools do you use to collect data?**

Gayan Koralage, Director, Group Strategy, edotco

**Group:** We have adopted a variety of initiatives and tools across our business that enables our operations systems to be leaner, agile and more cost-effective. Some of the more notable projects are:

**Drones:** To conduct site surveys, network inspection
alongside assessment for preventive maintenance and revenue assurance. The use of drones’ results in faster data collation and report generation, reducing the turnaround time for reports by 35%.

**echo RMS:** Monitors real-time batteries, rectifiers and generator sets to make sure they are in good working condition. These assets are equipped with sensors that help us manage our maintenance scheduling.

**easi:** An asset management platform to help us keep track of our inventory and workforce (our field technicians), ensuring what we have in reality matches what we have in our databases. Currently both echo and easi each have mobile applications, and we plan to merge them next year, along with the workforce asset management system on one cloud-based platform for optimised results.

**RAPID:** Usage of smart process automation built into our financial system.

**TowerXchange:** What tools do you use to analyse and visualise data?

**Gayan Koralage, Director, Group Strategy, edotco Group:** We use tools such as Power BI, MapInfo and, available functions in Microsoft Excel.

Power BI transforms our data into rich visuals for better visualisation. We’re able to use such visuals and share insights organisation-wide, enabling our teams with the necessary to work more efficiently. As for MapInfo, it is a geographic information system (GIS) software that we use for mapping and location analysis for our tower sites. It helps us visualise, analyse, and interpret data to understand certain patterns and trends.

**TowerXchange:** How do you translate data into actionable insights? What kind of reports and ‘what if’ scenarios are you able to run?

**Gayan Koralage, Director, Group Strategy, edotco Group:** We have a few examples of extremely useful achievable and automated insights, including:

- **Long-tail analysis:** Derived from data gathered, this analysis helps us identify sites with prolonged power outage issues. As such, we can escalate it to the local operations teams to put the necessary precautionary measures in place. In addition to that, by analysing the data, we are able identify the cause of an incident (i.e. failure of equipment, faulty) hence determining the best way to overcome or avoid an issue.

- **Monitor diesel readings:** Having a thorough view of the diesel readings without being onsite helps us identify generator set inefficiencies and also, detect or prevent theft.

- **Avoid overbilling:** We are able to show a comparison of our AC meter readings against utilities charges. This enables both edotco and the relevant utilities company to study and understand energy billings within a certain site better.

- **Revenue assurance:** Comparison of energy usage at site against our asset register to detect equipment that was installed without permission or not updated in our internal system.

- **Monitoring of temperature:** Real-time temperature reading to reduce energy consumption at site or avoid damaging equipment due to high temperatures.

**TowerXchange:** What are the most important KPIs you are measuring and managing in terms of operational performance? And can you share some success stories?

**Gayan Koralage, Director, Group Strategy, edotco Group:** Our most important KPI is uptime. Aside from that, we also look into mean time to repair
order generation needs to move beyond reactive to proactive – informing customers where sites need to be built with a ready catalogue of structures and location partners for them when they do decide to build

(MTTR); percentage of sites with theft, vandalism and accidents; site delivery according to service level agreements (SLAs) and percentage of green or hybrid sites among others.

Externally, the above KPIs give us the ability to meet the needs of our customers while internally, it helps us to be more competitive from the perspective of cost, time and quality in terms of the ability to meet and surpass our service level agreements (SLAs). Some of the successes we have attained over the past years include:

- Maintaining energy up time in Bangladesh despite deteriorating grid conditions.
- Over 600 sites with renewable energy, resulting in approximately 25% carbon reduction.
- The construction of more than ten bamboo structures in Bangladesh, the equivalent of 70% carbon reduction per site.
- A 30% reduction of theft, vandalism and other safety risks through the usage of edotco’s smart padlocks and easi asset lifecycle management.
- A 30% reduction of theft, vandalism and other safety risks through the usage of edotco’s smart padlocks and easi asset lifecycle management.

TowerXchange: What are the most important KPIs you are measuring and managing in terms of commercial performance? And can you share some success stories?

Gayan Koralage, Director, Group Strategy, edotco Group: In terms of commercial performance, there are many KPIs we benchmark against however, tenancy ratio of sites alongside lease fee per tenant per site is the most important measure of our commercial performance.

edotco’s portfolio of towers has a 1.60 tenancy ratio, while the global average is between 1.6 and 2.0. Our tenancy ratio grew from 1.5 in 2017 to 1.60 as of 3Q last year – this is a clear indication of our growth across all six markets we are in.

TowerXchange: Please sum up your personal view of where we are as a communications infrastructure industry today in terms of collecting and utilising big data – and what we should strive to achieve in the future.

Gayan Koralage, Director, Group Strategy, edotco Group: Businesses across all industries need to innovate or risk being left behind. Based on my observations, the communications infrastructure industry has not been adopting big data analytics as quick as they should. Driving value more for customers requires towercos to deepen their presence in the telecoms value chain. This means developing the right competencies and capabilities. Moving forward, we need to be able manage an end-to-end telecoms network autonomously with the use of RPA, AI, machine learning and so forth. Reducing the reaction or response time to a sub-millisecond range is crucial in the era of 5G where low latency and high availability are key. Even more so, order generation needs to move beyond reactive to proactive – informing customers where sites need to be built with a ready catalogue of structures and location partners for them when they do decide to build.

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edotco keeps driving growth and innovation in its backyard

The group’s CRO talks new solutions, 5G and recent moves in Malaysia

2018 has been a successful and dynamic year for edotco at home. The infrastructure innovator achieved a 30% year-on-year growth nationally and the acquisition of Yiked Bina has driven its tenancy ratios up to 1.8x. While the company continued to deploy traditional macro sites, over 50% of its new builds last year were infill lamp-poles and special structures, and they expect demand to keep moving towards new solutions such as small cells, street furniture and fibre integration as the country prepares for 5G transition. In this interview, edotco’s Chief Regional Officer in Malaysia Wan Zainal analyses last year’s performance, offers his views on the local market and shares some key insights on new solutions and edotco’s vision for the near future.

Keywords: 4G, 5G, Asia, Asia Insights, Co-Locations, Construction, edotco, Energy, Fibre, IBS, LTE, Malaysia, Market Overview, Off-Grid, On-Grid, Operational Excellence, Small Cells, Tenancy Ratios, Towercos

Read this article to learn:
- The current state of the Malaysian telecoms and tower markets
- edotco’s footprint and strategy in the country
- What are the new solutions that edotco is exploring ahead of 5G?
- Insights into the Yiked Bina acquisition and its benefits
- Operational improvements and the future of connectivity

TowerXchange: Would you introduce the tower market in Malaysia and the role edotco plays in that market?

Wan Zainal, Chief Regional Officer, Malaysia, edotco: The tower scene in Malaysia is at an interesting phase; while it is a mature industry, the market is still growing with about 1,000 to 2,000 new structures, including street level furniture, being put up every year. This is driven by operators needing to support current 4G requirements and to be 5G-ready, as well as meet the constantly growing demand for higher capacity and speed as data usage increases. More infill solutions will be required in order to meet all these requirements.

edotco owns and manages close to 10,000 towers across the country. We are firm advocates of agile, shareable infrastructure that meets the connectivity and capacity demands. In addition to enabling connectivity through towers, we also fulfill capacity requirements via BTS hotels, in-building systems (IBS) and shareable solutions, allowing for a quick setup of MNOs’ hardware as well as providing room for upgrades when needed. Co-location is very much our core value proposition for the industry to help customers reduce cost of network operations and achieve operational excellence.

TowerXchange: How would you characterise the current state of 4G rollout in Malaysia, and how much impact have the newer LTE operators had?

Wan Zainal, Chief Regional Officer, Malaysia, edotco: 4G Rollout in Malaysia has registered rapid growth
in the past few years with the main, established operators claiming coverage of more than 90% of the population. At the same time, the newer LTE operators have been aggressive in deploying new sites to extend their network coverage nationwide.

We believe that this trend will continue for the next few years as the increased demand for high data capacity, especially in densely populated, urban environments, will require more in-fill sites.

TowerXchange: What is the extent of fibreisation of edotco’s Malaysian towers, and how does that compare to the other towers in the country?

Wan Zainal, Chief Regional Officer, Malaysia, edotco: One third of edotco’s portfolio in Malaysia is already integrated with fibre to provide a complete suite of services to customers, with relevant options to cater to their individual preferences and needs. Overall, the tower infrastructure in Malaysia is 30-40% fiberised.

As it is crucial for the nation to be equipped with the right telecom infrastructure, edotco Malaysia will be looking to fibreise more sites to increase the link capacity and user experience. This will also support the growing demand for capacity and bandwidth in the backhaul system towards 5G readiness.

TowerXchange: 2018 has been a good year in terms of build-to-suit for edotco Malaysia. Are you primarily building for Celcom or also for third parties? Can you give us a sense of the build volumes and how they compare to previous years?

Wan Zainal, Chief Regional Officer, Malaysia, edotco: While Celcom is our anchor tenant and most of our new builds in 2018 were for them, we are seeing an increase in demand from other operators as well. We are an independent towerco and we work with any party who entrusts us to build, operate or manage telecom infrastructure for them.

Malaysia is experiencing high data growth, especially with 5G around the corner. New sites are still required to increase coverage, offload capacity and reduce latency. In 2018, edotco Malaysia grew around 30% year-on-year. However, beyond build volume, an interesting observation was the changing trend for infrastructure type; over 50% of our new builds last year were infill lamp-poles and special structures. We expect this trend to continue.

TowerXchange: What site typologies are you building – for example what is the mix of traditional macro sites versus rooftop poles, lamp-posts, DAS and other innovations like BTS hotels?

Wan Zainal, Chief Regional Officer, Malaysia, edotco: It depends on the project needs, the requirements of the customer and site availability. We evaluate the suitable solutions to deploy based on the brief and desired outcome as well as site acquisition.

For instance, for skyline harmonisation and aesthetic purposes, we would build camouflaged towers or lamp-poles instead of a macro tower or rooftop structures. In remote locations, a traditional 3 or 4-legged tower would still be rolled out. While towers remain important for us to improve connectivity levels in the country, we are also looking ahead to fulfilling capacity requirements to support the nation’s digital goals. We do this through the implementation of cell sites at street level such as panel antennae, small cells and other IBS in various projects, from transportation hubs, to stadiums and even smart cities.

The top three solutions that edotco Malaysia is focusing on aside from the traditional tower solutions are:
1. In-building system (IBS)
2. Lamp-pole solutions
3. Street furniture

TowerXchange: What exactly is a BTS hotel? In what typical scenarios have you deployed BTS hotels and why?

Wan Zainal, Chief Regional Officer, Malaysia, edotco: A BTS (base transceiver station) Hotel is a solution that integrates the benefits of fibre, common antenna and towers. It aggregates fixed and wireless traffic resources into a single location to provide shared network connectivity to the operators. The solution is ideal in townships that emphasise skyline harmonisation for space-constrained areas, while promoting shared infrastructure.

In terms of capital, it provides up to 35% cost savings compared to the deployment of a traditional site. This is achieved via a Plug & Play model, where operators are not required to invest in microwave equipment for backhaul, thus saving on bandwidth lease.
TowerXchange: In terms of other growth drivers, has it been a similarly good year for lease-up in Malaysia? Would you mind telling us about your current tenancy ratio and how you’ve achieved that success?

Wan Zainal, Chief Regional Officer, Malaysia, edotco: 2018 has been a good year for edotco Malaysia. With the consolidation of Yiked Bina into our portfolio, our tenancy ratio has risen to the 1.8x mark and more operators are experiencing the value proposition of co-location. Kudos to the team’s diligence, tenacity and drive to deliver on our commitments to customers.

Our engineers work tirelessly around the clock to ensure the right solutions are deployed on time and thereafter work closely with our customers to optimise within the stipulated deadline, with minimal disruption to service. We are motivated to take on challenging projects and serve our customers with the goal of long-term partnerships. This is our strength that has helped set the benchmark for edotco to lead the industry.

TowerXchange: Congratulations on the acquisition of Yiked Bina! For the benefit of readers who don’t know what the State-backed towercos are in Malaysia, please explain the role they play. And can you describe some of the drivers behind the acquisition of Yiked Bina towers?

Wan Zainal, Chief Regional Officer, Malaysia, edotco: States in Malaysia progress at different paces and have different ICT aspirations. To ensure that telecom infrastructure development keeps pace with the state’s vision, they appoint companies that fulfil their requirements and that of the regulators. Typically, state agencies would also hold equity interest in these companies.

In terms of the deal, we are always looking out for growth opportunities both organically and inorganically, and Yiked Bina synergised well with edotco’s business and value proposition. The acquisition also enabled our expansion in the northern state with readily available towers.

TowerXchange: For the benefit of suppliers reading this, can you give a quick overview of edotco’s Malaysian portfolio in terms of on/off/unreliable grid connectivity, remote monitoring and typical service intervals? And what are your remaining priorities in terms of operational improvement?

Wan Zainal, Chief Regional Officer, Malaysia, edotco: edotco Malaysia’s portfolio consists of almost 4,300 owned towers, serving multiple operators in the country. The Malaysian industry has been growing rapidly in terms of infrastructure development and technology advancement in the last 20 years, helped by a stable power grid.

Of our 4,300 owned towers, over 98.5% of them are on-grid, with the remainder being off-grid or with unreliable grid connectivity. We place emphasis on remote monitoring to proactively detect abnormalities at our sites in real time to enable quick response. More than 90% of our sites are equipped with remote monitoring capabilities.

As for service interval, we conduct it on a quarterly basis. Our priorities for improving operations are in four key areas of safety and health, reducing opex to achieve operational excellence, increasing remote monitoring to at least 95%, and focusing on data analytics to increase efficiency of fault detection and improve reliability of service.

TowerXchange: Finally, please sum up your vision for the future of enabling connectivity in Malaysia.

Wan Zainal, Chief Regional Officer, Malaysia, edotco: As MNOs gear towards preparing for 5G, there is a growing need to increase capacity and speed. In order to address this, fibreisation and densification are required. The installation of more IBS to complement macro sites is a solution. We envision greater densification in Malaysia to support the ever-increasing appetite for data consumption. Densification signals the shift to deploying more small cells and innovative structures such as panel antennae instead of traditional sites, especially as infill solutions in urban areas.

This shift to wider use of small cells also enables the country to be prepared for 5G implementation on the horizon, as they are able to support greater capacity and speed required to power the technology. In line with this, edotco is reassessing and improving our engagement with stakeholders such as MNOs, municipal councils, authorities, and landlords as we collectively focus on supporting Malaysia towards achieving the nation’s digital goals.
Despite years of on/off deals and tower activity in the MENA region, 2019 looks set to be the year when independent towercos finally enter this diverse and opportunity-filled market. From Zain’s deals with IHS in KSA and Kuwait to Saudi Telecom Company’s carve out plans, Omantel’s potential sale process and new towercos with local expertise cropping up across the region, there will doubtless be plenty of tower activity in 2019.

What’s driving change in MENA isn’t just about towers changing hands. In the GCC countries in particular, MNOs are under pressure to deliver Smart City infrastructure and rollout 5G, and managing their existing infrastructure more effectively is becoming increasingly critical. Regulation in the region is also playing a bigger role, as governments see the benefits of effective infrastructure sharing and regulators push for better use of resources. Take a look through key market studies from across MENA and access insights from leading players in the industry in TowerXchange’s latest research.

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Zain pioneering the sale of towers in the MENA region

Zain has announced two deals with IHS Towers for its Saudi and Kuwaiti towers, TowerXchange find out what happened behind the scenes

In a regional first, in October 2017, Zain announced that it had reached a deal with IHS Towers for the sale and leaseback of its tower portfolios in Kuwait, in November 2018 news followed that Zain had agreed another sale and leaseback agreement with IHS Towers in Saudi Arabia. The transactions should be finalised imminently. The company announced that 1,700 Kuwaiti towers will be sold for US$165mn and 8,100 Saudi towers for US$650mn, while both deals include provisions for further new build. The move sees Zain pivot from a traditional telco to a digital service provider without the encumbrance of a portfolio of non-core, passive infrastructure. TowerXchange spoke with CSO Kamil Hilali about the transactions, the Kuwaiti and Saudi markets and the changes in Zain’s strategy that led to the decision to dispose of its towers.

Keywords: Business Model, C-Level Perspective, First Mover Advantage, IHS Towers, Kuwait, MNOs, Masts & Towers, Middle East, Multi-Country Partner, Regulation, Sale & Leaseback, Saudi Arabia, Stakeholder Buy-In, Tenant’s Perspective, Towercos, Zain

Read this article to learn:
- Why Zain is selling its towers and what it means for other Middle Eastern MNOs
- How tower sales are perceived internally in the Middle East
- What happens when regulators with limited experience of tower deals get involved
- Zain’s plans for its towers in Kuwait and Saudi Arabia

TowerXchange: Please tell us a bit about Zain’s footprint and what brought it to sell its tower portfolios in Kuwait and Saudi Arabia.

Kamil Hilali, Chief Strategy Officer, Zain Group: Zain has a broad footprint across MENA and has different strategies and approaches in each geography, but there is a Zain ethos of quality and innovation across all of those markets. Zain started operations in Kuwait, but has operations in Bahrain, Iraq, Jordan, KSA, Sudan and South Sudan and operates a concession in Lebanon branded Touch. In 2011 Zain exited most of Africa with a sale to Airtel, but remained in Sudan, South Sudan and a kept small stake in Morocco’s 3rd operator. So overall, that’s 49 million customers across eight countries and Zain is the market leader in five of them: Kuwait, Iraq, Sudan, Jordan and Lebanon. Across all its operations, in 2018, Zain saw net income of US$649mn and EBITDA of US$1.7bn on revenues of US$4.4bn. Our 39% EBITDA margin is one of the highest in the region.

Zain has looked at a tower sale for some years in several key markets, including Kuwait and KSA. The main reason for undertaking such a transaction is that it creates shareholder value as it reduces debt obligations, unlocks capital and resources, thus allowing more focus on core operations in driving new business growth. These two markets are very prime for Zain as we expect exponential growth in digital services, especially in the Government, Enterprise and B2B areas.
TowerXchange: Tell us a little about yourself, what is your background and how did you come to manage the first successful tower sale in the Middle East.

Kamil Hilali, Chief Strategy Officer, Zain Group:
I am in charge of the development and implementation of Zain’s growth strategy and its transformation from mobile operator to a digital services provider. My responsibilities also include business development, strategic investments and portfolio management.

Prior to my current role, I was head of the Group’s M&A team and this prepared me for the complex negotiations involved in a successful sale and lease back of towers. Before that I had experience in private equity in MENA and asset management with JP Morgan in the U.S.

TowerXchange: When plans for a tower sale were initially mooted, what was the attitude internally? Where did the idea come from?

Kamil Hilali, Chief Strategy Officer, Zain Group:
Working with an independent towerco was something Zain had been looking at for a long time. For at least the last three years, we have been mobilised for these two transaction and they were both initiated by our Group CEO. Working with an independent towerco was something Zain had been looking at for a long time. For at least the last three years, we have been mobilised for these two transaction and they were both initiated by our Group CEO

TowerXchange: Were there concerns about losing control, or was the attitude more positive?

Kamil Hilali, Chief Strategy Officer, Zain Group:
To be frank, there is no precedent in the region so the concern we faced internally was totally normal and completely to be accepted. It is a big change. An important external stakeholder we had to work with was the regulator in both markets. We had to help them understand the business and execution plan and clarify them why it is beneficial for the sector and local economy as a whole. Under the terms of the agreement, Zain will be selling only its passive, physical infrastructure to IHS and will retain its intelligent software, technology and intellectual property with respect to managing its network. This is why Zain is looking across the region and reaching out to explain the fundamentals of tower transactions to the market. Other MNOs and regulators across the region are starting to think about their infrastructure and we have quickly become known as a reference for such divestment.

The regulator had questions, but there was nothing particularly concerning or surprising in their reaction. We were asking to move from a simple telecoms market to introducing a whole new player,
in the form of a towerco. They needed to know the towerco were a reputable entity, knew what they were doing, that strategic infrastructure was protected, and so on. So, it is a process to make sure all t’s are crossed and i’s are dotted. It is important.

We chose to work with IHS Towers for many strategic reasons noting they are one of the largest independent tower operator in the MENA region by tower count. They are a company that possesses high calibre of expertise with sound operational experience in diverse and very difficult markets. In many African markets in which IHS Towers operate, for example, power reliability is poor and some sites in the divested estates of towers require that level of power expertise.

TowerXchange: Is there any kind of Middle Eastern body that ties the regulators together? How does information spread in the region?

Kamil Hilali, Chief Strategy Officer, Zain Group:
The region’s regulators have been quite sophisticated. That might not be the usual image of telecoms regulators, but the regulators in the region have access to top-notch international talent. And they’ve been through a journey of discovery of the benefits and challenges of separating active and passive infrastructure. Many regional regulators have gone through public consultations to work out how infrastructure sharing can work in their area. There’s a big appetite to apply best practice and in keeping abreast with global trends in the telecommunications sector by offering licenses to provide wholesale services for tower infrastructure, thereby reducing capital expenditure challenges on telecom operators and raising the efficiency of mobile networks. This pro-activeness also allows new investors to enter the market, creating job opportunities and showcases the country as a more attractive place to invest.

Although the Kuwaiti deal was agreed at the end of 2017 we’ve had to undergo a long but constructive regulatory exercise which will allow us to close in early 2019. This slowed us down but it means that now there is a clear legal regime for towerco in Kuwait. Because of the learnings we have brought to the region, we expect the process for our Saudi sale and engagement with Saudi regulators to be shorter and to be able to close out the deal by mid-2019.

TowerXchange: How are the build to suit elements of the contracts designed? How will the tower sale help with 5G?

Kamil Hilali, Chief Strategy Officer, Zain Group:
We look forward to the efficient roll-out of 5G services to our customers and contributing to the socio-economic development of the country. Both the KSA deal and the Kuwait deal involve provisions for further new build. So the deals are not just about monetising passive assets but they will also help with future roll-outs of 4G densification and 5G networks. KSA has the larger new build component because Zain are expanding our network significantly more in KSA, whereas in Kuwait we are already very well established. We need to improve coverage in KSA, but we also need to boost the capacity of the network as we build out a 5G-capable network. The increase in density of sites for 5G requires significant investment in new sites. Both KSA and Kuwait are investing and beginning their 5G roll-outs this year, so this is a live problem that will require new traditional sites and rooftop solutions.

TowerXchange: What is on the horizon for Zain as it moves forward without its towers?

Kamil Hilali, Chief Strategy Officer, Zain Group:
Zain sees the impending Tower deal as beneficial on multiple fronts. Once closed in these two key markets, we are very confident there are important learnings to take forward, not just for Zain in other markets, but for other MNOs – and not just for telecoms but for increasing infrastructure sharing across the Middle East. It is a tremendous opportunity.

Lots of value accretive deals will be happening with Zain during 2019, not all of them I can announce just now. But the flexibility and capital released from the tower sale will help us do some really exciting things in unlocking opportunities in the digital space and at the same time meet the ever-increasing demand for reliable broadband access and data consumption. In the next few months, we will elaborate more on the strategic direction of Zain Group and our stakeholders will see what our move into becoming a digital services provider really means.
Kuwait: Poised for a landmark moment in the MENA tower industry

A study of the Kuwaiti market with the closure of Zain’s tower sale to IHS imminent

On 10 October 2017, Zain Kuwait announced that it had reached a deal with IHS Towers for the sale and leaseback of its tower portfolio in the country. The deal, which is expected to close imminently, will mark the Middle East’s first tower transaction of scale. TowerXchange take a closer look at the Kuwaiti market and the Zain transaction.

Keywords: Africa & ME, Communication Towers, Deal Structure, Energy, IHS Towers, Kuwait, MENA, Middle East, Ooredoo, Operator-led JV, Sale and Leaseback, Saudi Telecom Company, Tower, Tower Count, Towershare, VIVA, Zain

Kuwait’s economy and geography

With a landmass of 17,820km² and a population of just 2.9mn (Source: CIA World Factbook) Kuwait is one of the smallest countries in MENA, but is also one of the wealthiest, posting one of the highest levels of GDP per capita in the region. Unemployment is low (less than 1%) with around 75% of the population employed by the public sector. The economy has a heavy dependence on oil but after it shrank in 2017 (linked to falling oil prices), the IMF forecasts a growth of 2.33% in 2018, followed by a growth of 4.06% in 2019. Kuwait planned to introduce 5% VAT in 2018 in a bid to improve the country’s finances but in May announced that VAT introduction would be postponed until 2021, whilst still pushing ahead on plans to introduce excise tax on selected products. 100% of the population lives in urban areas.

The Kuwaiti mobile market

Kuwait is a developed mobile market with a mobile penetration rate of 173% and mobile broadband penetration sitting at 91% (Source: GSMA Intelligence, 2018). ARPU is one of the highest in the region with Zain Kuwait posting a figure of US$25 in Q3 2018, although in line with other countries ARPU has been steadily been decreasing. LTE coverage is almost complete and the country is very much positioning itself to be a frontrunner in 5G, with operators investing in their networks, in preparation for spectrum allocation and handset readiness.

Read this article to learn:
- Key background on the Kuwaiti mobile sector
- Tower ownership, sharing and operations in Kuwait
- Details of Zain’s tower sale to IHS Towers
- Whether we could see further towerco activity in Kuwait
Zain Group, which launched operations in the country in 1983, is Kuwait’s leading operator with 37% market share. Omantel acquired a 21.9% stake in Zain in 2017, making it the single largest shareholder after the Kuwait Investment Authority (which owns a 24.6% stake; 5.05% is owned by Nohoudh Development Trading & Contracting with the remaining shareholding listed on the Tadawul stock exchange).

Having acquired Wataniya Telecom in 2007 (Wataniya Telecom having launched operations in Kuwait back in 1999), Qatari-headquartered Ooredoo is Kuwait’s second largest mobile network operator with 32% market share. Saudi Telecom Company-owned VIVA launched commercial operations in the country in 2008 and currently sits just behind Ooredoo in terms of market share with 31%.

**The tower landscape**

There are approximately 4,100 towers in the Kuwaiti market (figure two) and whilst there has been limited infrastructure sharing between the operators, Zain report that, as of Q3 2018, they use 2,360 “sites” whilst their tower portfolio is known to be closer to 1,700 thus suggesting that some degree of infrastructure sharing or use of alternative site typologies is at play.

The deployment and operation of cell towers is regulated by CITRA, Kuwait’s Communication and Information Technology Regulatory Authority, which sets and monitors technical standards and electromagnetic radiation and ensures that environmental concerns are addressed. Around 10% of towers in Kuwait are understood to lack all necessary permits that are required with one of the biggest knock-on effects of this being that they are unable to connect to the electricity grid. As such, in spite of Kuwait’s extensive and robust grid infrastructure, approximately 10% of the country’s total tower stock (technically classed as temporary sites) are reliant on diesel generators 24/7 as their primary source of power (due to low fuel prices in the country, hybrid solutions have not been widely explored).

New site build in Kuwait is relatively modest. In their 2017 annual report, Ooredoo Kuwait reported that they had added 160 new sites for the calendar year, whilst Zain Kuwait’s tower portfolio is understood to have grown by around 100 sites in the past 12 months. To date, no towercos have been active in the Kuwaiti market, with operators and their supply chain partners responsible for deploying, operating and owning the country’s full complement of towers. On 10 October 2017, however, Zain Kuwait announced that it had reached a deal with IHS Towers for the sale and leaseback of its tower portfolio in the country.

**Zain’s tower deal with IHS**

News of Zain’s interest in divesting their Kuwaiti towers emerged back in 2015 when they appointed Citigroup to examine a potential tower sale in two Gulf countries. Later in 2015, then CEO, Scott Gegenheimer confirmed the company was opening a process for a sale of both their Saudi and Kuwaiti towers and in March 2016 it was announced that they were narrowing down potential bidders.
In Kuwait, it is understood that interest was received from 15 parties, with Zain Group undergoing a rigorous processes to narrow this down to five shortlisted bidders before finally settling the deal with IHS Towers and Towershare. IHS are understood to have fronted and bought the assets with Towershare acting as a regional partner (with Towershare having since been absorbed into IHS) and Zain retaining equity in the new entity. The division of equity between the parties was not disclosed. With Zain’s retention of residual equity reducing the capital requirement to purchase the towers, and IHS having significant liquidity on their balance sheet, IHS did not have to raise new capital to finance the transaction. Zain’s retention of equity is for financial upside exposure only, with no access to strategic or competitive information, thus guaranteeing the independence of the new towerco entity.

The deal is understood to involve a build-to-suit commitment over the next three to five years and whilst no details of decommissioning plans have emerged, consolidation is expected in a bid to bring efficiencies to the portfolio. Whilst there has been no discussions of the towerco entity expanding beyond the ownership and operation of macro-sites, Kuwait’s plans to become a leader in the rollout of 5G could create a potential role for the towerco entity in small cells and DAS rollout to meet densification requirements.

IHS will take over power as a service and whilst the vast majority of sites are on-grid, Zain had previously been investing in energy efficiency initiatives in a bid to control energy costs and reduce carbon emissions.

Speaking at the time of the transaction, Bader Al-Kharafi, Vice-Chairman and Group CEO of Zain said “This transaction is set to support Zain’s transformational strategy in becoming a digital lifestyle provider as it will optimise operational efficiencies, enhance customer experience, and deliver greater value for its shareholders. This deal will unlock value that can be more efficiently deployed in new technologies and higher yielding investments for Zain, and at the same time pave the way for further network expansion and tower infrastructure sharing in Kuwait. I’m very proud of Zain team for its professionalism in completing the first agreement of its kind in the MENA region. We are confident we have chosen the right partner in IHS, a company that possesses high caliber expertise with sound operational experience in diverse markets. The company has an ambitious team that is focused on expanding their operations across the Middle East and Africa.”

Sam Darwish, Executive Vice Chairman and CEO of IHS commented “We are delighted to partner with Zain on this agreement which will expand our operating footprint into the Middle East. We look forward to a long-term partnership with Zain, where we can demonstrate our strong operating capabilities and service offering in support of their customers. We expect significant growth in wireless phone and data usage in a number of emerging markets over the next few years and we believe, given the significant experience we have gained in our African operations, we are well positioned to meet the growing needs of wireless network operators in these countries.”
The deal is expected to close imminently with just final closing conditions to be determined.

**Could we see further tower transactions in Kuwait?**

In Saudi Arabia, Saudi Telecom Company has explored various strategies for its tower portfolio, proposing the formation of a joint venture with number two operator, Mobily, hinting at their interest in potentially selling their tower portfolio, and more recently creating a dedicated towerco subsidiary - Communication Towers, for which they have looked into securing a towerco partner.

STC’s Communication Towers plans look to be moving ahead, with insiders suggesting that the towerco could commence commercial operations in Saudi Arabia as early as January 2019 (although a change in STC management, coupled with ongoing discussions with regulators has stalled some of the progress). Saudi Telecom Company have remained close lipped as to whether their towerco strategy could be rolled out across their other markets, however TowerXchange consider it unlikely that STC’s VIVA would look at selling their Kuwaiti towers before a decision regarding tower strategy is reached in Saudi Arabia.

Ooredoo have experience working with towercos, having completed a tower transaction in Indonesia, selling 2,500 towers to Tower Bersama and working closely with a number of towercos in Myanmar. The operator has not announced further plans for their towers but is known to be exploring strategies to reduce its opex and capex spend across its different operations.

**Who could have an appetite for towers in Kuwait?**

As a relatively small market, the scope for multiple towercos to operate in Kuwait is limited and one could expect IHS to be the most likely acquirer of any subsequent tower portfolios that should come to market, driving value through decommissioning. Multiple towercos have however been linked to tower transactions in MENA, primarily in the Saudi Arabian market, and so competition for towers could ensue. Should Saudi Telecom Company’s Communication Towers commence commercial operations in Saudi Arabia, one can imagine that the towerco would cross the border into Kuwait in a bid to better commercialise VIVA’s tower portfolio.

Whilst a small market, the imminent closure of Zain’s sale and leaseback transaction to IHS Towers in Kuwait is a landmark moment for the Middle Eastern tower market. Whilst several tower transactions have been agreed previously in the region, the Kuwaiti deal looks set to be the first to cross the finish line, setting an important precedent and benchmark for future tower activity in MENA. TowerXchange remain optimistic that the deal could close ahead of our first Meetup MENA, being held on 29-30 January in Dubai which will welcome speakers from Zain, and IHS amongst other key players. For further information, please visit www.towerxchange.com/meetup/meetup-mena
Saudi Arabia makes major strides in the tower industry

Zain reach a deal with IHS plus progress on regulatory issues

On Wednesday 28 November 2018, Zain Saudi Arabia announced that it had accepted an offer valued at SAR 2.43bn (US$647.7mn) from IHS Towers for the sale and leaseback of its portfolio of 8,100 towers in the market. The news follows on from a previous announcement on 2 October 2017 that the two parties had entered into exclusive negotiations regarding the operator’s tower portfolio. After a number of stop-start processes in Saudi Arabia, TowerXchange examines the latest developments in the context of the Saudi Arabian tower industry and the knock on effect this may have for the burgeoning MENA tower industry.

Saudi Arabia is the Middle East's largest economy (GDP reported as US$683.8bn at December 2017; Source: World Bank's World Development Indicators Database) and is the Middle East's largest country in terms of landmass, and third largest in terms of population (32.9mn citizens as of December 2017; Source: World Bank's World Development Indicators Database). With 43mn subscriptions, mobile penetration sitting at 132% and mobile broadband penetration at 89% (Source: CITC Q2, 2018) and some of the highest data usage per capita globally, the sheer scale of the market leads it to being considered the Middle East's most important telecoms market.

There are three mobile network operators in Saudi Arabia and two MVNOs. Saudi Telecom Company is the country's largest mobile network operator with approximately 45% market share. The operator is 70% owned by the government's Public Investment Fund, 7% by the General Organisation for Social Insurance and 6.77% owned by Saudi Arabia's Public Pension, with the remaining shareholding free floating on the stock exchange.

Mobily (Etihad Etisalat Co), in which UAE-headquartered Etisalat has a 27% stake, has the second largest market share in the Kingdom, accounting for approximately 35% of Saudi subscribers. The operator launched commercial operations in the country in May 2005.

With 8.0mn subscribers (19% market share),

Keywords: Africa & ME News, Communication Towers, Deal Structure, Etisalat, IHS, IHS Towers, Kuwait, MENA, Middle East, Mobily, Operator-Led JV, Regulation, Sale & Leaseback, Saudi Arabia, Saudi Telecom Company, TASC Towers, Tower Count, Towercos, Zain

Read this article to learn:

- Details of Zain's tower sale to IHS Towers
- Progress on the formation of Saudi Telecom Company's Communication Towers
- Previous tower transactions and joint venture discussions that have come and gone in Saudi Arabia
- The size and shape of Saudi Arabia's mobile market and tower landscape
- What the future holds for towerco activity in Saudi Arabia and MENA
Zain Saudi Arabia is the country’s third largest operator having launched commercial operations in August 2008. The MNO is 37% owned by Kuwaiti-headquartered Zain Group (which also has mobile operations in Kuwait, Iraq, Jordan, Lebanon, Sudan and South Sudan and a minority stake in Moroccan operator, INWI) with 21% shareholding held by a Saudi consortium and the remaining 42% free floating on the Tadawul stock exchange.

The two MVNOs, Virgin Mobile and Lebara have just 1% market share between them.

The tower landscape

Saudi Arabia has an estimated 35,400 towers with Saudi Telecom Company having the largest portfolio (figure three). Infrastructure sharing in the Kingdom has to date been very limited, with fewer than 2% of sites believed to have more than one tenant. In the major cities, Riyadh and Jeddah there has been some infrastructure sharing as part of MNO densification plans to meet growing data usage, whilst in some of the country’s holy sites where access to land is limited, infrastructure sharing has arisen out of necessity. These infrastructure sharing arrangements are typically under bilateral commercial agreements and thus far have only covered passive equipment. With little infrastructure sharing a high degree of parallel infrastructure has developed: 95% of Zain and Mobily’s sites are reported to overlap.

Around 50% of sites are understood to be on government owned land, with 35% of sites on private land and operators owning the land on which about 10-15% of their tower portfolios sit.
MNOs have reported significant upward pressure on lease rates from municipalities and landlords, which is not only having an impact on their bottom line but is also adding to workloads as the operators look to renegotiate.

In terms of power requirements, around 90% of sites are on-grid with an extensive and reliable grid infrastructure across much of the country. What’s more, electricity prices in the Middle East are substantially lower than those in other regions, with some reports suggesting them to be one fifth the level of the global average. With increasing pressure on the economy from declining oil prices however, subsidies relating to electricity prices are gradually beginning to be withdrawn which will have an impact on site opex. Off-grid sites are generally those in more rural and remote areas although reports have emerged that some sites lack grid connections as a function of their lack of key permits. Such sites are reliant on diesel generators 24/7 with low fuel prices meaning that hybrid solutions have not been widely deployed. With the cost of diesel being low, the highest costs for off-grid sites relate to fuel delivery which can be significant for certain regions.

**Figure two: MNO and MVNO market share in Saudi Arabia**

- Saudi Telecom Company: 45%
- Mobily: 35%
- Zain: 19%
- MVNOs: 1%

Source: TowerXchange

**Figure three: Tower ownership by Saudi Arabia’s MNOs**

- Saudi Telecom Company: 16,400
- Mobily: 8,100
- Zain: 11,000

Source: TowerXchange

As early as 2011, Saudi Telecom Company and Mobily entered into discussions surrounding the potential formation of a tower joint venture into which they would pool their existing portfolios in a bid to reduce passive infrastructure related capital.
In late 2014/early 2015, Zain appointed Citigroup to study the potential for a tower sale across its operations in multiple markets. Shortly after, it was reported that Mobily had issued a tender for advisory services to look at options for its tower portfolio, with TAP Advisors winning the contract.

Over the course of 2016, expressions of interest for the two operators’ tower portfolios were invited, with a May deadline being set (Zain also inviting bids for their Kuwaiti tower portfolio). Mobily’s larger tower portfolio (approximately 80% bigger than that of Zain) was viewed as the more attractive of the two by bidders, although the potential to acquire two portfolios had a positive effect in pushing up the valuation of both portfolios (a towerco or investor which acquired both sets of assets would own approximately 50% of the country’s total tower stock). The deals reached an advanced stage with commercial and technical due diligence completed. Names linked to the transactions included IHS Towers, Digital Bridge, TASC Towers, edotco, Providence Equity Partners and Towershare plus local investors and conglomerates including Saudi Aramco, Al Rahji Group and Al Zamil Group. Mobily received three binding bids, reportedly at terms they were happy with.

Around the same time, Saudi Telecom Company hinted that they too may consider a sale of their assets, before approaching Mobily to reopen discussions around the formation of a joint venture. Whilst one of Mobily's principal drivers to sell towers had originally been to reduce their debt burden (the operator reported substantial accountancy errors in 2014 leading to their profits for the year being revised down from SAR219mn to a loss of SAR913mn in Q1 2015), the appointment of a new management team enabled the operator to refinance its debt at a more attractive rate, thus reducing their pressure to sell.

Mobily abandoned their sale process in favour of continuing joint venture discussions with STC, in a bid to reduce costs and improve EBITDA. The two parties signed an initial three month agreement to study the joint venture in August 2016.
This move put a spanner in the works for the Zain deal. A potential joint venture between Saudi Telecom Company and Mobily could consolidate as much as 70% of the country’s towers into a single pair of hands; Zain’s tower portfolio, representing just 30% of the country’s tower stock and up against a strong competitor, suddenly became less attractive to potential acquirers, decreasing the potential value. In December 2016 however, Zain entered into exclusive negotiations with a consortium involving TASC Towers and local conglomerate, ACWA Group with a potential deal value being reported around US$500mn.

Joint venture discussions between Mobily and Saudi Telecom Company were extended with the operators putting out an RFP for an advisor to oversee the JV formation in early 2017. The contract was awarded to Standard Chartered but not long into the process joint venture plans were called off, with reports emerging that STC was not keen to share ownership, a stance which put Mobily off. As such, the second attempt to form a joint venture once again fell apart.

Talks between Zain and the TASC Towers - ACWA Group consortium dissolved, with the potential acquirers reportedly failing to raise the necessary equity for the deal. Advisors Citigroup remarkeeted the deal, attracting the attention of Towershare who had entered into discussions with Zain regarding their much smaller Kuwaiti tower portfolio. Towershare brought IHS into the deal with the two parties submitting bids for both Zain’s Saudi Arabian and Kuwaiti towers. On 6 August 2017 it was then announced that Zain had entered into exclusive talks with with the two parties, with the negotiations “superseding all prior arrangements”.

### A first tower deal completed in the Kingdom: January 2017 STC acquires GO sites

Whilst all eyes had been on a first sale and leaseback transaction between the Kingdom’s operators and a towerco, as well as on talks of a joint venture, one tower transaction that flew beneath the radar was Saudi Telecom Company’s acquisition of the towers belonging to operator GO Telecom (Etihad Atheeb Telecom). Reports as to the number of towers acquired vary from several hundred towers up to around 1,000. Saudi Telecom Company played down the deal, telling reporters that the SAR230mn (US$61mn) purchase which was financed through internal resources, would not have any material impact on financial results or their tower portfolio. Whilst no advisors were appointed by either party to run the deal, those close to the matter observed that the towers had received a decent valuation, given the financial stress that GO Telecom was under, providing a first benchmark for tower transactions in the region (albeit a transaction between two MNOs rather than an MNO and a towerco).

### Q1 2018: Saudi Telecom Company creates Communication Towers Co. Ltd

During the first quarter of 2018, STC established Communication Towers Co. Ltd., a fully owned limited liability company, with a share capital of SAR200mn. According to STC’s Q1 presentation “Communication Towers Company will be responsible for owning, constructing, operating, leasing and commercialising telecom towers”.

The operator’s total tower portfolio is reportedly 16,400 sites although it is as yet unclear as to whether their full portfolio will be managed by the entity which is yet to commence commercial operations (pending the award of necessary licenses from the relevant authorities).

STC is known to have employed the services of various consultancy firms to study the formation of its new towerco with both Delta Partners and Analysys Mason brought in to advise on the matter. The operator’s preferred model for their towerco has been to retain full equity, whilst enlisting the services of a towerco management partner to get operations up and running for the first couple of years. STC issued an RFP for a towerco management partner, and whilst various towercos from across the globe took a look at the deal on the table, no offers were received due to STC’s reluctance to cede any equity in the venture.

There have been several management changes within STC since Communication Towers was established, with Jeremy Sell most recently appointed to the position of Chief Strategy Officer (Sell having previously served as Ooredoo’s Head of M&A and CSO from 2006-2015, during which time the operator sold their portfolio of towers in Indonesia). Whilst insiders suggest that some at STC retain hopes of securing a towerco management
partner without ceding equity, the towerco continues to explore all its options. Reports have emerged that STC expects to commence commercial operations before early 2019, with progress in securing key licenses having reportedly been made.

**Regulatory barriers to towerco activity**

The Saudi telecoms market is regulated by the Communications and Information Technology Commission (CITC) – a well established institution which manages spectrum auctions, the Universal Service Fund and all other aspects governed by the telecommunications act.

Whilst discussions surrounding towerco activity in Saudi Arabia have been going on for a number of years, limited dialogue with the CITC meant that very little progress had been made on regulatory issues prior to the Kingdom’s first deal being announced. With no previous experience of towerco activity in the market, the regulator and government have remained cautious, particularly with regards to the transition of ownership of towers into independent and foreign hands. Concerns over national security and who controls and has access to towers have reportedly been at the forefront of the CITC’s reservations regarding towerco activity in the market, although towercos have been keen to point out that access is already granted to a range of contractors and subcontractors currently managing the assets.

In recent weeks, reports have emerged of significant regulatory progress on the towerco issue, with the finalisation of CITC’s towerco licensing regime expected to be imminent. Such a step forward will light the touch paper on towerco activity in the market, paving the way for STC’s Communication Towers and Zain’s tower sale to IHS as well as further towerco activity in the country.

**November 2018: Zain announces deal with IHS Towers**

On 28 November, Zain Saudi Arabia announced that it had reached a deal with IHS Towers for the sale and leaseback of its passive infrastructure. The deal, valued at of SAR2.43bn (US$647.7mn) covers the sale and leaseback of 8,100 towers for a 15 year period with the option to renew for five years and also includes the building of an additional 1,500 towers over the next six years. The deal is subject to approval from the CITC as well as lenders.

Commenting on the news, Bader Al Kharafi, Zain Vice-Chairman and Group CEO; and Vice-Chairman of Zain Saudi Arabia said, “The sale of Zain KSA’s impressive tower network is a highly positive move, as it creates shareholder value by helping the company reduce its debt position, as the proceeds will be used to reduce the company’s Murabaha facility. Both the Zain Saudi Arabia board of directors and Zain Group executive management are confident that we have chosen the right partners in IHS, a company that possesses high caliber expertise with sound operational experience in diverse markets.”

Al Kharafi continued, “We recognise and appreciate the efforts made by the Kingdom’s CITC in keeping abreast with global trends in the telecommunications sector by offering licenses to provide wholesale services for tower infrastructure, thereby reducing capital expenditure challenges on telecom operators and raising the efficiency of mobile networks. This proactiveness also allows new investors to enter the market, creating job opportunities. These efforts by the CITC that complements our deal with IHS, enhances Zain KSA’s mission of playing its contributory role to achieving the Kingdom’s 2020 National Transformation Program and the 2030 Economic Vision ambitions.”

Al Kharafi concluded, “Zain KSA has implemented a transformation program in the Kingdom for some time now, advancing its efforts to become a digital lifestyle provider. The deal unlocks capital and resources, allowing the operator to focus on its core operations and further invest in and deliver the latest ICT technologies to meet the ever-increasing demand for reliable broadband access and data consumption. It also provides Zain KSA additional impetus to focus on the delivery of more data monetisation initiatives and customer enhancing services to offer customers the best data experience in the Kingdom.”

With a portfolio of over 23,000 towers spanning Nigeria, Cameroon, Côte d’Ivoire, Zambia and Rwanda (figure five), IHS Towers is EMEA’s largest independent towerco. Privately owned, IHS’ investors include MTN (with a 29% stake), Wendel, the IFC, FMO, ECP Private Equity, AIIM, GIC, KIC, Investec and Goldman Sachs. IHS commenced
operations as a tower builder in Nigeria in 2001 and since then has grown into one of the biggest players in the global tower industry (read TowerXchange’s 2017 interview with IHS’ Executive Vice Chairman and Group CEO, Sam Darwish in issue 21 of the TowerXchange journal).

The company is very much positioning itself to be a front runner in the burgeoning Middle Eastern tower industry, having also reached an agreement with Zain Group to acquire their portfolio of 1,700 Kuwaiti towers for US$165mn back in Q3 2017 (with the deal expected to close imminently).

**Growth in the Saudi Arabian market**

Whilst 4G coverage stands close to 100% in Saudi Arabia, significant densification is required in the Kingdom to meet the growing data usage of citizens as well as the ICT targets of Crown Prince Mohammed bin Salman’s Saudi Vision 2030. The country has also laid out ambitious plans to bring broadband access with download speeds of 10Mbps to 70% of households in rural areas by 2020, an agreement for the third phase of which having been signed between the Ministry of Communications and IT and Saudi Telecom Company in late November.

The Zain deal includes the build of 1,500 new towers by IHS over the next six years in a bid to improve coverage and capacity, with Zain’s tower portfolio having also grown by several hundred sites between when exclusive negotiations began in late 2017 and today, demonstrating the requirements for new build in the country.

Saudi Arabia is very much positioning itself to be a frontrunner in the move towards 5G and as such, one can expect that towercos in the Kingdom may play a significant role in the rollout and management of small cell networks, as well as macro towers, as we have seen in other markets across the US, Europe and Asia.

Decommissioning is also likely to play an important role in towerco activity in the country, with significant parallel infrastructure understood to exist due to limited infrastructure sharing between operators to date.

**Knock on effects for the tower industry in other MENA markets**

Considered by many to be MENA most important mobile market due to its scale and wealth, a tower sale in Saudi Arabia is likely to have knock
on effects for tower transactions and towerco activity across the region as the whole with a benchmark now being set for such processes. Tower transactions have previously been explored in Egypt, Bahrain and Jordan only for the sale processes to fall apart (read more in TowerXchange’s analysis of the MENA tower industry at the start of the journal), but with deals agreed in both Kuwait and now Saudi Arabia, one can expect momentum to build.

Should the deals prove successful, Zain is likely to explore tower sales in its other markets and other operators are likely to follow suit; Omantel, for example, are expected to formally announce a tower sale process in early 2019. The creation of a regulatory framework for towerco activity in a market as important as Saudi Arabia is also likely to serve as a guide for other regulators across the region and hopefully ease the way for further tower sales should they come to market.

Given the major changes underway in MENA’s tower industry, TowerXchange will be hosting a VIP only Meetup for MNOs, towercos, regulators, investors and select supply chain companies on 29-30 January 2019 at Le Meridien Hotel and Conference Centre in Dubai. 250 executives are invited with Zain Group’s CSO Kamil Hilali and IHS Towers’ management team joining other industry leaders including Etisalat International’s CTO, Hatem Bamatraf and Saudi Telecom Company’s new CSO, Jeremy Sell. To find out more and to enquire about joining please visit our website at:

www.towerxchange.com/meetup/meetup-mena/

See you at our future events!

Meetup Europe 2019
9-10 April, London

Meetup Americas 2019
9-10 July, Boca Raton

Meetup Africa 2019
8-9 October, Johannesburg

Meetup Asia 2019
3-4 December, Singapore

Meetup MENA 2020
28-29 January, Dubai

www.towerxchange.com
Saudi Arabia roundtable reveals imminent transition to towerco business model

The current state of tower carve-outs and sales in KSA – and what it means for you!

All the leading stakeholders in the emerging Saudi Arabian tower sharing market participated in the inaugural TowerXchange Meetup MENA in January 2019. Several of the county's leading MNOs, tower cos, investors and suppliers contributed to discussions at a revealing Saudi roundtable, which covered ground leases, lease-up plans, new build, decommissioning, regulation, fibre and urban infrastructure deployment. Here's what we learned.

Keywords: 5G, Build-to-suit, CITC, Capacity Enhancements, Carve Out, Co-locations, Deal Structure, Decommissioning, Etisalat, Fibre, IHS Towers, Infrastructure Sharing, MENA, MNOs, Market Overview, Mobily, Nocation of Leases, Procurement, Research, Sale & Leaseback, Saudi Arabia, Saudi Telecom Company, Small Cells, Smart Cities, TowerXchange Research, Towercos, Zain

Read this article to learn:
- The cost of renting the land under Saudi towers, and the prospects for lease liquidation for decommissioning
- The race to secure co-locations: what will determine which towers are leased up?
- STC's carve-out towerco Communication Towers: what and how will they buy?
- Fibre to the tower and the role of Dawiyat
- New build and the specific needs for 5G-ready urban connectivity in KSA’s ‘Giga projects’

By Kieron Osmotherly, CEO, TowerXchange

The current state of the emerging Saudi tower market (as at January 2019)

All three Saudi MNOs are exploring significant changes in their tower strategy:

- Zain has announced the sale and leaseback of 8,100 towers with African market leading towerco IHS Towers, agreeing a US$647.7mn transaction which remains subject to regulatory approval before closing. Zain are believed to have an existing tenancy ratio of around 1.15x.

- Saudi Telecom Company (STC) is now getting serious about monetising its tower assets, and has carved out captive towerco “Communication Towers”. STC is interested in partnering with (but not selling to) a third party towerco to lease up the towers, and will create a lean organisational design substantially leveraging outsourcing. After Communication Towers is established, STC may explore capital markets recognition of the value of the asset.

- There have been conflicting reports as to the status of the Etisalat (Mobily) towers. At the TowerXchange Meetup MENA Etisalat were suggesting they would retain and lease up their towers, while other sources suggested they had carved out a separate towerco – although creating a towerco newco does not necessarily indicate a full carve out or sale and leaseback is imminent. “Mobily have had interest to consolidate or share towers for a long time, especially for new build,” commented one roundtable participant.
With active infrastructure sharing proving too politically complex to be agreed in KSA, there is a widespread recognition that there may be no better time to monetise passive infrastructure, with global towerco valuations at an all-time high, and with 5G already being trialled, carving out towers reduces rollout and maintenance complexity.

**The tower landscape**

Land lease rental is very expensive in the Kingdom of Saudi Arabia (KSA). Land ownership is diverse, but the land under most sites is privately rather than government-owned. As KSA is a relatively mature mobile infrastructure market, many underlying ground leases are up for renewal, with significant upward pressure on rental fees during renegotiation. However, even at sites with a significant period remaining on the leases, terms and conditions often enable the operator to liquidate the tower, and with significant parallel infrastructure in the country, an increased culture of infrastructure sharing could result in rapid tower network consolidation. “The Saudi tower market is generally overbuilt with ample capacity to share 60m monster towers,” commented one roundtable participant. “Both STC and Mobily build towers to British standards, so there is sufficient excess capacity at many sites to enable decommissioning of adjacent towers.”

With IHS poised to begin leasing up Zain’s towers, STC’s carve out of Communication Towers ongoing, and Etsalat making noises about leasing up Mobily’s towers, the race to secure “low hanging fruit” co-locations in Saudi Arabia is about to begin. With responsibility for provision of power seemingly likely to be transferred to towercos, uptime, structural capacity, and the idealness of a tower’s location within network plan will determine which tower is leased up. With 5G imminent, fibreization will also represent a significant attraction for co-location.

**Fibre**

Amid increasing pressure from the Saudi regulator the Communications and Information Technology Commission (CITC) to open up fibre, the revenue model and optimal partnership structure to deliver fibre to the tower (FTTT) remains unclear. The CITC has published a regulatory framework on Wholesale Infrastructure Sharing. Wholesale Infrastructure Sharing licenses permit the deployment of towers, masts, small cells, DAS, dark fibre, ducts and wholesale data connectivity, albeit each under different categories. The CITC has also instigated the transfer of Saudi Electricity Company (SEC)’s fibre assets to subsidiary Dawiyat, which has 70,000km of fibre and a robust balance sheet. Dawiyat could be a prospective landlord for new towers. Dawiyat has 200 telecom towers as well as fibre. KSA’s MNOs also have substantial fibre holdings.

**STC’s new towerco Communication Towers: What and how will they buy?**

STC’s existing procurement model is largely consolidated through three vendors. That arrangement is likely to be opened up as carve-out towerco Communication Towers establishes its independence and unique governance processes, so prospective new suppliers should be on the lookout for new procurement agreements. Some alignment with STC is likely to continue, however, as Communication Towers seeks to leverage volume and knowledge benefits.

Communication Towers may initially absorb many existing STC contracts and processes, but many will be revisited as the entity endeavours to create new efficiencies.

It should be noted that regulations in KSA increasingly favour local manufacturing, and that localisation may continue to earn extra points when bidding for procurement contracts. “We’ve proved many times that local steel is available at the best price in KSA,” commented one roundtable participant, “although it’s less a steel purchase centric issue now; tower owners want an installed solution.”

Manpower remains a perennial challenge in KSA communications infrastructure, so the ability to recruit and retain a skilled workforce can be a differentiator, particularly again if there is a significant local component.
Regulation

The CITC has been an advocate of infrastructure sharing for several years, and regulation has prohibited the building of adjacent towers, while requiring that new towers be built with adequate capacity to be shared. However, those regulations have not always been enforced.

At the time of the TowerXchange Meetup MENA it seemed that the Wholesale Infrastructure Sharing license regime had been confirmed, but the licenses themselves had not yet been received by towercos. When the new towercos are carved out and licensed, it is anticipated that those entities, rather than the MNOs will build the majority of the Kingdom’s new towers.

New build in KSA

As noted previously, the Saudi tower network is generally overbuilt – there may as much decommissioning as new build as a culture of infrastructure sharing takes root. As such, there may be less new tower build, and more smart engineering projects to strengthen existing macro sites, or in rare cases to replace towers with stronger structures (as mentioned above, Saudi’s towers often have excess capacity).

That said, both IHS and STC’s Communication Towers will build to suit for third parties. It should be noted that STC are committed to demonstrate the independence of Communication Towers, which is likely to have its own management team and governance processes – it must be a separate company to ensure third parties in KSA are comfortable assigning search rings or co-locating on existing towers.

Around 60% of KSA’s existing cell sites are macro towers, 40% rooftops, but as much as 75% of new build is likely to be in urban environments, particularly densification sites for 4G/5G.

New build volumes are likely to be highest within several ‘Giga projects’ in KSA, such as the King Abdullah Economic City (KAEC), NEOM, a 5G-enabled city of the future in the Northwest, and The Red Sea Development Company. Such projects call for less macro towers – rather, they will demand smart cities infrastructure such as small cells and IBS, and may be hotspots for pioneering edge data centre deployments.

In conclusion, the Saudi Arabia roundtable painted a picture of a mobile and tower market on the brink of transition. The biggest obstacles have been overcome: deals and carve outs have been agreed, the regulatory regime is ready. KSA will be a unique tower market: a power-as-a-service tower market with pervasive and reliable grid, a tower market with a preponderance of decommissioning over build-to-suit projects, and a need for innovative urban infrastructure solutions for 5G-enabled smart cities.
Etisalat: searching for efficiency across a diverse portfolio

Etisalat International’s CTO shares insights into key MENA markets

Etisalat operate across 16 different countries, with an extensive presence in the MENA region including UAE, Saudi Arabia, Pakistan, Afghanistan and Egypt. TowerXchange spoke to Etisalat International’s Group CTO, Hatem Bamatraf, to find out more about plans for their MENA opcos, Etisalat’s current take on selling towers and network sharing and what partnerships and products they’re looking to deploy in order to boost efficiency across the region.

Keywords: 3G, 4G, 5G, Afghanistan, C-Level Perspective, Carve Out, ESCOs, Egypt, Etisalat, Etisalat Misr, Hybrid Power, Investment, MNOs, Market Overview, Middle East, Mobily, Network Rollout, Operator-Led JV, Pakistan, Renewables, Sale & Leaseback, Saudi Arabia, Smart Cities, Solar, UAE, Ufone

Read this article to learn:
- How the Etisalat portfolio is developing in terms of technology rollout
- An update on Etisalat’s key MENA opcos
- The main operational challenges Etisalat faces across their portfolio
- Etisalat’s current thoughts on selling towers and working with towercos
- How Etisalat is looking to work with ESCOs and why

Hatem Bamatraf, CTO, Etisalat International:

TowerXchange: Please introduce Etisalat’s global footprint and tell us about your opcos worldwide. Can you give us a picture of how far each opco is in terms of technology rollout?

Hatem Bamatraf, CTO, Etisalat International: We operate in 16 countries across the region with approximately 145 million subscribers. Our portfolio of companies differs in terms of scale and technology. In our key markets, our networks are advanced with 4G with large population coverage as well as a very high penetration of FTTH. When it comes to new technology launches, Etisalat Group is always at the forefront, believing that technology opens up new opportunities for the business and operations.

TowerXchange: We’d love to know your thoughts on some of the key MENA markets in which you operate. Can you talk us through the growth potential in the MENA markets in which you operate?

Hatem Bamatraf, CTO, Etisalat International: In Egypt, our focus is on growing the 4G coverage while managing the needs for 3G capacity. We are happy with the progress and we will probably be adding more sites per year in the short term to penetrate new areas.

I think KSA needs more cooperation between operators in terms of sharing. I hope that the degree of sharing will increase, especially as 5G rollouts are approaching. What is interesting about KSA is also the future of fixed infrastructure given the...
ambitious plans of the government to drive fibre adoption.

The situation in Afghanistan is complex mainly due to two reasons: security and fragmentation of the market. We continue to invest in our network to enable traffic growth and extend coverage into remote areas. I think that the market in Afghanistan needs transformation if it is to continue growing and securing investments.

Pakistan is a very competitive and I would say challenging market. We continue to share passive infrastructure with other operators wherever it is feasible and economic. We are also evaluating other forms of network cooperation. I don’t necessarily think of towercos as a requirement for passive sharing adoption – I see it more as a financial decision on which assets the operators wants to own and which not.

TowerXchange: You operate in a very diverse set of markets – what do you see as the main operational challenges across your portfolio, and what plans do you have to tackle any inefficiencies which may be creeping in?

Hatem Bamatraf, CTO, Etisalat International: That’s true. The markets we operate in vary a lot in terms of disposable incomes, infrastructure and local resources. In terms of operational challenges, we are trying to constantly reduce the costs of providing both data and voice services. In some markets, such as Afghanistan or parts of Pakistan security is a serious issue that adds challenges to our operations.

TowerXchange: You’ve completed one tower deal in the past, in Nigeria. What’s Etisalat’s current stance on tower transactions, how important is it for you to retain control of your assets?

Hatem Bamatraf, CTO, Etisalat International: Our stance has not changed. We look at the situation of the specific opco and the specific market it operates in. We are always in favour of increasing the utilisation of our assets to reduce the cost base. We look at this topic very carefully and evaluate all our options. We also monitor what’s going on in terms of tower deals around us.

TowerXchange: ESCOs are on the rise in the MEA region and have been producing strong results. How open is Etisalat to working with ESCOs?

Hatem Bamatraf, CTO, Etisalat International: The ESCO model is something we are currently evaluating in a couple of our markets and we are open to engaging with ESCO providers. We think that the potential and the attractiveness of such deals depends on the details of the economic model in each market. The key driver of the savings is the deployment of alternative power (solar) meaning the business case improves as fuel prices go up. We need to find ways to make sure that we, as an MNO, also benefit from that upside in the future, especially as ESCO deals are typically agreed for at least 10 years. Another important factor is currency exposure - we believe that the deal should reflect the providers underlying cost base and the non-local exposure should be limited to the capex portion.

In a bid to support the development of the nascent tower industry in MENA and foster improved infrastructure sharing, TowerXchange will be hosting a VIP networking event in Dubai on 29-30 January, welcoming operators, towercos, regulators, investors and other important industry stakeholders to discuss key issues and opportunities. Hatem Bamatraf has already confirmed his participation, as have other regional experts including Saudi Telecom Company, Zain, Omantel, IHS Towers, American Tower, edotco and TASC Towers. For further information, please visit our website at www.towerxchange.com/meetup/meetup-mena/
edotco on Pakistan: new build, decommissioning and strong uptake for a complete service

Despite the cancellation of the Jazz deal, edotco sees plenty of opportunity in Pakistan

In September 2018 edotco announced the cancellation of their agreement to acquire Jazz’s 13,000 towers in Pakistan. While this was a blow for edotco’s growth plans in the country, TowerXchange caught up with Arif Hussin, country managing director at edotco Pakistan to discuss edotco’s continuing growth narrative in the country and why they’re as committed as ever to fibre, towers and their neutral host service offering in Pakistan.

Keywords: 3G, 4G, Acquisition, edotco, Energy Efficiency, Fibre, Hybrid Power, Investment, Jazz, Market Overview, Middle East, O&M, Off-Grid, Pakistan, Renewables, Sale & Leaseback, Solar, Towercos, Unreliable Grid, VEON

TowerXchange: Can you give us an overview of your portfolio in Pakistan as it stands now? What % of your towers are urban vs rural? When you acquired the towers from Towershare their tenancy ratio was 1.6x. What’s edotco’s tenancy ratio in Pakistan now?

Arif Hussin, Country Managing Director, edotco Pakistan: Our portfolio of over 800 towers is 97% concentrated in urban areas. Currently, we count all four mobile operators of Pakistan as our customers, with nearly 1,200 tenancies. This translates to a co-location ratio of about of 1.4x, which is slightly below the tenancy ratio we acquired due to new build to suit tower additions in 2018 for one of the major mobile operators’ 4G coverage expansion programme. We have a strong pipeline with demand for both build to suit and colocation and expect to further improve our co-location ratio in the coming year.

TowerXchange: Can you share insights in to why the Jazz deal didn’t work out?

Arif Hussin, Country Managing Director, edotco Pakistan: Parties involved agreed to terminate the transaction due to the non-fulfilment of the conditions precedent to the SPA before expiry of the Long Stop Date, in particular regulatory approval for the resulting change of control contemplated under the SPA.

We will continue to engage the relevant authorities to seek a better understanding of the causes that resulted in the delay of approvals. Meanwhile,
our focus is on organic growth, given the healthy demand.

**TowerXchange: How does edotco view the Pakistan market now? Do you see further opportunity for significant growth?**

**Arif Hussin, Country Managing Director, edotco Pakistan:** We remain positive about the country and its outlook as a key market for us. The opportunities for organic and inorganic growth in the country continue to be strong. Pakistan, with its high demand for sites driven by exponential 4G demand and adjacent opportunities such as energy solutions, remains an attractive market for edotco.

We have a long-term commitment to Pakistan. Our existing operations continue to progress well with securing substantial orders and rolling out sites for top tier customers. edotco will remain focused in Pakistan and we look forward to investing in further growth opportunities, both organically and inorganically.

**TowerXchange: Your first moves into the Pakistani market were in fibre. Can you talk to us about how this helped your tower offering and how the two verticals are developing in Pakistan today?**

**Arif Hussin, Country Managing Director, edotco Pakistan:** That was actually an entry by Axiata, our parent company, which to date they have diversified in full. We, as edotco, look to partner with fibre providers to connect our sites to allow for better back haul connectivity for our customers. Today Pakistan has one of the lowest number of fiberized tower sites (industry estimates are <5%) which to us is a substantially underserved market and an opportunity. The last mile fibre market is quite fragmented and is one of the reasons for low penetration. We are actively working on partnering with multiple players to provide a unified offer that meets the demands for an enhanced user experience. For edotco, a site fully energized and fiberized for an operator to come in as a plug and play tenant is the ultimate goal and we continue to make progress towards that.

**TowerXchange: When we spoke to Suresh last September, he said he anticipated high take-up of your complete service offering, given the security and power issues in Pakistan. Has this proved to be the case?**

**Arif Hussin, Country Managing Director, edotco Pakistan:** We definitely see a high demand in terms of our full offerings – build to suits, O&M and energy. To date we provide complete end to end solutions which, when coupled with our regional experience, allows us to bring in best practices from across our footprint and enables
We continue to focus on reducing the reliance on diesel gensets for backup power by deploying longer battery backups, which is also a more cost effective option for customers.

TowerXchange: What power and site management solutions do you find are working best in Pakistan?

Arif Hussin, Country Managing Director, edotco Pakistan: Li-ion batteries which are deep-cycle batteries with a longer operational life as compared to the conventional VRLA batteries are an ideal fit for the operational environment of Pakistan. They are also environmentally friendly making them a good fit for our GOOD (Get out of Diesel) initiative. We continue to focus on reducing the reliance on diesel gensets for backup power by deploying longer battery backups, which is also a more cost effective option for customers.

As a company we embrace investing in automation to reduce cost and increase uptime. We are committed to echo, our comprehensive remote monitoring solution to deliver more efficient O&M, including power management and site security.

TowerXchange: In 2015 edotco told us that it was expecting the site count in Pakistan to double from ~28,000 over the next five to eight years. Is the market on track for this? Can you talk us through new build and decommissioning needs in Pakistan?

Arif Hussin, Country Managing Director, edotco Pakistan: The current number of sites has substantially grown since 2015 and currently stand at around 42,000 nationwide according to the PTA, providing about 92% geographical coverage. Data from Analysis Mason forecasts that 35,000 new towers will be built between now and end of 2022. Operators continue to aggressively plan new sites and we are seeing strong organic demand from them to fulfil extending 4G coverage and urban 4G densification needs.

The Pakistan tower market remains nascent with substantial overlapping coverage. There has been some proof of concept bilateral initiatives between operators in the last 18 months towards site consolidation, but these remain few and far between.

We still believe there are further requirements for decommissioning of overlapping infrastructure. Typically, the acquisition of tower assets by a neutral party towerco can help change the dynamics of consolidation resulting in increased sharing which translates into substantial economic benefits for operators.
Bahraini regulator encourages tower sharing through new legislation

Bahrain’s PRS Regulation will drive tower sharing from 12% to 40% and see 90% of the tower stock renewed

Bahrain’s Telecommunications Regulatory Authority has recently produced an extensive Public Radio communications Stations Regulation which covers the planning, design, installation upgrading and maintenance of masts and towers in the country. We spoke with Mohamed Abdulla Ramzan Alnoaimi, Director of Technical & Operations at the Telecommunications Regulatory Authority (TRA) to find out more about the motivation behind the new framework and how the TRA anticipates it will change the telecoms infrastructure landscape in the country.

**Keywords:** 5G, Bahrain, Camouflage, Infill, Infrastructure Sharing, Market Overview, Masts & Towers, Middle East, Operator-Led JV, Regulation, Rooftop, Small Cells, Solar, Telecommunications Regulatory Authority, TowerXchange Research

Read this article to learn:
- An overview of Bahrain’s Public Radio communications Stations Regulation
- How and why as much as 90% of Bahrain’s tower stock will need to be rectified
- The TRA’s stance on tower sharing and the potential entry of a towerco into the market
- How the TRA anticipates the regulation will affect 5G rollout in Bahrain

TowerXchange: The new regulation is very detailed but can you share an overview of the scope of the document and what it means for tower owners in Bahrain?

Mohamed Abdulla Ramzan Alnoaimi, Director, Technical & Operations, Telecommunications Regulatory Authority: The Public Radio communications Stations Regulation (“PRS Regulation”) aims at achieving a comprehensive regulatory framework including a permitting system that allows for the planning, designing, installation, upgrading and maintaining of PRSs (masts and towers). The regulation provides unified policies and procedures to enable the deployment of PRSs by operators with the Authority working as a single point of contact between telecommunications operators, the public and relevant bodies. The PRS Regulation will apply to all works of installing, upgrading or maintaining of new PRSs as well as to existing PRS that don’t comply with the provisions of the Regulation.

TowerXchange: As much as 90% of the tower stock will need to be rectified – what are the major changes which will need to be made and how involved with the TRA be in specifying which new solutions and structures are used?

Mohamed Abdulla Ramzan Alnoaimi, Director, Technical & Operations, Telecommunications Regulatory Authority: The rectification process of existing PRSs (mast and towers), as specified by
PRS Regulation, is intended to reasonably address the requirements and concerns of the various stakeholders within the telecommunications sector, including those of residents, relevant bodies and operators. The aim is to ensure that the proposed solutions and outcomes of the process balance the needs and expectations of all relevant parties involved.

As the cost of rectifying existing PRSs is tremendously high the rectification will take place over a span of 15 years. In order to assist in reducing the cost, the Authority has issued a zoning map classifying Bahrain into six different zones with only certain types of PRSs applicable in each zone with emphasis on shared use of such PRSs.

**TowerXchange: Much of the aim of the regulation is to minimise the impact of towers on the environment – do you have requirements in terms of the power sources used for the towers? And is power back up and resilience a part of the document?**

Mohamed Abdulla Ramzan Alnoaimi, Director, Technical & Operations, Telecommunications Regulatory Authority: The PRS Regulation is neutral with respect to the type of technical solutions but within permitting processes it has enabled and facilitated the connection to national power grids in addition to other power supply such as generators and solar energy.

**TowerXchange: What’s the new regulatory stance towards tower sharing in Bahrain? What do you see being the main areas for regulation in terms of infrastructure sharing and what would the aim of your regulations be?**

Mohamed Abdulla Ramzan Alnoaimi, Director, Technical & Operations, Telecommunications Regulatory Authority: The PRS Regulation requires operators to make reasonable efforts to ensure the sharing of existing and new PRSs in order to optimise the use of stations and avoid replication of networks. The PRS Regulation along with Schedule of Fees Regulation establishes incentives to encourage operators to share their stations. The authority aims at increasing the sharing percentage to around 40% of macro sites from a current sharing percentage of 12%.

**TowerXchange: Would you plan to regulate differently in case of an independent third party entering the tower market versus sharing between operators, or would a blanket rule apply?**

Mohamed Abdulla Ramzan Alnoaimi, Director, Technical & Operations, Telecommunications Regulatory Authority: The Authority had some communication with other regional regulators during the development of PRS Regulation, but undoubtedly the new approach adopted by the Regulation is unique and has placed the Authority in a pioneering position with respect to the permitting of deploying masts and towers.

**TowerXchange: Can you share your plans for the rollout of 5G infrastructure? Do you specify how small cells and street furniture must be used?**

Mohamed Abdulla Ramzan Alnoaimi, Director, Technical & Operations, Telecommunications Regulatory Authority: The PRS Regulation predicts considerable increase in the number of small cells, in the near future, to ensure effective delivery of 5G services. Accordingly it has introduced clear processes and incentives to enable and encourage operators in deploying increased small cells and street furniture. This will undoubtedly contribute into the environmental responsibilities as well as efficient 5G services delivery by operators.

**TowerXchange: Are you speaking to other regulators in the region about their plans? Where are you looking for information and guidance about how best to regulate this system?**

Mohamed Abdulla Ramzan Alnoaimi, Director, Technical & Operations, Telecommunications Regulatory Authority: The Authority had some communication with other regional regulators during the development of PRS Regulation, but undoubtedly the new approach adopted by the Regulation is unique and has placed the Authority in a pioneering position with respect to the permitting of deploying masts and towers.
A new type of communications infrastructure in Bahrain

An overview of the Bahraini market as the regulator proposes rebuilding towers from the bottom up

Governments, regulators and MNOs in the Middle East are starting to think carefully about how best to use and deploy their wireless communications infrastructure, and nowhere more so than in Bahrain, where the Telecommunications Regulatory Authority has published an extensive new report which assesses both the quality and quantity of towers needed in Bahrain. As a result of this report, which carefully considers social and environmental factors as well as commercial drivers, we can expect to see as much as 90% of Bahrain’s tower stock being re-built over the next 15 years. TowerXchange takes a look at the Bahraini market, the history of the existing infrastructure and how ready the country is for a third party towerco.

Keywords: 4G, 5G, Africa & ME Research, Bahrain, Batelco, Co-locations, Consolidation, Infrastructure Sharing, Market Overview, Middle East, Saudi Telecom Company, Viva, Zain

Bahrain

The Kingdom of Bahrain is, in fact, an archipelago of 33 islands covering 741 square kilometres in the Arabian Gulf, a fact which further complicates achieving connectivity for Bahrain’s 1.41mn inhabitants.

As one of the first countries in the Middle East to discover crude oil, fossil fuel revenues make up a large chunk of Bahraini GDP, although the country is working hard to diversify with growth in financial services, real estate, manufacturing and construction driving a GDP growth of 2.5% in 2017, despite the stagnation in the oil sector.

The Bahraini mobile market

The Kingdom of Bahrain has three mobile network operators: national incumbent Batelco, Saudi Telecom Company-owned Viva and Zain serving a subscriber base of 2.2mn (source: TRA Q2 2018).

Established in 1981 as a public joint stock company listed on the Bahrain Bourse, Batelco’s major shareholders are mainly government entities such as the Mumtalakat Holding Company and Amber Holding, as well as the Social Insurance Organisation. Batelco held on to a monopoly for more than 20 years after its creation, reaching 100,000 mobile subscribers by 1999, before pressure from international bodies prompted the government to pass the telecommunications law in 2002.

Batelco’s monopoly officially ended in 2003 with the entrance of MTC-Vodafone, which rebranded as...
Zain in 2007. The TRA had received 10 applications for the licence from various international and regional applicants, indicating high demand to enter Bahrain’s then-untapped market.

In 2009 VIVA, the Kingdom’s third major operator and a subsidiary of Saudi Telecommunications Company (STC), was granted the third operator licence.

Since then, telecommunications in Bahrain have gone from strength to strength, with mobile accounting for 48% of all retail revenue in 2017, the biggest single category, and mobile broadband traffic increasing 12% from Q217 to Q218, according to the TRA. However, although data usage climbed in 2017, mobile revenues still dropped by 4% between 2016 and 2017, continuing a trend of declining ARPs across the board.

The current tower landscape

With Bahraini operators finding themselves under the same pressures as operators all over the world: declining or static ARPs coupled with increasing pressure to spend on infrastructure in order to support technology rollout for data-hungry subscribers.

This need to review infrastructure may be exacerbated by new regulations as in 2016 the Telecommunications Regulatory Authority of Bahrain (TRA) commissioned a study to examine the rationalisation of the Kingdom’s total tower count from the current total of 1,500 towers down to a core network of 400 sites. In early 2018, the TRA introduced the new Public Radio Communications Stations Regulation (PRS Regulation) to regulate the deployment of new towers and “rectify existing ones in accordance with best practice”. The detailed legislation lays out key specifications for new and existing towers, specifying everything from the type of concrete used in the foundations to key health and safety requirements. The rectification plan is to take place over the next 15 years, with more than 90% of the towers requiring modification and the TRA setting out a goal of increasing the percentage of sites being shared from 12% to 40% in the country.

Towerco opportunities in Bahrain

It seems that the TRA is very open to relieving pressure on the MNOs to bear the brunt of this infrastructure overhaul by opening the market up to a third party infrastructure provider. When questioned by TowerXchange on different business models to reach the targets set in place, the TRA stated “Currently there are three operators who are licenced to deploy masts and towers in Bahrain. As a result there are three different mast and towers networks, i.e. one for each operator. The Authority considers there is room for improvement by merging these different networks into one or at least two. This could be done either by introducing a towerco company, a joint venture between existing operators or other feasible business models.”

Bahrain’s attitude towards towercos has long been positive, with Batelco formally opening a process to sell its towers in 2012 and attracting several interested parties, before deciding instead to focus on sharing infrastructure more effectively with Zain and Viva. In addition, Zain are known to be open
to the sale of their telecoms assets, agreeing to a
sale and leaseback deal with IHS Towers in Kuwait
and Saudi Arabia, and Saudi Telecom Company
have taken steps to reform the way in which their
towers are managed, establishing a new (although
not yet commercially operating) towerco business,
Communication Towers Co Ltd, in Saudi Arabia.

In 2012 much was made of Batelco’s debt-free
status, and the fact that they were under no
pressure to sell the towers to pay down debt,
unlike many MNOs who have brought towers to
market in Europe, Africa, Latin America or Asia.
However, as ARPU’s have declined since 2012 and
infrastructure owners are being pushed to upgrade
and rationalise their networks by the regulator,
it would seem that now is an optimal time for
Bahraini operators to review how they manage
their tower assets.

Who could bid for the Bahraini towers?

The towerco which enters the market will need to
have experience of building and managing networks
in tough climates. As a small country with urban
populations, a towerco entering Bahrain would
most likely need to see their entry into the country
as part of a broader MENA play as a portfolio of this
size is unlikely to achieve the scale to transform a
towerco’s portfolio. IHS Towers, of course, have a
strong track record here and the added benefit of
an existing relationship with Zain. American Tower,
Helios and Eaton have experience of building and
managing towers across Africa and edotco are
present in Asia and Pakistan already.

Entering the Bahraini market won’t be as
straightforward as other sale and leasebacks, not
least because the scale of new build and mandatory
upgrades will far outweigh the towers which can be
acquired with an operational lifespan of over ten
years, but the opportunity to enter a well regulated
market with three tier one operators will no
doubt pique the interest of the international tower
community.

What shape could a third party take?

The TRA has been careful not to specify whether
they are encouraging the entry of an independent
towerco into the market, a joint venture between
the MNOs or another ‘feasible business model’,
but the Bahraini operators will be summing up the
pros and cons of each.

With a proposed reduction in tower numbers
by as much as 73% (from 1,500 to 400) and a
total of as many as 90% of towers needing to be
decommissioned, re-built or upgraded, whoever
takes on this work will need a healthy appetite
for new build and operational excellence. While
a JV between the operators may allow them to
distribute the pressure on their network upgrades
more evenly, it’s also possible that a tower sale
in Bahrain could allow one operator to benefit
financially from their tower assets, while ensuring
that a third party takes on the pain and financial
commitments needed to overhaul and rationalise
Bahrain’s infrastructure. In a market where the
regulator is very hands-on, a third option, where a
deal could be brokered between all three operators
and an independent towerco also seems viable.

Meetup Europe 2019
9-10 April, London

Meetup Americas 2019
9-10 July, Boca Raton

Meetup Africa 2019
8-9 October, Johannesburg

Meetup Asia 2019
3-4 December, Singapore

Meetup MENA 2020
28-29 January, Dubai

www.towerxchange.com
The turbulent history of MENA tower transactions

Which deals have come and gone and which will cross the finish line?

With the closure of MENA's first major tower transaction looking imminent with Zain Group's sale of 1,700 Kuwaiti towers to IHS Towers on track to be finalised by early 2019, TowerXchange look back on the tower deals that have come and gone in MENA, exploring factors that have contributed to the decisions and examining what the future holds for tower transactions in the region.

Keywords: AWAL Telecom, Abraaj, Africa & ME, Algeria, Bahrain, Build-to-Suit, Carve Out, Citi, Communication Towers, Country Risk, DH Corp, Deal Finance, Deal Structure, Deodar, Djezzy, Eaton, Eaton Towers, edotco, Egypt, Etisalat, Fanasia, HOI MEA, IHS Towers, Infrastructure Sharing, Investors, Iran, Iranian Towers, Jazz, Jordan, Kuwait, MCI, MENA, MNOs, Middle East, MobiNil, Mobily, Ooredoo, Operator-Led JV, Orange, Pakistan, Rightel, Sale & Leaseback, Saudi Arabia, Saudi Telecom Company, TASC Towers, Tanzanite, Towershare, Tunisia, Tunisie Telecom, VEON, Valuation, VimpelCom, Vodafone, Zain

Read this article to learn:
- The factors that have held back tower transactions in MENA
- Tower sale processes that have been announced and cancelled and the reasons behind the decisions
- Attitudes of the region's major operators towards working with towercos and how this may impact future strategy
- Deals that are expected to close and the knock on effect this will have in the market

Tower ownership and mobile market dynamics in MENA

The Middle East and North Africa is the region currently the least penetrated by the towercos business model, with fewer than 1% of towers currently sitting in towercos hands (versus the global average of 66% - see figure one). As such, with a handful of exceptions, MENA's 275,104 towers sit in the hands of mobile network operators.

The vast majority of countries have three operational MNOs, many of which have some degree of state ownership, and there are a handful of operators with operations in multiple markets, namely Etisalat, Zain, Saudi Telecom Company, Ooredoo, Orange, Batelco and VEON. The scale of total tower counts owned by the operators in MENA varies dramatically, from over 35,000 towers in Saudi Arabia and Iran, to just 1,500 towers in Bahrain (figure two).

In spite of many commonalities between countries (a strong Arabic influence, a central role of government in the business sector, similar climates and environmental conditions and a prevalence of key telecom players across multiple markets) MENA is not a uniform market. At the one end of the spectrum you have GCC countries with European levels of affluence, at the other end of the spectrum you have developing countries with unstable geopolitical situations, a factor it is important to take into account when making statements about dynamics in the region. Whilst some countries have close to 100% population coverage, high...
Mobile broadband penetration and are positioning themselves to be front runners in 5G, others are focussed on expanding or restoring network coverage and rolling out 3G in operationally complex markets.

The size, health and wealth of different mobile markets has a significant impact on MNO motivations to divest towers and work with independent towercos, whilst similarly having an impact on the appetite of towercos to enter such countries. More detail on key dynamics at play can be read in TowerXchange’s country by country study of the MENA tower industry.

**Why haven’t we seen tower deals in MENA? What factors are at play?**

There are a number of different factors which have held back the proliferation of sale and leaseback and towercos activity across the MENA region. Here we examine ten different considerations:

1. **No overriding financial pressure to monetise tower portfolios**

When studying tower transactions globally, one of the principle drivers behind operator decisions to monetise their tower portfolios has been the pressure to reduce leverage, raise capital and
improve their balance sheets. Many (although not all) of MENA’s operators are well financed entities with healthy balance sheets and as such, have not felt pressured to monetise their passive infrastructure.

2. The “buyer not seller” culture within mobile network operators

Historically, many of MENA’s MNOs have been buyers rather than sellers, with their healthy balance sheets meaning that they have focussed much more on acquisitions than divestments. With no longstanding history of selling assets, the sale of a tower portfolio requires different thinking and a different strategy to that which an operator may be used to.

3. A focus on improving top line revenues versus reducing costs

With some of the world’s highest data usage, voice still generating strong revenues and ARPU being relatively well preserved relative to other regions, many of MENA’s MNOs have focussed more heavily on improving and growing top line revenues than reducing costs. As such, the efficiencies generated by infrastructure sharing and outsourcing to towercos have not taken centre stage on board room tables.

4. CTO-led strategies and the view that networks are a source of competitive advantage

It has been observed that MNOs in the region tend to be very much led by the CTO and only in recent years have the CFO and commercial teams become more involved in influencing the strategic direction of an operator, balancing the technical influence. Whilst in some markets, coverage might be the differentiator, in others it will be quality of service. With there often being little difference in market share between MNOs in some countries, maintaining that competitive edge through quality of service, OTT offerings or innovative packages are key focal points for companies, something they fear may be eroded by sharing or outsourcing their infrastructure.

5. Simple operating conditions

In a number of sub-Saharan and Asian countries,
towers are often located in remote areas with poor road access and no grid connection. Ensuring that such towers remain operational is highly complex with generator maintenance and refuelling as well as theft on sites representing particularly acute challenges. As such, operators in those regions have been motivated to sell towers in a bid to rid themselves of operational complexities and focus more on their core business. In more developed markets in MENA where the vast majority of towers are in urban areas and the electricity grid is reliable, such motivations do not exist. The same cannot be said however for MENA’s developing markets.

6. State involvement in MNOs and the cash-cow nature of the telecoms sector

Many of MENA’s MNOs in which the state has a significant stake have been generating healthy profits, thus making significant contributions to state coffers. Governments have been reluctant to cede control of such cash-cow businesses and as such, assets have not changed hands. Decision making in the public sector is often slower and more conservative than in the private sector and as such, radical changes in strategy are less likely.

7. Lack of clear regulatory frameworks for towercos and infrastructure sharing

Whilst infrastructure sharing and the towerco business model has become widespread on other continents, there has been until recently limited regional examples and benchmarks in MENA. Familiarising governments with the merits of infrastructure sharing and the towerco business model is a lengthy process and critical to the success of a tower transaction.

8. Government concerns over security

As a region with a number of political tensions and security concerns, governments in the region have voiced concerns about handing over control of towers to foreign entities, anxious about who could gain access to towers and the potential impact of that on national security.

9. Unfavourable political and economic conditions

Political turmoil, limits on foreign direct investment and currency devaluation in some countries has served to deter a number of towercos from entering such markets. Whilst MNOs in such countries may have been keen to sell, a lack of willing buyers has acted as the roadblock in tower processes getting off the ground.

10. A preference for doing business with known regional players

This one presents a bit of a catch 22. In all walks of life in the Middle East, business is generally conducted with the people you know. Whilst towercos have been operating globally since the mid 1990s, in the absence of local MENA towercos, the market has had to start slow while new entrants build relationships with MNOs and governments in the region.

Attempts at tower transactions in MENA

In spite of the aforementioned factors, several attempts have been made to do tower deals and stimulate towerco activity in MENA, with varying degrees of success:

2006: PTA establishes towerco licensing regime in Pakistan

Select towercos active

In 2006, the Pakistan Telecommunications Authority (PTA) established a licensing regime in Pakistan, setting unofficial goals to promote infrastructure sharing in the country. Several companies have been awarded towerco licenses since then although only Tanzanite Tower, edotco and AWAL Telecom ever commenced commercial towerco operations.

2010: NTRA awards towerco licenses in Egypt

HOI-MEA active

In late 2010 and early 2011, Egypt’s National Telecom Regulatory Authority issued telecommunications infrastructure licenses to four Egyptian companies, namely HOI MEA, Alkan, EEC and Mobiserve’s Mobitower. The licenses enable the companies to build, own, retain and lease space on towers in the country, effectively functioning as independent towercos.

Whilst four companies were awarded licenses, only HOI-MEA has built and retained towers, developing
a modest portfolio of 38 sites built for Etisalat and Vodafone since the license was awarded. HOI-MEA have reportedly been looking for a buyer for their tower portfolio.

2011: **Batelco explore the sale of tower portfolios in Bahrain and Jordan**  
**Process cancelled**

In December 2011, Bahrain Telecommunications Company (Batelco) announced plans to sell its tower assets in Bahrain and Jordan. With zero debt, the decision to explore a tower transaction related to the funding of future acquisitions outside of its domestic market in a bid to offset falling revenue in Bahrain’s already small mobile market. Batelco appointed Citigroup to run the process and reportedly received two binding bids for the tower portfolios, rumoured to be between US$200-300mn.

In May 2012, the operator announced that it had decided not to move forward with the sale and leaseback transactions, with Batelco’s then CEO, Sheikh Mohamed Al-Khalifa noting that the company had “the ability to raise funds at much lower rates than tower companies and thus could not justify the lease back arrangements.” Rumours suggested that the acquisitions that Batelco had earmarked fell through and as such, raising capital became less of an urgent priority.

Abandoning the tower sale process, Batelco announced that it had instead decided to pursue tower sharing opportunities with other operators in the market.

2015: **MobiNil (now Orange) agree the sale of 2,000 towers to Eaton Towers in Egypt**  
**Process cancelled**

In April of 2015, Orange (then trading as MobiNil) announced the sale of their stake in the company’s tower subsidiary, Egyptian Company for Mobile Tower Services (ECMTS) to Eaton Towers for EGP1bn (US$131.2mn). The agreement encompassed the purchase of approximately 2,000 towers (around one third of Orange’s total tower count in the country) with a 15-year leaseback contract for the operation and maintenance and also for the additional build-out of new sites. The towers purchased by Eaton were in three geographic areas: Delta, Upper Egypt and Red Sea and excluded Orange’s rooftop sites in Cairo.

Eaton subsequently entered negotiations to acquire a second tranche of Orange towers, although no deal was announced.

Following the agreement, Eaton Towers and Orange worked on the technical handover of the towers, with Eaton beginning to shadow operations from January 2016. 13 staff were recruited from Orange into Eaton’ Egyptian team whilst Karim El Azzawy (formerly of Egyptian managed service provider, Mobiserve) was appointed as the country manager.

In March 2016, the Central Bank of Egypt devalued the Egyptian Pound by almost 13% as they shifted their exchange rate policy in a bid to boost foreign reserves and increase competitiveness. As per the signed agreement between Orange and Eaton, the devaluation meant a revision to the commercial terms of the deal, with further devaluation and revisions expected.

On the 21 July, the longstop date laid out for completion of the transaction, Orange Egypt was still awaiting certain regulatory approvals relating to the change of control of ECMTS, the separate company into which they had transferred the 2,000 towers for Eaton to acquire.

With the prerequisites and conditions necessary for completion of the deal not met, the Orange Egypt board made the decision to not extend the deadline and as such terminated the agreement.

Read more on potential towerco activity in the Egyptian market in “Major new build forecast in the Egyptian tower market”.

2011 & 2016: **Saudi Telecom Company and Mobily discuss the formation of a towerco JV in Saudi Arabia**  
**Talks abandoned**

In 2011, Saudi Telecom Company and Mobily first entered into discussions surrounding the potential formation of a joint venture into which they would pool their existing tower portfolios in a bid to reduce passive infrastructure related capital and operating spend. The pair were understood to be considering selling off a 49% stake in the projected US$2.5bn venture but talks stalled and plans surrounding a joint venture were shelved.
The two parties once again re-opened joint venture discussions in 2016, signing an initial three month agreement to study the joint venture in the August of that year, an agreement which was subsequently extended before the pair appointed Standard Chartered as an advisor to oversee the process in 2017. Talks once again dissolved, with the two parties reportedly unable to agree on how ownership should be shared.

2016: Mobily shortlists three bidders for tower sale in Saudi Arabia  
**Process cancelled**

In between joint venture discussions with Saudi Telecom Company, Etisalat’s Saudi Arabian opco, Mobily, formally launched a tower sale process in 2016 after having appointed TAP Advisors to run the deal. Mobily’s strategy was motivated by a need to reduce their debt burden after substantial accountancy errors in 2014 led to their annual profits being revised down from a profit of SAR219mn to a loss of SAR913mn.

The tower process attracted a high degree of interest, with names linked to the transaction including IHS Towers, Digital Bridge, TASC Towers, edotco, Providence Equity Partners and Towershare plus local investors and conglomerates including Saudi Aramco, Al Rahji Group and Al Zamil Group. The deal reached an advanced stage with technical and commercial due diligence completed and with Mobily receiving three binding bids, reportedly at terms they were happy with. However, with Mobily having managed to refinance much of their original debt at more attractive terms, the urgency to sell towers was reduced, and as such, when Saudi Telecom Company once again approached them to open joint venture discussions, Mobily abandoned the tower sale process.

2016: Djezzy study the potential for a tower sale in Algeria  
**Formal process never initiated**

In 2016, VimpelCom (now VEON), who own a 49% stake in Algeria’s Djezzy, commenced a strategy to monetise their tower portfolio globally, kicking off processes in Russia, Bangladesh and Pakistan (and later, the CIS). At the same time, a team was appointed at Djezzy to assess the business case for a sale of the company’s 6,500 Algerian towers.

With limits on foreign direct investment in Algeria (limiting international ownership to 49%) and talks around active infrastructure sharing between Djezzy and Ooredoo materialising at the time, the preliminary study revealed limited appetite amongst towercos to participate in a tower transaction in the country. With processes underway in Russia, Bangladesh and Pakistan, the M&A team at VimpelCom turned their attention to such more imminent transactions and no formal tower process was announced in Algeria.

2016: Zain enter into exclusive negotiations with TASC Towers and ACWA Group in Saudi Arabia  
**Deal cancelled**

In early 2015, Zain appointed Citigroup to study the potential for a tower sale across its operations in multiple markets. Later in 2015, Zain’s then CEO, Scott Gegenheimer confirmed the company was opening a process for a sale of both their Saudi and Kuwaiti towers and in March 2016 it was announced that they were narrowing down potential bidders.

Stop-start discussions around Mobily and STC’s joint venture and Mobily’s tower sale in Saudi Arabia delayed the sale process, however in December 2016 Zain announced that it had entered into exclusive negotiations with a consortium involving TASC Towers and local conglomerate, ACWA Group for the sale and leaseback of their Saudi Arabian tower portfolio, with a reported deal value of around US$500mn.

With the acquirers unable to raise the necessary equity however in the desired time frame, the deal was subsequently cancelled.

2017: MCI, Rightel and Fanasia form Iranian Towers  
**Joint venture operational**

In early 2017, Iran’s leading mobile network operator MCI and number three operator, Rightel joined forces with Iran’s first towercos, Fanasia to create a new towercos company, Fanasia to create a new towercos company, then named Iranian Towers.

Fanasia, an Iranian company with a background as a turnkey service provider to the country’s MNOs, first commenced towercos operations in the country
in 2014. Their first project on Kish Island, conducted with the support of the Kish Free Zone Organisation, was to rationalise the number of towers on the island. With 110 sites on the Island, each with a single tenant and unsuitable for the addition of further tenants, Fanasia built 27 new sites which the operators were mandated to use, whilst existing sites were decommissioned. The municipality benefited from a revenue sharing model on top of the land rental fee and further benefited from the freeing up of land under the old towers. Following the success of the Kish Island project, Fanasia reached a similar agreement with the municipality of Mashhad, Iran’s second most populous city to develop a core network of 350 sites in March 2016.

Speaking at the time of Iranian Towers’ formation in an interview with TowerXchange, MCI’s CTO Morteza Taheribakhsh said “Iranian Towers was established to act as an exclusive towerco for both MCI and RighTel. It is expected that most new sites required by both operators will be built and operated by Iranian Towers. Furthermore, we will gradually proceed to purchase and leaseback the existing sites of MNOs. Therefore both build to suit and buy-leaseback scenarios have been considered by Iranian Towers.”

Taheribakhsh added “In Iran, as with the rest of the world, operator voice revenues and ARPU are continuing to decline whilst demand for data continues to increase. Significant capital is required to deploy 4G and 4.5G technologies which are required to support the increased data requirements. This places significant strain on mobile network operators and as such cost saving measures become increasingly important. Considering this fact, the primary motivation behind the creation of Iranian Towers is cost management. Sharing the cost of new site deployment as well as site operations will bring considerable savings to the business. Having Iranian Towers in place will enable MNOs to invest in their technological requirements without worrying about site infrastructure costs.”

The first phase of Iranian Towers’ operations was the construction of approximately 1,000 new towers, capable of hosting multiple tenants, across major cities in the country to accommodate 4G and 4.5G rollout. The second phase of Iranian Towers operations is to involve the sale and leaseback of the operators’ two tower portfolios. With MCI owning 21,000 towers and Rightel just 4,000, the exact number of towers that will be transferred to the towerco is yet to be decided.

2017: edotco Group acquire Tanzanite Tower in Pakistan
Deal completed

In June 2017, edotco announced that it had entered into an agreement to acquire Tanzanite Tower, Towershare’s towerco business in Pakistan. The deal, encompassing 700 towers and valuing Tanzanite at an enterprise value of US$90mn enabled edotco to add a further footprint to its portfolio and add instant scale to its operations in Pakistan, and marked the first in market towerco consolidation in the extended MENASA region.

2017: Jazz agree tower sale to edotco and DH Corp in Pakistan
Deal cancelled

In August 2017, VEON’s Pakistani subsidiary, Jazz announced that it had reached a deal for the sale of its wholly owned tower company, Deodar, to Tanzanite Tower, a towerco wholly owned by edotco and Dawood Hercules.

The transaction, for a total consideration of PKR98,700mn (US$940mn) covering Deodar’s total portfolio of approximately 13,000 towers was for an initial 12-year period with the option to renew for three consecutive periods of five years each.

Commenting on the transaction at the time, Jean-Yves Charlier, Chief Executive Officer of VEON, said: “This transaction is highly value accretive for VEON and GTH and a further execution of VEON’s asset light strategy. It also reflects the start of a long-term partnership with a strong counterparty with significant experience in tower management.” Proceeds from the deal were to be used for general corporate purposes, the funding of recently awarded spectrum and repayment of a proportion of Jazz’s outstanding debt.

In September 2018 however, Jazz announced that the tower sale had been cancelled due to a failure to get the necessary regulatory approvals to proceed. For further information on the cancelled deal process read “TowerXchange’s updated Pakistan tower market study 2018”.

For further information on the cancelled deal process read “TowerXchange’s updated Pakistan tower market study 2018”.
**2017: Zain agree the sale and leaseback of towers to IHS in Kuwait**

**Deal closure imminent**

On 10 October 2017, Zain Kuwait announced that it had reached a deal with IHS Towers for the sale and leaseback of its tower portfolio in the country. As previously mentioned, Zain began studying the potential to sell its tower portfolios back in 2015 when they appointed Citigroup to lead the process.

Whilst Zain’s larger tower portfolio (and Mobily’s concurrent tower sale) in Saudi Arabia stole much of the limelight, Zain reportedly received 15 bids for their Kuwaiti portfolio. The operator undertook a rigorous processes to narrow this down to five shortlisted bidders before finally settling the deal with IHS Towers and Towershare for an agreed deal value of US$165mn (Towershare having since been absorbed into IHS).

The deal is expected to close imminently with the two parties in the process of agreeing final closing conditions.

For further detail on the transaction read “Kuwait: Poised for a landmark moment in the MENA tower industry”.

**2018: Saudi Telecom Company establish Communication Towers in Saudi Arabia**

**Process ongoing**

After a number of stop-start discussions with Mobily regarding the formation of a joint venture, in Q1 2018, Saudi Telecom Company revealed that it had established a dedicated towerco subsidiary called Communication Towers Co. Ltd. which would be responsible for owning, constructing, operating, leasing and commercialising telecom towers for the operator.

It is understood that STC plans to transfer the vast majority of it’s 16,400 tower portfolio into the entity which is yet to commence commercial operations, pending approvals from the relevant authorities. STC’s initial plan for the towerco was to put in place a towerco management contract for the first 2-3 years, but with the operator reluctant to cede any equity, limited interest was received from the international tower community. Some within the organisation remain hopeful of securing a towerco partner, whilst others see Communication Towers moving forward without such a management contract in place. With progress having been made regarding towerco licensing in Saudi Arabia, rumours suggest that Communication Towers could commence commercial operations as early as January 2019.

**2018: Zain agree the sale and leaseback of towers to IHS in Saudi Arabia**

**Process ongoing**

The latest news to come out of the emerging MENA region was Zain’s 28 November announcement that it had reached a deal with IHS Towers for the sale and leaseback of its 8,100 Saudi Arabian towers for US$647.7mn. The deal, for an initial term of 15 years also includes a build to suit component, provisioning for the addition of 1,500 new towers over the next six years.

The two parties entered into exclusive negotiations back in 2017, with the agreement between Zain Group and TASC Towers for the portfolio having collapsed. The deal is still subject to approvals from lenders and the relevant authorities but marks a significant step in the establishment of a Middle Eastern tower industry, given Saudi Arabia’s importance and scale in the region.

For further detail on the deal read “Saudi Arabia makes major strides in the tower industry”.

**What towerco and transaction activity could we see moving forward?**

The completion of a first tower transaction in the MENA region is expected to act as a catalyst for further activity, putting in place a benchmark and template for other operators and regulators to potentially follow. Whilst the specific nuances and dynamics of different markets play heavily on an operator’s tower strategy in a given country, figure four examines what we know about the tower strategies of multi-country operators with a footprint in the region, speculating as to what this means we could expect going forward.

In addition to the multi-country players, several single country operators have been rumoured to have an appetite to explore tower transactions. In Oman, Omantel (which now owns a 21.9% stake in Zain) is expected to announce a tower sale process
in early 2019 and in Tunisia, the (now cancelled) sale of the business to Abraaj Group was expected to precipitate a tower sale.

As in other regions, most towercos looking at a prospective buy and leaseback opportunity will be looking for a credit-worthy seller in an attractive market. The dollar linked economies of many countries in the region present an attractive opportunity and with the MENA region seen as virgin territory for towercos, interest is stirring from towercos in all four corners of the globe.

The importance of local partners cannot be underscored enough in MENA and so it is likely that we may see partnerships between international towercos and local companies as they aim to bring both towercos and regional expertise to a bid. In the GCC in particular, the huge wave of infrastructure development that is underway means that telecoms must compete with other infrastructure asset classes for local investment, but as companies and countries look to diversify away from their dependency on oil, telecoms infrastructure could present an attractive investment opportunity.

Whilst progress is being made on a regulatory front, particularly in Kuwait and Saudi Arabia, history shows us that decision making in the region has traditionally been slow and cautious by regulators and operators alike. There is a continuing need for education of relevant stakeholders on the merits of infrastructure sharing and the importance of independent towercos and infracos in rolling out and managing the region’s communications infrastructure more cost effectively.

In a bid to support the development of the nascent tower industry in MENA and foster improved infrastructure sharing, TowerXchange will be hosting a VIP networking event in Dubai on 29-30 January, welcoming operators, towercos, regulators, investors and other important industry stakeholders to discuss key issues and opportunities.

Participation is already confirmed from a large proportion of companies referenced in this article including Etisalat, Saudi Telecom Company, Zain, Omantel, IHS Towers, American Tower, edotco and TASC Towers. For further information, please visit www.towerxchange.com/meetup/meetup-mena/
## Figure four: Tower strategies of MENA’s major operators

<table>
<thead>
<tr>
<th>Operator</th>
<th>Regional footprint</th>
<th>History of tower deals and working with towercos</th>
<th>Expected activity going forward</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zain</td>
<td>Kuwait, Saudi Arabia, Iraq, Jordan, Sudan &amp; Bahrain (plus management contract in Lebanon)</td>
<td>Deals agreed with IHS Towers in Saudi Arabia and Kuwait</td>
<td>High likelihood the operator will explore further deals should the Kuwait and Saudi deals prove successful</td>
</tr>
<tr>
<td>Saudi Telecom Company</td>
<td>Saudi Arabia, Kuwait &amp; Bahrain</td>
<td>In the process of establishing their own towerco subsidiary, Communication Towers, in Saudi Arabia</td>
<td>Communication Towers expected to commence commercial operations in 2019. If successful, the same towerco strategy may be rolled out to other markets</td>
</tr>
<tr>
<td>Etisalat</td>
<td>UAE, Saudi Arabia, Egypt, Pakistan &amp; Afghanistan (plus 53% stake in Maroc Telecom)</td>
<td>Tower transaction completed in Nigeria (prior to exit of the market due to opco’s insolvency); experience working with towercos in select markets</td>
<td>Keen appetite to increase infrastructure sharing with other operators in a bid to increase utilisation of their assets. Tower deals not ruled out but given experience in Nigeria will remain cautious</td>
</tr>
<tr>
<td>Orange</td>
<td>Egypt, Jordan &amp; Morocco (plus non controlling interests in Tunisia &amp; Iraq)</td>
<td>Monetised towers in three sub-Saharan African markets; agreed and then subsequently cancelled a tower deal in Egypt; extensive experience of working with towercos across Africa and Europe</td>
<td>Although has experience of doing tower deals in sub-saharan Africa, currently more focussed on other forms of infrastructure sharing including working with ESCOs and sharing with other operators. Tower deal considered unlikely</td>
</tr>
<tr>
<td>Batelco</td>
<td>Bahrain &amp; Jordan (plus minority interest in Yemen)</td>
<td>Announced and then cancelled tower sale process in Bahrain and Jordan</td>
<td>Recent restructuring of the business may make doing a tower deal hard but could potentially explore the option once again</td>
</tr>
<tr>
<td>Ooredoo</td>
<td>Algeria, Iraq, Kuwait, Oman, Palestine &amp; Tunisia</td>
<td>Tower sale completed in Indonesia plus experience of working with towercos in Myanmar</td>
<td>No serious rumours of tower deals emerged yet maintains keen focus on furthering infrastructure sharing; potential candidate for tower transaction activity</td>
</tr>
<tr>
<td>VEON</td>
<td>Algeria and Pakistan</td>
<td>Commenced a major tower monetisation strategy globally but only one deal closed to date. Reached and the cancelled a deal to sell Pakistani towers; expressed an appetite to divest Algerian towers; experience of working with towercos in Russia; successfully sold Wind towers in Italy to Cellnex in 2015</td>
<td>Pakistan deal rumoured to be back on the table; likely to have an appetite to divest their Algerian towers should a willing buyer present themselves</td>
</tr>
<tr>
<td>Vodafone</td>
<td>Egypt</td>
<td>Keen advocate of infrastructure sharing, forming tower JVs in the UK and Ireland and participating in Indus Towers in India; sold towers in Tanzania and signed MLL arrangement in Ghana; extensive experience in working with towercos across multiple markets</td>
<td>In 2018, Vodafone’s new CEO announced they were assessing the sale of their 53,000 European towers; no tower deal currently expected in Egypt but likely to have a strong appetite to share infrastructure and work with towercos in the market</td>
</tr>
</tbody>
</table>

Source: TowerXchange
Towerco activity
Towerco activity plus major tower sale rumoured
MNOs rumoured to be considering a major tower transaction
Confirmed tower sale process underway
No towerco activity or deal rumours

Source: TowerXchange
Welcome to the TowerXchange who’s who!

Welcome to the TowerXchange who’s who, a kind of vendor directory with personality! Over the last five years we’ve interviewed over 294 business leaders from innovative passive infrastructure equipment and service providers. By popular demand, here we categorise those profiles, with each company name hyperlinked to our exclusive interviews.

351 Al-Babtain LeBlanc: local expertise, international scope
355 Apollo Solar partner with Orange and Caumsat for pure solar
364 Atrebo: trusted asset and lifecycle management platform
368 Byrne Equipment Rental: a new power offering from GCC leader
371 CGM Italia: a family business offering quality generators
374 Digital Trinity: digitising tower cos
378 Flexenclosure: why you shouldn’t put up with poor rectifiers
382 GRIDSERVE*: partnering with Bladon to minimise opex
385 Kleos: a new breed of 5G-ready base stations
389 Neptuno USA: the implications of smart cities in the Americas
397 NEXSYS-ONE: driving operational excellence
402 Sera4: access control innovation
405 Sitetracker: embracing complexity
408 STULZ: scalable solutions for a converging infrastructure landscape
410 TSS: reliable solar solutions tailored to each client’s needs

Image courtesy of Camusat
### Energy equipment and ESCOs

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<th>4energy</th>
<th>Ballard</th>
<th>Delta Electronics</th>
<th>Flexenclosure Africa</th>
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<td>Eltek Africa</td>
<td>Flexenclosure Myanmar</td>
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<td>Beijing Dynamic Power</td>
<td>Eltek APAC</td>
<td>Flexenclosure Myanmar, part two</td>
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<td>Apollo Solar 2018</td>
<td>Bergey Windpower</td>
<td>Eltek CALA</td>
<td>Flexenclosure on rectifiers</td>
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<td>Apollo Solar</td>
<td>Bhaskar Solar</td>
<td>Eltek optimise energy systems</td>
<td>GenCell</td>
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<td>Apollo Solar on Africa</td>
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<td>Eltek on ESCOs</td>
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<td>Emerson Network Power</td>
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<td>Ascot &amp; Makasa Sun</td>
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<td>Energy Vision 2018</td>
<td>Huawei energy intelligence</td>
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Is your company not included in our Who’s who? Would you like to suggest additions? Please email amayhew@towerxchange.com.
<table>
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<tr>
<th>IPT Powertech T-ESCO</th>
<th>Schneider Electric</th>
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## TowerXchange's who's who in passive equipment and services (cont.)

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## TowerXchange's who's who in passive equipment and services (cont.)

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Is your company not included in our Who’s who? Would you like to suggest additions? Please email amayhew@towerxchange.com
Al-Babtain LeBlanc: Local expertise, international scope and a complete service offering

How this local tower builder grew to become one of the cornerstones of telecoms infrastructure in the MENA region

TowerXchange: Please introduce Al-Babtain LeBlanc, your history and footprint.

Omar Abdulaziz Al Rasheed, General Manager, Al-Babtain LeBlanc: Al-Babtain LeBlanc is a fully owned subsidiary of Al-Babtain Power & Telecom which was founded 60 years ago in 1955 as manufacturing company concentrating on manufacture of steel products. In 1993 we formed a joint venture with LeBlanc international to concentrate on the telecoms business which was more about the telecom infrastructure: towers, monopoles and rooftops as design, manufacturing and implementation, and in 2011 we became a 100% subsidiary of Al-Babtain Power & Telecom and expanded our reach from telecoms activities to other more and new areas such as security solutions, traffic solutions, smart infrastructure solutions, Special Architectural structures etc. Since 2011 we have diversified, changing focus to become a telecom system integrator. We are based in Riyadh in Saudi Arabia, but also have established businesses in UAE and Egypt and project offices in Oman, Yemen and Bahrain from which we cover all of the GCC and North Africa.

TowerXchange: Al-Babtain LeBlanc works across multiple fields with many high-profile clients. Can you tell us about how your telecoms business line developed and where it sits in the larger business?

Omar Abdulaziz Al Rasheed, General Manager, Al-Babtain LeBlanc: We took the decision five years ago to make it our mission to become market

Keywords: 4G, 5G, Africa & ME, Al-Babtain LeBlanc, Camouflage, Construction, DAS, IBS, Installation, Managed Services, Masts & Towers, Middle East, Multi-Country Partner, O&M, Regulation, Rooftop, Small Cells, Smart Cities, Steelwork

Read this article to learn:
- Who Al-Babtain LeBlanc are and their background and footprint
- How tower needs have changed in the MENA region
- The impact of tower sharing on the key players in the MENA tower ecosystem
- How the rollout of 5G will affect tower owners across the region
leaders in infrastructure for all technologies, and concentrating more on the telecoms market. We offer a complete solution for the passive part of telecoms infrastructure, from towers to antenna and with the capability and experience to do more telecom scope design, testing and operating. Also, we do indoor based solutions, right through from tests to design, implementation and maintenance. In addition to standard telecoms sites we also offer complete solutions for smart infrastructure including smart cities, smart malls, smart schools, smart sport venues, etcetera – what we call ‘Smart X’. We are working on those solutions with international partners with the aim to provide our clients with full solution reaching their satisfaction and having the latest technology in the worldwide market.

**TowerXchange: Tell us about Al-Babtain LeBlanc’s relationship with your clients and what sets you apart from your competitors.**

Omar Abdulaziz Al Rasheed, General Manager, Al-Babtain LeBlanc: We had a very good relationship with our clients, particularly the operators in the GCC and North Africa, which came about because we are able to offer such a comprehensive solution, much more than our competitors. We have competitors in supply and we have others in implementation, but it’s hard to find someone who does both, whereas we offer a complete solution, starting from design right through to implementation. Clients feel we offer the right solution, implement in the right way, and that we are here for any issues later on. We have more than 25 years of experience and many of our team members have been working with us since the beginning, which adds value for our clients and confidence that we are the right partner, giving us the competitive edge. This is why we are coming to TowerXchange Meetup MENA to deliver this message to the region. Our design team is made up of over 50 experts who are designing everything from a normal telecoms site or monopole to a large or camouflage custom tower: we have a huge range and can offer whatever a client needs.

**TowerXchange: You offer a wide range of high quality structures. Please talk us through how you have seen your telecoms clients’ needs changing and how this is reflected in the shape of their infrastructure.**

Omar Abdulaziz Al Rasheed, General Manager, Al-Babtain LeBlanc: Firstly, our clients are looking for more comprehensive solution, not only a tower. They are looking for a service and often need a special design then installation and after sales
service. They need more than just a tower. The second change we are observing is the appearance of towercos in the MENA market right now. We are seeing towercos emerging in Oman, Kuwait and Saudi Arabia already and this upcoming change is big news at the moment. Thirdly, tower owners are also moving away from standard towers and monopoles: they’re under pressure to reduce the impact of their infrastructure on the landscape or local environment, which is not a cheap solution as it needs to be customised for each client and city dependant on specific requirements. There’s a lot of pressure on us to fulfill these bespoke camouflage requirements, but providing this is one of our strengths: we designed more than 500 different towers in the last two years.

TowerXchange: As the MENA landscape changes and we see an increased amount of tower sharing on the horizon, through independent towercos, regulator-mandated co-locations and bi-lateral collaborations between MNOs, what changes do you think will need to be made to MENA towers and where should tower owners be focussing in terms of rollout?

Omar Abdulaziz Al Rasheed, General Manager, Al-Babtain LeBlanc: Usually we are told that tower sharing is affecting solutions providers globally, as the market goes from three operators to only one main infrastructure provider but we see this very much as an opportunity. Tower sharing and making towers fit their landscape are a key part of the master plans of local and national governments, but delivering this needs more than a subcontractor. This is where we fit, we can add value, one of the advantages of Al-Babtain LeBlanc is that we are not just tower supplier but also enhance existing towers and structures, we can add camouflage for existing sites, and upgrade and strengthen towers. Do we see tower sharing as a threat to our business? No, we look at it as another trend: the stage of “single operator site” is almost over and we are entering a new stage of sharing sites, which we look at as an opportunity which will increase our market share as it requires a more specialised company. The need to upgrade towers is a new trend which is an opportunity for us as a tower player, as new technology like 5G will require a specialised company which can do the analysis of existing sites and the replacement of the existing sites where needed. We explore how tower owners can utilise existing structures as well as providing...
new products, both of which necessitate a lot of experience and engineering work. In 2018, Albabtain LeBlanc engineering workload was double than the average of the previous years, although we built the same number of sites.

So, as 5G rollouts will be started soon, this will become more and more important it is a big opportunity for replacing, enhancing and camouflaging sites, driven by 5G and new colocation needs.

TowerXchange: We are seeing regulators putting increasing pressure on tower owners to minimise the impact of their towers on the landscape. How can Al-Babtain LeBlanc support MNOs and towercos in conforming to these demands?

Omar Abdulaziz Al Rasheed, General Manager, Al-Babtain LeBlanc: There are over 25,000 Al-Babtain LeBlanc traditional towers in use in the GCC which we’ve designed, manufactured and in many cases implemented in the last 25 years. When it comes to landmark projects in the region, we have played a critical role, supplying more than 4,500 towers for the huge USF project in Saudi Arabia to cover the rural area country wise. Another of our stand out projects was the Abu Dhabi Police Tower in Abu Dhabi, which is over 70 metres high and for which we undertook the design, civil works and erection.

It’s also important to note that we don’t just have good relationships with infrastructure owners, we also work closely with regulators as well. We participate in workshops and give presentations, as well as suggesting solutions to help them manage this industry and create the right regulations. As a leading player in the manufacture of camouflage solutions in the GCC with a wealth of experience working for regional MNOs, we have a wide base of knowledge.

So, to answer your question, yes we consider ourselves is the best partner to MNOs and towercos to make their projects more successful and profitable.

TowerXchange: Talk to us about urban infrastructure. With the advent of 5G and countries like Saudi Arabia and Dubai making plans for ‘smart city’ infrastructure, what can Al-Babtain LeBlanc do to facilitate the rollout of densified networks?

Omar Abdulaziz Al Rasheed, General Manager, Al-Babtain LeBlanc: We look at 5G from two angles: firstly, 5G for existing infrastructure, for which telecom services companies are needed to install 5G on existing towers. We’ve already started a project with MNOs in the GCC to analyse and enhance their infrastructure based on these needs.

Secondly, there will be a bigger need for small cells, small city sites, for which we have various solutions which can be customised based on city requirements. We have already created customised solutions for clients in Saudi Arabia, UAE, Bahrain and Oman. When developers are focussing on a specific property or land, we can adapt our offering and work closely with their team to come up with a bespoke solution.

So in terms of 5G we can do the small cells and city solutions, and we can do upgrades to existing sites if needed as well. Whether city sites or rural sites, we do telecom installation, indoor solutions and mobile solutions as well.
Orange and Camusat contract with Apollo Solar for pure solar energy systems

A case study in cost reduction and greenhouse gas elimination

Apollo Solar designs and manufactures energy systems for Remote Mobile Telecom Towers. Starting in September 2012, Camusat has installed these systems on towers owned by Orange. With over 1,000 systems now running, some for the entire six-year period, the results in terms of reliability, cost, battery life and greenhouse gas avoidance are statistically significant. The installations are spread over seven countries in Africa, which include challenging climates. This case study, submitted by Apollo Solar CEO John Pfeifer, will identify the principle results, and comes at a timely moment as MNOs and towercos contemplate the economic, social and regulatory burdens associated with continued reliance on fossil fuels.

**Keywords:** Apollo Solar, Batteries, Camusat, Energy, Energy Efficiency, Off-Grid, Opex Reduction, Orange, Renewables, Research, SLA, SSA, Solar, Uptime

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**Overview**

All mobile phone towers, or Base Transceiver Stations (BTS) require continuous electricity. Utility grid power may not be available outside urban areas in many emerging markets. As the coverage for mobile phones grows in more and more rural areas, a larger percentage of the towers depend on remote energy systems. At first, the easy answer was to install a diesel generator at the base of every tower. However, diesel generators (DGs) come with five inherent disadvantages:

1. The cost of diesel fuel is significant, and the cost of delivery to remote sites make diesel fuel more than 50% of the total operating expense for every remote tower.

2. The poor reliability of diesel generators is such that two generators must be installed at each tower to approach the continuous energy requirement.

3. The generators require that oil and filters be changed every 250 hours, which means a visit to the remote sites every ten days. The entire generator is typically replaced or rebuilt every 18 to 24 months.

4. Carbon dioxide and the other greenhouse gases created with the burning of diesel fuel for electricity at telecom towers are now understood to represent a significant part of the cause of climate change.

5. Diesel fuel often gets stolen at multiple points in the supply chain. Theft was been estimated as high as 30% by many tower companies.

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**Read this article to learn:**

- The disadvantages of reliance on diesel to power cell sites
- How Apollo Solar has achieved 100% uptime since September 2012 across a portfolio of now 1,032 sites
- Quantifying greenhouse gas avoidance: reducing CO2 emissions by almost 110,000 metric tons over 72 months
- A TCO comparison of using pure solar versus diesel gensets to power remote cell sites
Relevant backgrounds of the three participating companies

Orange was experiencing the same problems as other Mobile Network Operators with diesel powered cell sites in their network. The costs of diesel powered sites at Orange may have been more significant because their networks were expanding into rural sections of African countries where electric grids were almost non-existent and the remote solution was becoming a larger percentage of the total network energy requirement.

Camusat had been contracted by France Telecom (now Orange) to build and install towers for many decades. They have a strong relationship and both companies are leaders in their field, so it was just a small step in the right direction for France Telecom to ask Camusat to take the added responsibility of providing the solar-powered energy systems required on the remote towers.

Meanwhile, Apollo Solar, Inc. had deployed solar-based energy systems for off-grid military, telecom, and commercial applications in challenging climates, and had developed a line of energy systems specifically for remote telecom towers.

A typical Apollo Solar Cabinet is shown installed under a standard Solar Array. The tan colored boxes house the batteries. These three components comprise the complete pure solar remote energy system for a BTS, drawing about 1.5kW.

The Apollo cabinet includes all of the circuit
breakers, connections, relays and contactors required for complete operation. In addition, we have integrated the sensors, the computer and the modem, which make up the remote monitoring system.

The cabinet is only 1,000mm wide by 1,200mm tall by 300mm deep and has an ingress protection rating of IP65, so no dust or moisture can get in.

By 2010, Apollo had a number of pure solar systems deployed on telecom towers in North and South America. In the process of supporting these remote systems, Apollo developed the Remote Monitoring System, which sends all the key operating parameters back to a server in Apollo's Network Operating Center in real time. Feedback gathered from the remote sites provides key insights to enhance the reliability of every part in the system.

### Uptime

In the tower energy business, one of the critical success factors is uptime. Typically, the company providing the energy is under a Service Level Agreement that imposes a penalty if the energy availability uptime is less than 99.97%. The exact level varies from contract to contract, but we were told that any downtime in excess of a few hours per year is charged back to the energy provider at the rate of sometimes $30,000 per hour!!! Clearly the highest priority must be placed on reliability. When just a single hour of downtime can cost more than a new system, having a proven track record is essential. Because the electronics are the most...
vulnerable part of these systems, attempts to cut costs in the electronics cabinet is generally deemed a false economy.

The risks associated with solar energy systems

When this programme began in 2011, the telecom industry was skeptical that a pure solar energy system could be designed, built and installed in the challenging climates of Africa that would yield the kind of reliability that telecom towers required. Several MNOs had experimented with small-scale solar added to a diesel generator-based system. The results of these experiments varied from poor to worse. Since the results of these failed experiments were rarely published, it was not easy for us to get hard data. However, from our understanding inside the industry, Apollo obtained these essential facts.

The majority of these “experimental” solar sites were naively built with inherent fatal flaws. The sites used for these solar experiments were required to continue to provide uninterrupted power, so the diesel generators were retained to produce most of the energy. The small amount of solar that was added was done using solar arrays and batteries that were undersized, and they used the cheapest possible, untested electronic equipment. In the face of the challenging climates, it is no surprise that results from the majority of these experiments were disappointing. Some MNOs and tower companies came to the erroneous conclusion that solar would not work in their environment.

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In the 2010 - 2012 timeframe it was considered a risk to install solar for remote energy systems, and a much larger risk to eliminate the generator entirely to depend only on solar. For all the reasons stated, the equipment for a pure solar site was under tremendous pressure to work without failures, because there was no backup.

The challenge presented to Apollo Solar

Orange and Camusat asked Apollo to take on some of the risks associated with deploying pure solar remote energy systems. Considering the history of the failed hybrid experimental solar power systems, and the penalties for downtime, these risks were rather daunting. Certainly Orange and Camusat were taking on a large portion of the risk, however both of these partners were large enough to survive any failures at a certain number of sites, and diesel generators could be re-installed if failures occurred. There were several individuals at both Orange and Camusat who put their reputations on the line. Apollo Solar however was a smaller company and therefore more vulnerable.

Batteries and PV modules had been proven in other fields, so they were not an issue. The electronic equipment Apollo Solar was to supply was considered the weakest link because electronics can fail with heat, or cycles of hot and cold ambient temperatures. The Apollo Solar equipment had to be designed to withstand extremes in temperature and full temperature cycles every day without a system failure over many years. Most specifications for military electronics are less robust.

Apollo Solar accepted the challenge and employed the full spectrum of our 40 years’ experience from our parent company, Electronic Design Lab, Inc. Our high reliability design uses these four elements:

1. The design of the pure solar energy systems for Orange and Camusat used the core T80HV MPPT Solar Charge Controller, which Apollo Solar had designed and tested for extreme ambient temperature duty. Apollo had had thousands of units in the field in challenging climates for over five years at that point and the reliability was well proven.

2. To enhance the reliability as much as possible, Apollo designed the telecom energy systems with redundant channels of T80HV Charge Controllers. Redundancy is a well-known design method to maximise reliability. Statistically, in parallel systems, the chances of two channels experiencing a failure at the same time is extremely small. In all cases there would be at least two and in many cases, three or four T80HVs running in parallel. They are each smart enough to run as totally independent units, so if one were to fail, it does not affect the others.

3. The pure solar remote energy systems are battery based and Apollo made certain that each system used multiple parallel strings of batteries, and that every battery system was large enough to provide all the energy required for the telecom BTS load for at least three days without any energy input.

4. Finally, Apollo Solar integrated our Remote Monitoring system in each Cabinet. Our software
reports the status and any alarms or warnings automatically every minute. So if any parameter were to drift out of the acceptable range, the central office or NOC was instantly aware and a crew could be deployed to the site to address small problems before they became big enough to cause down-time.

**Case study details**

Of the 1,000+ systems installed starting in September 2012, there has been a total of 0.0 hours of downtime. The key is that Apollo Solar designed these systems with 100% uptime reliability as the first priority without compromise. So every active component in the energy path has redundant components in place. Active components are those parts with silicon semi-conductors that are in a switching state and produce heat. Passive components are items such as circuit breakers, connectors, wires, fuses, relays and contactors usually without silicon. Passive components have track records of very low failure rates and are not as sensitive to temperature extremes.

The most critical electronic components are the Solar T80HV MPPT Charge Controllers because they use many active semi-conductors. Each system uses a minimum of two Charge Controllers running in parallel. Many systems have three or more. The critical BTS load is connected directly to several parallel strings of large 48-volt lead-acid batteries. The batteries are monitored carefully to make sure they are being charged properly. If remote sensors indicate the state of charge is trending low, alarms are sent out so field technicians can be deployed to fix any problem. The batteries have at least three full days of autonomy.

That said, Apollo Solar makes it clear that, in the course of this case study, there were failures of the Charge Controllers. In fact, 22 Apollo Charge Controllers were returned with internal failures. Of the 2,500 Charge Controllers in the study, 22 units represents 0.88%. Because each of these Charge Controllers was wired in parallel with at least one other Charge Controller, the second unit continued to work when the twin failed so that the energy system did not fail and the power to the site was never lost. The offending Charge Controller was replaced during regularly scheduled maintenance visits so there was no additional maintenance cost associated with this redundancy feature. A complex component that shows a failure rate of less than 1% over the long term is considered acceptable since none of those failures caused the systems they were powering to go down.

**Priorities from now until mid-century**

When this programme was initiated, the focus was on reliability and cost. The capex was compared against the opex of the pure solar, diesel only as well as diesel / battery hybrid. The total cost of ownership (TCO) was calculated for each design in order to compare capex and opex using the TCO over the time frames of five, ten and 20 years. Priority was given to the elimination of fuel theft and the minimising of other diesel-related costs.

At the onset of this programme the world’s understanding of the Climate Change Crisis was not what it is in 2019. The telecom industry in Africa had been fully focused on the financial costs of diesel-generated electricity. Today, the highest priority is increasingly weighted on reduction of fossil fuel use whenever and wherever possible. In the light of new Greenhouse Gas (GHG) facts, other case studies have shown that BTS towers along with the data centres associated with the smart phone revolution, are responsible for a large use of electricity which generates as much GHG as the transportation sector. Our case study now takes on a new significance. By using pure solar to charge the batteries, the diesel generators were totally eliminated and every one of these 1,000 sites has a zero carbon footprint.

**Case study results: Greenhouse gas avoidance**

Calculating the GHG avoided for telecom towers is straightforward because the load is well known.

The diesel generators used on a BTS are an average of 12kW. Based on the specifications of the popular diesel generators made by Perkins, we find that the efficiency for producing electricity is much lower when running below 50% of full load. Most BTS Towers use oversized generators because they are large and difficult to steal. A 12kW generator running at 10% of full power gets only 0.833 kWh per liter of fuel.

The amount of CO2 resulting from combustion of diesel fuel is a fixed rate of 2.639 kg per litre of fuel by the laws of chemistry. Diesel fuel burns completely meaning that essentially 100% of the carbon is combined with oxygen in the oxidation
reaction. The weight of a Carbon atom is added to the weight of two Oxygen atoms. The other greenhouse gases add to the global warming, but we focused on the largest (81%) offender, CO2. The size, percentage of full power or efficiency of the generator make no difference: every litre of diesel fuel is going to produce 2.639 kg of Carbon Dioxide. It is simple arithmetic to find the amount of CO2 produced by each DG:

- The energy required for a 1.2kW BTS load running 24 hours is 28.8kWh per day.
- At 0.833kWh per liter, the generator fuel consumption is 1.20L/kWh.
- The amount of fuel burned each day is 1.20L/kWh X 28.8kWh which is 34.56L per day.
- Finally, 34.56L per day X the given of 2.639 kg of CO2 per litre of fuel is 91.207 kg of CO2 per day, per site. Or 2,774.5 kg per month, per site.

So, by completely eliminating the diesel generator, the pure solar sites avoid all of the 2,774.5 kg of CO2 for every 1.2kW load site, every month.

Although the 1,000+ Apollo pure solar remote energy systems were installed in batches from September 2012 to April 2018, we can average the installations on a relatively continuous basis, which is about 15 systems per month for 67 months. The graph below shows the total amount of CO2 avoided each month during this six-year case study. Each month 2,774.5kg of CO2 X 15 new sites which is 41,617.5 kg is added to the running total.

One can see that at the end of the 72 months of this study, we have avoided a total of almost
110,000 metric tons of CO2. Without installing any additional systems, the installed systems continue to avoid an additional 2,788 metric tons of CO2 every month going forward.

For international clarity, a metric ton (1000 kg) is 1.1023 U.S. ton (2000 US lbs) so the 110,000 metric tons on the chart is equal to 121,245 U.S. tons.

**Case study results – opex v capex and the TCO**

The bottom line is that these new solar energy systems have to compete against the costs of diesel generated electricity.

In order to compare these costs of solar and diesel it is essential to understand that the solar energy systems are primarily a single up-front costs, often a capital expense, to purchase and install the equipment. The ongoing costs for fuel and maintenance, or operating expenses of a pure solar energy system are very close to zero. The batteries are costly and have a finite cycle life at between five and ten years. The typical DG plant costs are very different from the Solar plant. The up-front capex for diesel is lower than solar. Each generator costs about US$15,000 installed (the costs of each item vary from country to country). With two generators and the fuel tank, the complete energy system might be US$35,000. The ongoing opex for diesel is very high. The costs include the fuel transported to each site, maintenance visits to change oil and filters every ten days, and replacement of the generators every two years. It is this opex which the new solar based systems had to address.

In order to compare capex, which is a one-time cost, with opex items, which are ongoing, we convert both items to Total Cost of Ownership (TCO) over time. See the TCO chart. When the absolute cost of the pure solar system crosses the line representing the costs of the DG site, the pure solar system has paid for itself and for the rest of its life-time, it is free of costs with the exception of battery replacement which is about every ten years.

The results of this case study show that the TCO of solar energy systems are lower than DGs after one to two years. The length of time to “payback” is determined by many factors, but the costs of the diesel fuel delivered to the sites is the most significant factor.
Looking forward – can the future costs be predicted?

We recorded the price of solar PV modules and price of diesel fuel over the course of this case study.

The capital cost of Solar has come down. The price of silicon solar modules dropped from US$1.75/watt in 2010 to US$0.35/watt in 2017. It is now just 20% of what it was in 2010 and is relatively consistent. The point is that since a pure solar system is essentially a capex issue, the cost can be financed at a fixed cost per month for a fixed number of months. So the cost of energy is flat, well known, and goes to zero at some point.

Contrarily, the cost of diesel fuel has been volatile and without predictors. The base price in New York Harbor is directly related to the global price of a barrel of crude oil. On any day the price in $/litre of Ultra-low sulfur No. 2 diesel in New York Harbor can be found by dividing the global price of Brent Crude in $/bbl by a factor of 132.6.

Variability by country adds another factor. When a litre of diesel at the pump in the U.S. was $0.65, the price in Norway was $1.63 and $0.12 in Saudi Arabia. In Sub-Saharan Africa the average price was about $1.15. The cost of delivery to each remote site is a variable that cannot be addressed in this paper, but TowerXchange reports that the delivered cost of diesel is amplified as high as 1.8x in logistically challenging markets like the DRC. A contract with
the fuel delivery company may address some of these variables, but the theft is still a large unknown.

An Energy Services Company (ESCO) is running a high risk if they are using diesel fuel to generate the electricity they are selling at a fixed price.

**Results – were the risks worthwhile?**

Yes, the results of this programme prove that the risks were worth taking. There are four areas that stand out:

1. **Reliable energy:** This programme proved that pure solar remote energy systems can be deployed in the challenging climates in Africa and are perfectly reliable. In fact the uptime reliability far exceeds that of the DG systems that have been the mainstay for many years.

2. **Total Cost of Ownership:** This case study indicated that the TCO of the pure solar systems is significantly lower than the DG based systems after the initial period, which is 12 to 36 months depending on the real costs of the diesel fuel and other factors.

3. **Carbon Dioxide avoidance:** Most significantly, it is easy to prove that the pure solar remote energy systems deployed and described in this case study avoided a significant amount of Carbon Dioxide and other greenhouse gases, which would have been dumped into our atmosphere if DGs had been used instead of pure solar systems.

4. **Elimination of fuel theft:** Using only solar for remote energy is the most effective and lowest cost method to eliminate the theft of diesel fuel.

**Conclusions**

There is no question about the relationship between burning diesel fuel and the generation of CO2 and other greenhouse gases. And there is no question that the use of diesel fuel will be limited by the carbon tax or some other constraint according to the Paris Accord and other international agreements. The only question is how soon these financial constraints will impact the ESCOs, the tower companies, the MNOs and the rest of our industry. It is up to the stakeholders in the global tower industry to get ahead of the rulings (and on the proper side of history), or be dragged along paying the carbon tax because of non-compliance with the Global Committees and with moral common sense.

Using solar power for remote energy systems is an easy, reliable solution that pays for itself and continues to cut operating expenses. Apollo Solar has removed the risks and has proven that the pure solar energy systems are most cost effective, most reliable and most eco-friendly type of energy generation system for remote telecom tower sites.

- John Pfeifer, CEO, Apollo Solar

www.ApolloSolar.com
Introducting Atrebo’s trusted asset and lifecycle management platform

New tool for real estate efficiency already proven in 14 countries

Many MNOs and towercos continue to struggle to optimise processes by consolidating data across complex asset and infrastructure workflows and lifecycles. To that purpose, a new platform has emerged, Atrebo’s Tool for Real Estate Efficiency (TREE). Defined by the MNOs’ specific requirements around site acquisition, inventory and contract management, TREE is now one of Telefónica’s most widely deployed technology platforms.

Ahead of Atrebo’s debut at TowerXchange Meetup Europe, we caught up with CEO Jesús del Estad to learn about the origins and capabilities of this impressive new platform.

Keywords: Asset Register, Atrebo, Data Collection and Utilisation, IoT, Job Ticketing, KPIs, Leasing & Permitting, Network Rollout, Novation of Leases, Opex Reduction, Site Level Profitability, Smart Cities, Telefónica, Vendor Directory

Read this article to learn:
- The development and functionality of Atrebo’s TREE assets and lifecycle management platform
- Where and with whom Atrebo’s TREE platform has been successfully deployed
- The four pillars on which Atrebo delivers efficiency and productivity
- How Atrebo’s IoTREE manages infrastructure and device lifecycles to support the realisation of Smart Cities
- How profile models within TREE promote collaboration within the communications infrastructure ecosystem

TowerXchange: Please introduce Atrebo, the company and its footprint.

Jesús del Estad, CEO, Atrebo: We are a Spanish company specialising in the development and implementation of asset and infrastructure management solutions. We have broken into the market and in a very short time we have managed to position our assets and infrastructure management platform TREE (Tool for Real Estate Efficiency) as a market benchmark for the integrated management of the lifecycle of assets and infrastructures, covering operational, contractual, and financial management for the most important European and global telecommunications operators such as Telefónica and Vodafone.

From a technical point of view, the design of TREE’s software means it can be installed instantly, can interface with other platforms and can be tailored to suit our customers’ needs thanks to a high level of configurability. We can easily make the customisations which our customers require, or which are driven by changing legislation, without compromising the simplicity and standardisation of operational and business processes.

In terms of our commercial models, at Atrebo we look at options that are best suited to our customers, working through licensing, pure SaaS and software services on our clients’ internal networks.

Finally, a key factor in our success has been a corporate culture where prevailing values are...
efficiency and agility to ensure rapid deployment and a service adjusted to the needs of the customer.

All of this has led us to achieving a presence in more than 14 European and American countries within just two years. Our headquarters are in Spain and we operate subsidiaries with autonomous operational resources in America to offer our clients a more local service, so decisions and solutions can be offered on site from local experts. Our strategic plan includes new office openings in new geographies in the coming months.

TowerXchange: What are the origins of Atrebo and can you tell us about some of your customers?

Jesús del Estad, CEO, Atrebo: Although we founded the company eight years ago, our most important milestone took place in 2015, when Telefónica opened a process to select a global site management platform (we had already completed pilots and proofs of concept). After a competitive process, Telefónica chose the Atrebo platform over some longer-established site management and ERP platforms, and we started collaborating with them in 2016. We have a global umbrella framework with Telefónica, but have successfully made a business case for implementation in each country – Atrebo is currently deployed in 13 of Telefónica’s 21 markets, and we’re implementing our solution in another key market soon.
Telefónica has backed Atrebo, and they are happy with the work we’ve done – not just with the platform and functionality, but with our agile performance in the deployment and the actualisation of services.

**TowerXchange: Please tell us a little more about the different modules and functionality enabled by Atrebo.**

**Jesús del Estad, CEO, Atrebo:** We have developed a modular platform, able to integrate with different workflows.

At the heart of the platform is our assets module, which tracks mobile or fixed network assets throughout their lifecycle, connecting successive workflows for site acquisition, contract management, passive and active equipment inventory et cetera. This is enabled by powerful workflow engines: task management and role management, such that the platform becomes a collaborative hub where a towerco or MNO, and their contractors and vendors, can execute transactions.

The Head of IT at one of our largest customers described TREE as “much more than a platform to execute daily tasks – it’s a truly transformational platform, enabling site management and network efficiencies through advanced analytics – transforming the way assets are managed.”

**TowerXchange: You can help European tower owners to deliver improved productivity across their tower portfolios, can you talk to us about how Atrebo does this and what kind of measurable results you can deliver?**

**Jesús del Estad, CEO, Atrebo:** In my opinion, it doesn’t make sense to implement any tool unless it leads to productivity improvements, either due to its technical output, economic-financial tracking, organisational improvements or any other type of derivative.

In TREE our offering is based on four pillars: a consistent database; operational and analytical capabilities; workflows for each activity; and finally dashboards and reports of state and situation. This dynamic applies to each of the modules that TREE manages, such as acquisitions, energy, installations or legalisation (there are over 20 modules in total). We offer knowledge and analysis to enable our clients to make the best possible decisions in each task and in each concrete circumstance.

The result involves both direct impacts on the income statement including optimising capex investment, reducing opex costs, or improving revenues and profit margins, and indirect impacts such as improvement in the management of suppliers, management accounting, conflict reduction and providing the best commercial information to the client.

Ultimately, what makes TREE so special is its ability to deliver efficiency through productivity (a key factor even in its acronym, Tool for Real Estate Efficiency). We are proud to say that many of our clients have internally justified the implementation of TREE by targeting and achieving very demanding quantifiable efficiencies and savings.

**TowerXchange: It’s often said that it’s hard to cut costs in European tower portfolios, which have grid power access and fewer maintenance requirements than towers in Africa or Asia. Can you talk to us about cost management in Europe, and give some examples of where savings can be made?**

**Jesús del Estad, CEO, Atrebo:** In my previous response I mentioned direct and indirect impacts as a result of the implementation of TREE, but going beyond this: in Atrebo, we assist our clients in the identification of new efficiencies and the evolution of improvements across their businesses, which we translate into new functionalities and good practices in the platform.

In that sense, in TREE we differentiate ourselves by continuously incorporating intelligent elements to identify and optimise processes and operations and integrating technologies and convergent network typologies that directly result in reducing costs and margin improvements.

In addition, TREE drives the digital transformation of operators and towercos as an integrating factor, creating a relational ecosystem among them that again impacts on productivity improvements.
TowerXchange: It’s one thing to collect vast amounts of data through IoT, another to actually make good use of it. How do you work with your customers to identify and use the data which will really help them to deliver results in terms of productivity, visibility and accountability?

Jesús del Estad, CEO, Atrebo: Atrebo has developed a specific platform that we have named IoTREE for IoT projects and specifically for Smart City projects. Our objective as a company remains the same but adapted to the characteristics of this framework. IoTREE manages the complete life cycle of both devices and the infrastructures where they are installed. We follow a transversal model, offering our tool as the manager of the elements that use the final services. We collaborate and integrate with the other actors in Smart Cities, from operators to site owners, manufacturers, managed service providers, et cetera.

TowerXchange: For towercos in particular, interfacing with customers and service providers is critical. How does Atrebo facilitate user interfacing across multiple organisations?

Jesús del Estad, CEO, Atrebo: TREE facilitates and promotes the interaction between suppliers and customers to promote the advantages of a connected ecosystem. The definition of different profiles, direct portals of communication, interaction in the different processes, internal and external alerting systems, and reports examining comparative performance are features that have been designed precisely to make the relationship between operators and towercos more efficient and profitable.

TREE offers its customers solutions designed to optimise and supplement the interaction between them and their suppliers, thereby allowing both to benefit by creating favourable environments for new purchases, coordinating the management of both through process sharing, operational channels, improving communication, document management and billing of their services, among others.

TowerXchange: How do you see the future of 5G deployment in Europe from Atrebo? Is your TREE tool ready for the breakthrough that this new technology will bring?

Jesús del Estad, CEO, Atrebo: Atrebo has participated in several 5G pilot projects with leading operators, equipment suppliers, universities and managed service companies to adapt the resulting best practices to the digital process management environment, new devices, infrastructures and services.

Our vision of being a 360° both asset lifecycle services platform, and a radio technologies and land solution leads us to a continual process of innovation, improvement and learning that we share with our customers, suppliers and the sector as a whole.
A new power offering from GCC market leader
Byrne Equipment Rental are adding a complete tower power vertical to their extensive equipment hire business

Having operated across the GCC for almost 30 years, Byrne Equipment Rental understand the regions climate issues and ensure their extensive fleet of equipment can support their client’s requirements in the Oil & Gas, Medical and Telecommunication’s sector.

After identifying an opportunity to leverage their skills and capital to work more closely with mobile network operators in the region, they’ve spent the last 18 months developing an OPEX-led, complete tower power solution which will dramatically simplify a problem which has caused GCC tower owners a headache for many years. TowerXchange caught up with Steve Caygill, Regional General Manager and one of the experts spearheading the new model, to find out more about Byrne Equipment Rental’s new offering.

Keywords: Batteries, Byrne Equipment Rental, Capex, ESCOs, Energy, Energy Efficiency, Energy Storage, Fuel Cell, Fuel Security, Market Entry, Middle East, Multi-Country Partner, Off-Grid, Opex Reduction, ROI, Rectifiers, Rental, United Arab Emirates, Unreliable Grid, Uptime

Read this article to learn:
- About Byrne Rental’s pedigree and footprint in the GCC region
- How their new complete power solution will work
- How the tower power business fits into Byrne’s wider organisation
- The importance of power for network resilience in the GCC region
- Developments in Byrne’s ownership structure and how this will help them grow

TowerXchange: Please introduce Byrne Rental, your history and footprint.

Steve Caygill, Regional General Manager, Byrne Equipment Rental: Byrne Equipment Rental was established in the early 90s and for almost 30 years we have evolved to having 19 offices and depots across the GCC region. We have formed the ‘Byrne Group’ of companies which includes our traditional rental business alongside other entities we own including Spacemaker (UAE) and Byrne Technical Service (KSA), which manufactures high quality temporary and permanent structures; Byrne Gulf Oilfield Rental Solutions, which is our main operation in oil and gas; Yas Petroleum, our fuel management and distribution service in the UAE and our most recent launch; Byrne Medical Equipment Rental, offering operating lease options for specialist equipment to the medical sector. All in all, we have about 1,500 people working across our operations & 10,000 assets in our rental and lease fleets.

TowerXchange: You work across multiple industries. Can you tell us about your work in telecoms infrastructure and how important the sector is to your larger organisation?

Steve Caygill, Regional General Manager, Byrne Equipment Rental: Over the last 18 months we’ve been trialling a new product in the market by working with mobile network operators to find out where they have issues powering their tower assets in both standard and remote locations. There are a
lot of mobile network operators looking to reduce CAPEX and replace with an OPEX option. The challenge is in maximising the useful life of power assets – many tower owners aren’t quite getting the mix right in the form of battery type and rectifier and the amalgamation of the two, which means their equipment isn’t realising its full life potential and the additional OPEX needed to manage them is becoming costly, particularly for a non-core element of their business.

Power generation is over 40% of our Capital Investment profile which amounts to 488,000Kva of managed power in our fleet. Over the last 18 months we’ve been building our proof of concept, integrating world class products to create a single hybrid product for the market, with specialised lead crystal batteries, bespoke rectifiers coupled with a 1,000-hour service interval engine which requires less maintenance. We underpin this with a dedicated management system to get the most out of the solution. We are tailoring this to the market, to provide a single source for mobile network operators to reduce their operating overheads, remove capex and de-risk their business with a single source product which we own, operate and manage. This hybrid product reduces fuel consumption by up to 75%, we marry this product with the fuel delivery service which we currently offer in the UAE and hope to develop across the GCC countries where we are represented, and it’s a very compelling offering.

Our plan is to launch the solution at TowerXchange Meetup MENA, where we can demonstrate the value of the solution to tower owners across the region and beyond.

TowerXchange: Can you talk us through the model for your new solution?

Steve Caygill, Regional General Manager, Byrne Equipment Rental: We have no interest in owning towers at this juncture, but the power is our fundamental aim as we can finance and manage that as a core efficiency. We don’t want to tread on the core business of our customers, we want to power their asset and take away operational risk. We have a 20 unit trial pending in the GCC alongside significant interest in the UAE, and certain MNOs are holding off on tender releases until we can get this product to market. We’ve tested this solution in isolation and as a unified product: it works in this climate and we’re confident we can launch at TowerXchange MENA with a strong commitment. We think this will become the ‘new normal’ for the telco market.

TowerXchange: Tell us about how this fits into your existing business?

Steve Caygill, Regional General Manager, Byrne Equipment Rental: This is an expansion of what we already do. We are a plant generalist, we own and rent assets, provide a one stop solution to our clients, and we can provide anything from a portaloo to operating accommodation O&G camps offshore. This managed power solution is effectively an extension of what we’re already doing, just with a new product vertical already complementing our core functionality.

TowerXchange: Resilience is becoming increasingly key for telecoms networks across the world. What do you see as the main threats to uptime in MENA, and how can this be combatted?

Steve Caygill, Regional General Manager, Byrne Equipment Rental: It’s a collection of everything. Mobile network operators find themselves executing elements which are not in their core focus. It’s a core focus for us, and the challenge is acquiring and depreciating assets not delivering full useful life. They must be suited for the GCC market where you have a lot of Heat/Humidity & dust, of which have a massive impact on how well rectifiers perform, which knocks on to battery life, meaning assets are carrying cost and overhead beyond useful life. We see this solution as taking away all that headache and hassle. We’re offering a fixed fee, which is a big “risk off” position for our clients but we are very confident of what we have developed, we’ve sourced key supply change partners from Europe and Asia to ensure we are offering the very best solution.

TowerXchange: How do you differentiate yourselves from other ESCOs entering the MENA region?

Steve Caygill, Regional General Manager, Byrne Equipment Rental: They’re new to the region and
we’ve been here for almost 30 years. We have a 19 office footprint and 1,500 staff, so we know the market and the risk profile. We are an established brand with over 10,000 assets supporting clients in the market. We’ve built up a reputation for quality and reliability, and if we are willing to put our name behind a certain product, it’s our reputation on the line, so we know we must always deliver quality.

TowerXchange: Can you tell us more about your plans for the future and where you see the business going?

Steve Caygill, Regional General Manager, Byrne Equipment Rental: We recently had a restructure in our ownership, with new investors Citic Pacific and Vpower joining Itqan as our shareholders. Citic Pacific are a HKD 9trn company, listed in Hong Kong and the private investment arm of the Chinese Government, while VPower is one of the largest power manufacturers globally. We’re proud that Byrne Equipment Rental is their first investment in the Middle Eastern Region. A natural progression for us would therefore be to expand our geographical reach, and offer our services into the Asian market. The product line of our mobile network operator offering with a managed power solution would naturally follow into that territory. We have what we believe is the required scale, size and financial strength to allow us to roll out at scale when it comes to deployment in the GCC and into new geographies - it’s a matter of penetrating those markets and creating the awareness of what we can offer with our solutions to the Telco sector.

See you at our future events!

Meetup Europe 2019
9-10 April, London

Meetup Americas 2019
9-10 July, Boca Raton

Meetup Africa 2019
8-9 October, Johannesburg

Meetup Asia 2019
3-4 December, Singapore

Meetup MENA 2020
28-29 January, Dubai

TowerXchange
www.towerxchange.com
A family business offering quality generator solutions

CGM Italia has produced 52,000 generators in the last 38 years and continues to innovate

With two production facilities in Italy, and a range of generators produced to the highest standards, CGM Italia offers generators of all shapes and sizes, related products and hybrid solutions which enable tower owners in rural areas to reduce maintenance cycles and cut costs without compromising on reliability. We spoke with Stefano Chilese, Managing Director of CGM Italia, to find out more about the origins of their offering and plans for growth.

Keywords: Africa & ME, Batteries, Benin, CGM Italia, DG Runtime, Energy, Energy Efficiency, Ghana, Ivory Coast, Multi-Country Partner, Off-Grid, Opex Reduction, ROI, Rwanda, Unreliable Grid, Uptime

TowerXchange: Please introduce CGM Italia, your history and footprint.

Stefano Chilese, Managing Director, CGM Italia: CGM is an Italian family company, founded in 1980 producing generators across the spectrum of sizes, not only small but up to 3,000 KWH. We also supply secondary products like PTO, welding and lighting towers, all of which are produced in Italy on two sites, one where we have our technology and admin office and another not far away where we produce the smaller range. The good thing about CGM is we can offer all the products under the genset umbrella, including petrol, diesel, gas, PTO, 2-3k KWH – it is all produced by us, we don’t buy and resell products. We employ around 60 people and produce 2,500 generators per year. There are approximately 1,800 units in the industrial 20KWH range and the rest of what we produce is for the domestic market. In the last 34 years we have produced 52,000 generators.

The majority of our work is in Europe, the Middle East, Africa and Latin America. We are also in Asia and South Asia but to a lesser extent. We have 51 certified distributors who all carry stock and parts and tech support for warranties etcetera and we export to 128 countries. We have around 11,000 square metres of production space and we are also ISO 9001 certified.

TowerXchange: Tell us more about your offering in your key markets?

Read this article to learn:
- About CGM Italia’s background and global footprint
- Key customer demands
- The relative merits of different fuel options
- How CGM Italia is reducing maintenance cycles to improve efficiency
Stefano Chilese, Managing Director, CGM Italia: In the Middle East and Africa our offering is more related to very simple and standard machines, with a focus on availability of spare parts and support in commissioning and installation. We offer generators which are simple, easy to use, have a long maintenance cycle and for which it is easy to find spare parts and technicians. We use Stamford or Perkins to help the final customer to use our distributor network as well as their networks.

In Europe and South Africa we tend to find the opposite, they prefer good quality generators with high standards, and electronics and features are a plus, not a minus. Customers tend to prefer manufacturers to arrange the correct alternators and electrical parts to use and we use our own network, not distributors. In Europe there are different emissions requirements compared to elsewhere – the requirement for Stage III and the forthcoming Stage V solutions has already started and emissions will be tightly controlled.

Generators will become bigger in size, be much more delicate to use and will have more sensors and more maintenance in order to reduce emissions. It’s a big and difficult step but will be good for the European market. From next year you will only be able to buy a Stage V solution for mobile application.

TowerXchange: Tell us about your telecoms customers – MNOs, towercos and ESCOs are all buying generators, do you see much difference in their requirements or the way they operate?

Stefano Chilese, Managing Director, CGM Italia: We are seeing that more and more of our customers are much more fuel sensitive but still we see the highest demand for the standard generators with a long maintenance cycle and big tank. More and more hybrid solutions are required and tested, mostly in off-grid situations. Hybrid is coming more and more popular - if petrol prices continue to stay low the demand will stay as it but if the prices go up hybrids will boom. We are ready with some products here.

We are testing some hybrid solutions which will be ready soon and we are ready to sell some as prototypes. In 2019 we will offer standard telecom solutions without hybrid and we won’t remove this solution, but we can add support to our customers with batteries and solar or both. We have three or four different models of application: all-in-one or split out, which we have built as a constant evolution of our hours in the field in Africa to check and improve the fuel consumption and battery life. In 2019 we will be much more ready to support hybrid solutions.

TowerXchange: You manufacture generators which run off a variety of fuels. Can you talk to us about the relative merits of each, and where each is appropriate?

Stefano Chilese, Managing Director, CGM Italia: The petrol for telecoms is not good – consumption is high, we never recommend this in telecoms. Diesel is the most required at the moment, because it is much more available and the price is quite good in MEA. LPG is not so available in MEA, you will find only a few countries with an extensive LPG supply chain and certainly not everywhere. Diesel, however, is everywhere. It’s very difficult to access the LPG supply chain, only a few sites can handle it and hard to do but if LPG is available it can be a good alternative to diesel as the price is lower and it has a lower price per KW, so it could be used in future. Hybrid is another story – it has a higher starting price but you have a lot of hours less of maintenance and less time needed on site which helps in remote areas. If diesel prices hike like 10 years or so ago the hybrid will boom in city centres as well. So right now I’d say diesel is the clear winner, hybrids close behind and LPG is a third option in some scenarios.

TowerXchange: In MENA we’re seeing tower owners (mostly MNOs) starting to really challenge their operational costs. What would you suggest are the key changes they could make to reduce fuel costs for off-grid towers?

Stefano Chilese, Managing Director, CGM Italia: For off grid solutions, in our opinion, the best product is our 48volt DC which will start with hybrid solutions with fixed speed of 1500, that charges batteries, when they’re full the generator...
stops and the site will run on the batteries at the same rate. This is the best for consumption and long maintenance cycles, you start the generator automatically 3 times a day for one hour and the other 21 hours you work with the batteries. You can also add in off-grid applications and long free maintenance programmes, or you can double fuel and oil to increase up to 1,000 hours maintenance. Using this solution you can work for approximately 10 months without maintenance. To this you can add a bigger fuel tank, so for example you can put in 1,000 litres which is five months’ worth of fuel. With these fuel and maintenance solutions you only need to go to a site every five months, compared to the current standard where you go monthly or so. The upfront cost is more as you pay for batteries and the hybrid system but you can forget about it for months at a time and it pays off quickly.

TowerXchange: Our readers will always want to know: who is using your solutions - can you share some success stories?

Stefano Chilese, Managing Director, CGM Italia: I will share the countries, but I can’t share client names. Our most successful work has been in Ivory Coast, Ghana, Benin and Rwanda – in these four countries we are highly successful. In these countries we are making our partners more and more CGM friendly. We sell 5-600 generators a year in these markets and maybe 8,000-10,000 units across telecoms globally.
Digital Trinity: digitising towercos

A new platform to optimise rollout, reporting, billing and project management

Digital Trinity is an innovative new digitisation platform originally developed for one of the leading tower companies in Myanmar. Promising to be the antidote to expensive annual subscription fees, Digital Trinity provides a full set of operations, project and asset management tools for a one-time license fee, which could save a medium sized towerco upwards of US$1mn per annum in IT costs alone!

Keywords: Data Collection and Utilisation, Digital Trinity, IoT, Job Ticketing, KPIs, Myanmar, NOC, SLA, Site Surveys, Vendor Directory, Who’s Who

Read this article to learn:
- How Digital Trinity was developed to meet the needs of one of the fastest growing towercos in the world
- The value of an online, collaborative tool to unify data and create a single version of the truth
- Integrating data from RMS and power systems to generate load alerts
- How Digital Trinity proposes to use drones to optimise tower inspection

TowerXchange: Please introduce yourselves and your business.

Ajit Patel, CEO, Digital Trinity: I was Heading IT Transformation for one of the leading tower companies in Myanmar and in 2018, I Co-founded Digital Trinity to meet the data acquisition and revenue assurance challenges of tower companies across the globe. I come from Telecommunication background with experience in various products and services in CEM, IoT, Enterprise IT, Mobility, Big-data, Core Networks, VAS, NGN platforms, BSS/ OSS and identity management solutions spread across ASEAN, India, Middle-East and Africa. Along with the co-founders we developed a digital platform to help us overcome the challenges of accelerated tower network rollout in Myanmar, while integrating with remote monitoring reporting and billing tools. That platform was to become Digital Trinity, so it originates directly from meeting the needs of a fast-growing, green field towerco.

We have put a lot of effort into developing a systemised and digitised solution to capture assets, uptime, and O&M elements, as well as the active and passive infrastructure variables within a tower site; an ecosystem of data created out of necessity in order to achieve operational excellence.

We are 100% focused on developing software for the telecom vertical, leveraging IoT, Blockchain and digital mobility tools to connect the field force and consumption data with reporting and back office reconciliation.
Digital Trinity’s partners include Microsoft, Tardid, Nokia, Odoo, Knowesis, the Blockchain Council, and Digital Trust.

TowerXchange: How do towercos manage data – and how should towercos manage data?

Ajit Patel, CEO, Digital Trinity: Most towercos think they have a data strategy, but systems are typically very distributed and poorly integrated. For example, the towerco we worked for was initially a vendor-driven organisation before we identified critical workflows and brought critical processes in-house.

We customised our ERP platform as an end to end solution to integrate critical processes for a towerco: from warehousing and operations to finance – we brought everything together on a single platform. We integrated with existing installed systems such as trouble ticketing, asset depreciation and remote monitoring systems (RMS), and tied in mobility apps for the field force. And we used IoT technology to connect with sensors and aggregate data.

TowerXchange: Please sum up the operational challenges you are seeking to help tower owners and operators overcome.

Ajit Patel, CEO, Digital Trinity: Whether you are a tower company or an MNO, you are probably struggling to reconcile conflicting sources of data. Digital Trinity can be your gatekeeper – your single source of the truth.

Whether you are a tower company or an MNO, you are probably struggling to reconcile conflicting sources of data. Digital Trinity can be your gatekeeper – your single source of the truth.

"
99.95% uptime, need to harvest from multiple sources of data from diesel gensets, fuel filling contractors, CPS levels, load – Digital Trinity acts like a constantly updated audit and revenue gatekeeper.

**TowerXchange: What are the key functionalities Digital Trinity provides?**

**Ajit Patel, CEO, Digital Trinity:** I would like to highlight three key functionalities:

1. **Tower operations:** we have developed a proprietary tower rollout project management and reconciliation system, based on a Microsoft SharePoint and Odoo platform to ensure it is open and readily configurable by any tower company. Too many towercos are still using orphaned Excel spreadsheets to manage operations – going online and using a platform like SharePoint enables creation of a single, secure, shared document repository.

2. **Power solution:** We've integrated our power module with the sensors embedded into the energy equipment vendors most widely used in Myanmar, including those provided by Lineage, Cummins, Helios, Huawei, Greenpole, Flexenclosure and Invendis and we know the optimum operating parameters from Myanmar. Within this module we have developed a unique load alert system, first generated for an Operator in Myanmar. For example, if your tower has 2kW load and a new co-location or equipment switch breaches the MSA (Master Services Agreement) you get a real time alert. Such alerts are critical when seeking to solve conflicts between tenants or between towercos and their refuelling contractors.

3. **Fixed asset register:** Digital Trinity also makes a comprehensive asset tracking and management solution available from the tower operating centre (TOC). We understand the challenge of maintaining an up to date inventory of assets in the field, having audited towers, with up to 99 different assets on each tower. For example, we would separately audit 64 battery cells in a power cabinet – each would have its own scanned barcode sticker. Too often we’ve seen towercos and MNOs with incomplete or out of date asset registers, often dating back to the original acquisition of those assets. Having an accurate, up to date fixed asset register is critical for reconciliation.

Digital Trinity's goal is to create a shared platform for towercos and their MNO partners, consolidating data from multiple sources, and configurable by the end user. Our operational model combines:

- Project management
- Billing
- Collaboration
- ERP
- Asset management
- Operator integration
- Business intelligence
- Remote monitoring systems

**TowerXchange: Please explain the criticality of having an accurate fixed asset register when it comes to valuation.**

**Ajit Patel, CEO, Digital Trinity:** Whether you’re a buyer or a seller of towers, asset verification is key to correctly defining the value of a tower portfolio.

ERP is a poor solution for managing tower asset depreciation, and so many asset registers in our industry are not properly updated. But more importantly, we are able to maintain that asset register on a day to day basis.

**TowerXchange: Our readers will always want to know: how proven is Digital Trinity in the field?**

**Ajit Patel, CEO, Digital Trinity:** Digital Trinity has been refined and proven over three years of development and usage in Myanmar. We are in active discussions with one of the country’s MNOs. And we’re talking to a West African towerco about helping them with revenue assurance, asset management and drone based tower inspection. We are also in discussion with major tower companies in the region for pilots of drone inspection and asset management solutions using the latest tracking technologies.

**TowerXchange: What is Digital Trinity’s commercial model?**

**Ajit Patel, CEO, Digital Trinity:** One of the reasons we created Digital Trinity was our dissatisfaction with the cost of annual subscription fees to cloud-based software, compounded by the professional services costs of these ‘off the shelf’ solutions. We had three separate IT software agreements, and each of these
pieces of software had a three to five year annual subscription, billed per site per month.

Digital Trinity does not charge monthly fees, thus avoiding recurring costs.

For example, for one of our towerco partners, we managed to save over US$1mn per year through avoidance of a perpetual license cost.

**TowerXchange: What is the implementation roadmap?**

**Ajit Patel, CEO, Digital Trinity:** We start by conducting our due diligence on the current architecture and compare that to the ‘to be’ architecture. We do a detailed gap analysis and define the necessary re-architecting and total cost of ownership. And if that is all acceptable to the client, we implement, train and handover.

We can host Digital Trinity in our own data centre, or we can deploy it for our clients to self-operate.

**TowerXchange: Tell us about how Digital Trinity proposes to use drones for tower inspection.**

**Ajit Patel, CEO, Digital Trinity:** We don’t think it’s feasible to climb towers on a quarterly basis to audit them and check for safety.

We have a partnership with Tardid to use machine learning to inspect towers using drones. Drones can capture more than just pictures – we can use sensors to gather data on the nature of the materials used and any corrosion, and combine that data in a materials analysis that predicts future stresses on materials.

Combined with legacy barcoding tools, drones can be used as an active and passive asset reconciliation solution.

We are about to pilot drone technology in India, and hope to bring the technology to Myanmar shortly thereafter. Its already proven in oil and gas applications.

**TowerXchange: How does Digital Trinity propose to attract new customers?**

**Ajit Patel, CEO, Digital Trinity:** We would like to offer a free pilot to any tower owner – give us a chance to manage at least 50 sites and prove our solution works!

We are keen to work with any towerco seeking to achieve significant savings by replacing software subscriptions with a one-time license fee platform. This can significantly reduce the costs of IT, particularly for small and medium sized towercos that lack the financial means to spend US$1mn plus per year on software.
Enough is enough: why you shouldn’t put up with poor rectifiers any more

You wouldn’t keep a car which kept breaking down, so why do so many tower owners battle on with sub-par rectifiers?

In an industry where towercos are spending as much as 60% of their opex on fuel consumption, capex-heavy investments such as deploying solar power or switching from lead acid to lithium batteries can help them to make gains and improve margins as they decrease their reliance on an unpredictable fuel supply chain. However, as much as towercos might spend on their power systems, they have still had to put up with unreliable rectifiers which have struggled to cope with the dust, heat and humidity at many locations. According to Mattias Karlsson, Vice President eSite at Flexenclosure, as many as 20% of rectifiers can fail each year in off grid and poor grid locations across Africa, Asia and the Middle East, adding costs through downtime, replacements and man hours across the maintenance cycle.

**Keywords:** Africa & ME, Batteries, Burkina Faso, Capex, DG Runtime, ESCOs, Energy, Energy Storage, Flexenclosure, Fuel Security, Lithium-ion, Off-Grid, Opex Reduction, RMS, ROI, Rectifiers, Renewables, Risk, Skilled Workforces, Solar, Unreliable Grid, Uptime

**Read this article to learn:**
- Why rectifiers aren’t performing in developing markets
- How the industry has been coping with poor rectifier performance to date
- What solutions can make a difference
- How a sealed system can deliver results for off grid and poor grid sites

**Why do rectifiers perform so poorly in developing markets?**

Towercos, particularly those in emerging markets, are under two competing pressures: the need to offer a reliable service to their tenants – to meet SLAs and to create resilient and robust networks – and the downward pressure on pricing driven by huge leaps in data consumption with static or declining ARPUs. This pressure to deliver uninterrupted uptime while at the same time needing to drive down opex, is forcing towercos to re-evaluate their operations and maximise performance.

The environment at sites in much of Africa and parts of Asia and Latin America is tough: they are typically hot and dusty, often with high humidity. To make matters more difficult still, the electrical environment – both from poor grid supply and from diesel generators – is very inconsistent, with ageing gensets often producing damaging voltage spikes.

To date, most of the rectifiers in the market have been designed for indoor, on-grid use in developed markets like Europe or the USA and have been designed under the assumption that they would be working with a high quality and consistent power supply – something which simply doesn’t exist in most developing nations. They’re also often being repaired or maintained by field teams who lack the appropriate specialist training. If towercos can’t rely on rectifiers to get uninterrupted DC power it has an immediate effect on uptime, meaning their bottom line is hit by both the cost of replacement...
or repair and penalties imposed by their tenants as part of their SLAs. Even if a failure doesn’t lead to downtime, it will result in higher operational costs as batteries and generators won’t be performing optimally, creating a lot of pain for the site owner.

Mattias Karlsson thinks the problem comes from how telecoms infrastructure has evolved. ‘Telecoms first rolled out in Europe and the US in nice and reliable on-grid areas, and that’s what the technology was developed for. When wireless communications rolled out in less developed countries, the suppliers in those markets tried to create the illusion of a safe indoor setting by putting low cost indoor rectifiers inside a cabinet. The fact is though that even protected by a cabinet, these rectifiers simply aren’t robust enough for the more extreme operating environments that their cabinets were put in. But with no alternative available, towercos had no option but to accept the situation and try to push away the pain of dealing with rectifier failures to their suppliers.’

**Why hasn’t a solution been found before?**

Rectifiers are delicate bits of kit in terms of power generation, more prone to falling foul of the local climate than batteries or gensets. With cabinetry offering limited protection, the scope of solutions to address the problem was also limited so nothing much changed.

In addition, the problem was perpetuated by the way that RFPs and many procurement functions were set up. With no accepted alternative in place, RFPs based around traditional power systems requested the same elements and configurations that had always been used and didn’t leave much room for innovation in terms of the whole power system. And introducing something completely new would take time to find acceptance in slow moving supply chains.

The result was that towercos had no alternative but to accept poor rectifier performance as the status quo. With the available solutions having been created for other environments, expectations were low in terms of how fit for purpose they could be. However, Flexenclosure has been working to change this. ‘No one really looked at sub-Saharan
Africa with a view to designing and building solutions specifically for that market,’ says Karlsson. ‘So that’s exactly what we’ve done. We solved a problem that towercos in developing nations face every day, with a solution specifically designed for them and the very difficult environments in which they operate.’

What's the solution?

Thanks to Flexenclosure’s extensive experience working in off-grid and poor grid areas, there is now a much better solution for this. They redesigned every component from the ground up – specifically to withstand the harshest possible conditions – and then encased the electronics in a totally sealed box, thus creating a true outdoor product which will never be exposed to dust or humidity and is completely tamper-proof. Their eSite x10 site power solution is designed to address fluctuations in voltage, varying environmental conditions on site and is purpose built for the market.

‘People have tested so many brands and types of rectifier and they all fail in the same way, so why should they trust us?’ challenges Karlsson. ‘They need to see how radically different our solution is. If we think back to the days of rotary dial telephones, if someone had come along then and said ‘you don’t need that any more, here’s an iPhone’ we would never have believed it. But that’s what we’re doing with our eSite x10 as it’s so fundamentally different to how site power has been done in the past. We’ve completely overcome the technology issues. The challenge now is to help towercos in developing nations understand that they really don’t have to put up with second-best anymore.’

Where is it working?

‘In the three years since we launched eSite x10 and started to deploy it across Africa, the Middle East and Asia, we’ve had zero failed rectifiers. It is deployed in around 20 countries now and we’ve had no failures in that entire time,’ stated Karlsson.

Operationally, around 20% of rectifiers in off-grid and poor grid locations are replaced every year, so
Flexenclosure’s initial findings support their belief that the eSite x10 solution could completely change the game in terms of rectifier performance.

But that’s not all – when Flexenclosure works with a towerco, their eSite x10 systems connect to a server and their built-in eSite Tools RMS collects data which can support customers in optimising their power performance at a site level. Flexenclosure has found ESCOs in particular have understood the benefits of the eSite Tools offering as they seek to further optimise their operational spend.

‘We worked with an ESCO in Burkina Faso, across different sites with batteries or solar depending on grid availability, and then used our eSite Tools RMS data to optimise the settings not for the network as a whole but for each and every individual site. This ability to monitor and fine-tune performance at a site level will make a big difference, not just to fuel consumption or maximising battery life, but to an ESCO’s overall profitability,’ added Karlsson.

**Site data: an added benefit**

While the eSite x10 is maintenance free, with no filters or fans to maintain, it can also drive down maintenance needs for the rest of the site by improving operational performance. One major benefit of such a robust rectifier is that it can significantly improve the efficiency of a site. ‘In a standard system, the rectifier can only harvest power from the grid when the supply is good, whereas eSite x10 can safely and effectively harvest any available power regardless of how bad the grid is. This can mean that at some sites a genset isn’t needed at all,’ says Karlsson.

Flexenclosure has patented its own inbuilt ATS, which protects the system and makes intelligent decisions about when to switch between grid and genset power. It can also log all grid parameters so it’s possible to track exactly how the grid is behaving. This is a powerful tool for towercos or operators when they’re negotiating with their grid power supplier, as they can show what they’re actually receiving versus what they are paying for.

‘Customers want reliable site data,’ says Karlsson. ‘We can show in real time how the grid is performing and the data we collect can help site owners make important decisions for investment in battery capacity. eSite Tools not only measures ROI on our x10 system, but on the peripheral equipment they already have, meaning we can offer solid data analysis which will help overall site planning decisions. We see towercos asking for this kind of information, and the transformative power of our optimised data and reports where it’s implemented.’

As with all cutting-edge technology, Flexenclosure anticipates it will take some time for this solution to change the mindsets of towercos and operators who have been working in the same way over the last two decades. But with the evidence speaking for itself, there’s no doubt that the eSite x10 will change the game in terms of improving the reliability and efficiency of tower power across off-grid and poor grid locations worldwide.
GRIDSERVE® to partner with Bladon to minimise diesel consumption and opex

The two leading-edge organisations have signed an MOU reduce operating costs and carbon emissions

At the 2018 Meetup Africa, GRIDSERVE officially launched their 12kW Solar Energy Centre (SEC12), a best-in-class plug and play solar hybrid solution that slashes opex, minimises carbon footprint and greatly reduces ongoing maintenance requirements.

The company has now also signed an MOU with Bladon to bring to market a new generation of GRIDSERVE hybrid solutions that substitute diesel combustion engines with multi-fuel micro turbines, to further enhance SEC12’s benefits and allow operators and towercos to take additional steps toward a cleaner and more efficient energy future.

TowerXchange talked with GRIDSERVE’s APAC CEO Heston Harper to hear about their experience at the Meetup Africa and find out how this partnership came out.

Keywords: Africa, Asia, Bankability, Batteries, Bladon, DG Runtime, Dimensioning, Due Diligence, ESCOs, Energy, Energy Efficiency, Energy Storage, GRIDSERVE, Hybrid Power, Installation, Lithium-Ion, Logistics, Multi-Region, O&M, Opex Reduction, RMS, ROI, Rectifiers, Renewables, SEC, Site Visits, Skilled Workforces, Solar, Spare Parts, Who’s Who

Read this article to learn:
- GRIDSERVE’s Bladon partnership: what were the drivers and goals behind the agreement?
- Is the industry moving towards CO2 reductions?
- How micro turbines could help hybrid systems to further reduce diesel dependence?

TowerXchange: Last month you presented your innovative 12kW Solar Energy Centre (SEC12) solution in Johannesburg at the TX Meetup Africa. How was your experience at the event and what feedback did you receive from the industry?

Heston Harper, CEO – APAC, GRIDSERVE: The Africa show, where we participated as Diamond Sponsors, was a tremendous success for us. We had meetings with many of the most relevant people in this industry, and the official launch of our SEC12 hybrid system was very well received.

In fact, we are now in mature commercial discussions with a majority of the companies we wanted to meet at the event, and we are really looking forward to both Singapore and Dubai Meetups, where we will be announcing more exciting news and updates.

TowerXchange: Right after the show, GRIDSERVE signed a Memorandum of Understanding (MOU) with Bladon. How did this idea come up and what can we expect from this partnership?

Heston Harper, CEO – APAC, GRIDSERVE: Indeed, another great success of the show for us is how much we strengthened our relationship with Bladon. GRIDSERVE is actually a technology agnostic organisation, and we are always on the search for best-in-class technologies that can provide additional benefits. We started our conversations with Bladon about a year ago, as
we felt their micro turbine solution could be a very good fit for our solar-battery-genset hybrid system, especially given maintenance cycles that are stated to be up to every 8,000 hours.

Our stands at the show were actually next to each other, and we felt very comfortable participating at the event alongside Bladon, as it’s clear to us that our companies are working towards the same overarching goals, with a similar forward-thinking approach that attracted the interest of many participants at the Meetup. Bladon has invented, designed, and patented a micro turbine genset which is a clean burning, multi fuel, low noise and vibration alternative to conventional diesel gensets. During the last day of the event, we dotted the I’s and crossed the T’s on an MOU which we subsequently signed that lays out the basis for us integrating their technology into our hybrid powerplant in a way that provides maximum additional benefits.

Our current SEC12 hybrid system integrates the latest advance in bifacial solar technologies, advanced lithium battery storage solutions, best-in-class DC gensets and a fuel tank, and all that comes with its own monitoring and management suite. Whilst we are extremely enthusiastic about the Bladon unit, traditional generators remain the industry standard, so we will of course continue to offer a combustion-engine option (with our preference being the same DC generator that we currently use). However, a major advantage of the Bladon unit is being able to run on multiple - and mixtures - of fuels including diesel, kerosene and bio-diesel. A diesel-kerosene mix for example is particularly interesting as whilst this fuel will burn in a micro turbine, it is not suitable for a diesel engine hence the incentive for ‘would-be-thieves’ is significantly diminished.

Perhaps the most impressive statistic of the Bladon unit is the 8,000-hour service interval. In our SEC12 hybrid format, if on a particular site we were already using solar energy and energy storage to reduce diesel consumption by 80%, this theoretically means that it would take over 4-years until the 8,000-hour service time for the micro turbine was reached. Now we are not seriously suggesting in reality we would choose to leave it that long, however it is clear that we are pushing the envelope as to the realms of what is possible. In turn this means we can dramatically change and reduce MNO and towerco site maintenance costs and requirements. With site visits often taking place once or twice a month, our initial plans are to hit the once a quarter milestone, then bi-annual, and we do believe that once a year or beyond in some cases is even possible.
TowerXchange: Could you summarize the drivers and goals of this collaboration and what will be its impact on the industry?

Heston Harper, CEO – APAC, GRIDSERVE: We are seeing a shift to lower CO2 emission clean energy infrastructure in the telecoms industry, and the solution that will come out of this partnership will enable industry leaders to make significant in-roads towards that goal.

At the Africa Meetup, we noticed that some of the biggest global operators and infrastructure developers are very concerned about their carbon footprint which is manifesting as a risk to constraining their growth. The Bladon addition to our SEC12 solution is exciting because whilst we will continue to aim to provide the majority of energy from solar energy, the balance will need to come from liquid or gaseous fuels. As the Bladon unit can operate on a range of fuel types, we envisage that whilst we will initially use fuel types in current supply chains, such as diesel or diesel/kerosene blends, over time these can be substituted with low or zero carbon fuels derived from non-fossil fuel sources.

Given our SEC12 solutions are designed to minimise operating costs, we also have the potential to mobilise a large pool of capital by offering or supporting financed turn-key solutions, such as ‘infrastructure as a service’, that can replace the need for MNOs or towercos to fund large capital deployments of equipment. We appreciate that there is projected to be a large growth in ESCO models, and we believe our turn-key combination of bankable products and associated services is extremely timely to help others to implement these models.

TowerXchange: How advanced is this new solution?

Heston Harper, CEO – APAC, GRIDSERVE: The ink is still wet on the agreement and we are gaining momentum towards our deadlines. Bladon has two units in production that are earmarked for us: the first one will be shipped to Dubai and will be on display at the TowerXchange MENA Meetup. The second one is going to be installed in our UK headquarters, so we can really put it through its paces. We are very excited about the outcome and expect to be qualifying some game changing performance statistics.

Furthermore, beyond the initial deployments where the focus is ‘tower power’ we also see opportunities to add additional infrastructure in due course that can open additional business models and opportunities – that’s all I am able to say on this at the moment, but I really do suggest you watch this space!

TowerXchange: You have a vast, global experience with energy integration and now you are pushing renewable solutions across the world. What are the main drivers for renewables in telecoms and what are the most proactive markets in terms of exploring sustainable alternatives?

Heston Harper, CEO – APAC, GRIDSERVE: Whereas only a few years ago the driver for clean energy solutions may have sat in the ‘corporate social responsibility’ arena, incredible cost reductions for both solar energy and energy storage in the last few years have completely changed the game, such that the main driver of our business case for solar is one of fundamental economics: it’s a cheaper form of energy that gets replenished onsite every day.

The sun is obviously a ‘free’ feedstock and the more you integrate that ‘free’ energy into your power infrastructure, the cheaper your overall cost of energy becomes. We have been able to deliver dependable, low cost and clean energy by marrying solar with storage, gensets and now micro turbines, which provides dependability at a lower energy cost in comparison to ‘old sunlight’ derived fuels such as diesel.

TowerXchange: Based on your global experience, which are the most attractive markets for energy providers in Asia and what are the main opportunities?

Heston Harper, CEO – APAC, GRIDSERVE: We have a large global pipeline and we are now actively engaged with a significant number of end users across multiple Asian territories. To provide you a flavour we have maturing discussions in Malaysia, New Zealand, Australia, the Pacific Islands, India, Indonesia, the Philippines, Vietnam, Cambodia, Laos to name a few!
Kleos: a new breed of 5G-ready base stations

How to succeed at innovating without compromising coverage and QoS

Since 5G is becoming a recurring theme of discussion among telecoms executives, TowerXchange analyses some of the implications for base stations and their design with the multinational manufacturer Kleos. In this interview, the company’s CEO George El Aily shares insights into their latest product, PEGASUS base station, and how MNOs and infracos can successfully embrace 5G.

Keywords: 4G, 5G, Active Equipment, Active Infrasharing, Business Case, Densification, Insights, Kleos, Loading, Network Rollout, QoS, Who’s Who

Read this article to learn:
- Kleos’ solutions, products and vision for 4G+ and 5G
- What 5G means in terms of signal propagation and network topography
- How PEGASUS can serve the telecom industry in the run towards 5G
- Should infracos take over active equipment?

TowerXchange: Please introduce Kleos and the team behind it to our readers.

George El Aily, CEO, Kleos: Kleos specialises in designing and building advanced wireless communications systems. The company’s founding members played a key role in the conception of the first end-to-end full IP platform, HC-SDMA, known as iBurst, which was produced back in 2002 by Kyocera.

In the following years, they designed several of the largest iBurst networks and introduced a series of tools towards the deployment of advanced wireless platforms.

In 2007, Kleos designed an innovative public safety platform that was then adopted and utilised by several government agencies.

The increase in demand for higher capacity and throughputs led the Kleos team to develop a new breed of wireless platforms. PEGASUS is an advanced LTE system that is designed to lower the cost of ownership for operators and to ensure their profitability by accommodating a high number of simultaneous users and by providing coverage to large areas, while utilising the smallest possible number of base stations and optimising power consumption.

To date, Kleos is focused on expanding its footprint and our strategy revolves around teaming up with local partners such as Cognitive Corporate Finance (Spain) to cover new territories and introduce our platforms to potential international clients.
Kleos is heavily focused on R&D and on continuously improving their 4G+ platform and its features in its progression towards 5G.

**TowerXchange:** How will signal propagation change in the 5G era?

**George El Aily, CEO, Kleos:** Generally speaking, 5G is heading towards more personalised communication in terms of transmission and end user connectivity. It is envisaged that a 5G base station would provide a more precise, focused and cleaner RF pattern. This would be achieved via the usage of massive MiMo techniques, highly directional and steerable antennas to point in the best direction of a given user at a particular point in time. All this combined with advanced coding and modulation schemes and advanced signal processing techniques to help achieve higher throughputs, lower latency and larger number of users/sessions per base station.

On the other hand, we see that current implementations of 5G platforms are mainly focused towards higher bands such as the 28GHz spectrum, consequently we would expect 5G cells to have significantly smaller radius when compared to 4G/3G or 2G base stations and consequently to require a larger number of 5G base stations to provide ubiquitous coverage for a given area.

**TowerXchange:** What does that mean for network topographies – we all know densification is a must, but how should that densification be realised?

**George El Aily, CEO, Kleos:** While densification and increasing capacity can be achieved via several traditional means such as reducing the cell size, using pico and small cells, sectorisation or going to higher frequencies, we strongly believe that there are other ways.

At Kleos, we are looking into new techniques that would allow us to achieve a higher spectral efficiency without dramatically compromising coverage and without having to drastically increase the number of cells. This implies utilising new and higher forms of modulations, innovative coding and signal processing schemes and new modes of transmission that would allow us to get closer and closer to the Shannon limit and even delve deeper to implement faster than Nyquist signalling techniques.

Our aim has been not to only push the envelope by...
gaining a few Mbps here and there but to introduce a true game changer that allows us to go into new heights. This is the main reason and drive that led us to design our advanced PEGASUS base station.

TowerXchange: What are the implications of 5G for the owners and operators of macro cell sites and how will the equipment load and power load on sites evolve?

George El Aily, CEO, Kleos: Irrespective of how 5G progresses, macro cells will always be needed in order to provide the main coverage or the umbrella coverage, even if it meant providing lower speeds when outside the area of coverage of what will eventually be known as 5G spot.

The way 5G is progressing now will eventually force macro cell operators to increase their usage of small and micro cells in their networks and will push them to adopt hybrid models.

In terms of equipment load and power load on sites, the natural trend and progression is to have eNodeBs with smaller physical footprint and lower power consumption, even for macro base stations. Consequently, for small and pico 5G cells, the physical footprint and power consumption will definitely be quite low, however operators will require a larger number of eNodeBs to provide coverage for a particular area and hence will have a larger number of sites to cater for.

TowerXchange: How would you differentiate Kleos PEGASUS from other 5G antennas?

George El Aily, CEO, Kleos: To be clear, the current PEGASUS platform that is being commercially sold and deployed is a 4G+ macro base station with 5G ready capabilities and features. Our full-fledged 5G base station is under development and is expected to be released towards end of 2019.

What differentiates our platform, whether it is our 4G+ system or our 5G platform, is the fact that we design these systems with the main aim of reducing the operational expenses of operators and maximising their profitability. Consequently, with our 4G+ platform we have ensured higher capacity per site, larger coverage area, lower power consumption as well as ease in deployment, maintenance and scalability. Furthermore, our product enables various IoT applications and platforms as well as guarantees an effective and scalable virtual core.

Our 5G platform has been designed with the same spirit, where we anticipate preserving our edge in terms of capacity, coverage, power consumption and flexibility. This is achieved by implementing innovative transmission techniques and by introducing intelligent massive MiMo systems and by utilising superior forms of modulations, innovative coding and signal processing schemes.

Our ultimate goal is to introduce a real 5G platform that is flexible, practical and manageable to deploy and more importantly affordable and profitable for MNOs to own and operate.

TowerXchange: What is the current state of public safety networks, and what opportunity does 5G represent to upgrade existing public safety networks, or make new public safety networks viable?

George El Aily, CEO, Kleos: Public safety networks require a very specific set of features. Naturally, with 5G introducing higher speeds, lower latency and ad-hoc communication features and capabilities, we will see public safety networks benefiting from powerful real time applications and services that ensure a better response time, powerful capabilities and more effective communication.

Nevertheless, generally speaking governments and security agencies tend to be cautious prior to adopting new technologies and standards and they normally take their time to ensure it has been well tested/used and free of security holes. Therefore, I believe it is a little early for public safety networks to adopt 5G. Instead I think the trend will be to upgrade their existing 2G/3G systems to utilise advanced 4G platforms that have been well tested and used.

From our side, Kleos 4G+ and 5G platforms enjoy a set of unique wireless security characteristics that position it as one of the most advanced solution for public safety and tactical deployment networks.

TowerXchange: Towercos have evolved from the carve out and sale of passive infrastructure from MNOs to specialise infracos – should third
party infracos deploy, own and operate active equipment in the 5G era?

George El Aily, CEO, Kleos: I strongly believe that the trend is heading more and more towards the adoption of the active sharing concept. We see more MNOs willing and ready to outsource their RAN to be deployed, maintained and operated by third party infracos with the aim of mitigating their costs and focusing on services and applications.

Towercos are ideally positioned to take on these tasks by becoming specialised infracos. From our side as vendors, we have been anticipating this transformation in the business model, and as such we have even designed our 4G+ platform to accommodate active sharing.

Consequently, each of our current 4G+ base stations can be used by several operators at once to independently offer their wireless services.

TowerXchange: Please sum up your vision of 5G, particularly insofar as it applies to the acquisition, deployment and management of cell sites.

George El Aily, CEO, Kleos: Our vision of 5G slightly differs from the current trend that is being followed by major vendors. While we are on the same wavelength in terms of providing higher capacity, lower latency, more features and applications, we believe we are able to do so without having to compromise coverage and without having to let go of the macro cell concept. 5G is currently being introduced as a fixed wireless access service or in small cells deployment. We believe we can change that.

Kleos’ key features

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<tr>
<th>Highly secure and stable</th>
<th>Supports high data throughputs</th>
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<tr>
<td>Low cost of ownership</td>
<td>Rapidly deployable to reach quick operational status</td>
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<td>Supports high speed mobility</td>
<td>Ubiquitous coverage and high capacity per cell</td>
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<td>Easily expandable to a multi-cell system</td>
<td>Supports VoLTE</td>
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<td>Resilient to jamming and eavesdropping</td>
<td>Deployable in hard weather and wind conditions</td>
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<td>Efficient spectrum utilisation</td>
<td>Does not require frequency planning</td>
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Meetup Europe 2019
9-10 April, London

Meetup Americas 2019
9-10 July, Boca Raton

Meetup Africa 2019
8-9 October, Johannesburg

Meetup Asia 2019
3-4 December, Singapore

Meetup MENA 2020
28-29 January, Dubai
Understanding the implications of smart cities in the Americas

Neptuno on how infrastructure providers need to adapt their models and prepare for this transition

5G and its direct implications with smart city development is a crucial point in the agenda of MNOs and regulators across the U.S. and beyond. Stakeholders in the smart city industry know that the implementation of technology innovation requires flexible partners and more infrastructure than ever. In fact, smart city initiatives will force infrastructure providers to broaden their business scope, adapt their offer and explore new technologies in order to succeed in this swiftly evolving scenario. In this interview, TowerXchange spoke with Neptuno’s CEO Leticia Latino, about the disruptive adjustments that IoT and 5G will demand to infracos and their providers.

Keywords: 5G, Americas, Camouflage, Densification, Ericsson, IoT, Neptuno USA, Nokia, North America, Small Cells, Smart Cities, SmartTecPort, United States

TowerXchange: Could you reintroduce Neptuno for our readers?

Leticia Latino, CEO, Neptuno USA: Neptuno has been offering tower engineering, manufacturing, installation and built-to-suit services for almost 50 years, mainly in the Americas region. We have more than 10,000 installed sites and we are one of the main partners to MNOs, vendors and equipment providers within the industry including Ericsson and Nokia.

Recently, we have also decided to explore and focus on reality capture, which uses 3D technologies for towers surveillance and surveys, and we have developed our own software for assets lifecycle management.

Last year, we have also launched SmartTecPort, a spinoff that manages and develops our smart city initiatives and their required infrastructure.

TowerXchange: What type of structures are clients demanding across CALA and the U.S.? What is the proportion of macro-towers versus short poles, light poles, et cetera?

Leticia Latino, CEO, Neptuno USA: In order to answer that question precisely, we would need to introduce an additional category, as most of our work - around 40% - is focusing on evaluating and reinforcing existing assets.

Historically, tower revaluation was not generating relevant revenues, but the market context and perhaps some difficulties on permitting are pushing...
the industry towards this. Most companies want to
capitalise their assets and decide to improve their
existing infrastructure to equip them with more
antennas rather than building new ones.

On top of that, I would say that 30% of the actual
demand is coming from macro-towers, while
20% comes from innovative solutions related to
small cell deployment. Lastly, less than 10% of the
demand focuses on ecological solutions.

TowerXchange: Please tell us about Neptuno
Smart Solutions and how are you seeing the role
of towercos and infracos adapting to smart cities
initiatives.

Leticia Latino, CEO, Neptuno USA: Neptuno is a
traditional company that has focussed on offering
the same solutions for decades. However, we are
now facing a disruptive moment that will change
the industry and all key players and stakeholders
involved need to reconsider our role and approach
in order to adapt to this crucial times.

Consequently, Neptuno Smart Solutions is working
closely with key associations such as the Smart City
Council in the U.S. This is the time when everything
is being defined and the regulation is not definitive.
In January, the HR513 - a bill that aims to accelerate
broadband deployment - was presented in Congress,
and this regulation will play a key role in driving
and facilitating smart initiatives across U.S. cities.

The existence of two different regulatory scopes
in the U.S. - federal and state - is making things
even more complex. At Neptuno, we are working
very close to the cities, trying to understand and
support this necessary regulatory development,
while collaborating with different institutions and
regulatory bodies in the creation of a broad and
flexible legal framework that facilitates smart cities
development.

We are also playing a consultative role, advising
cities and always trying to see things from the
citizens’ perspective. Smart city development
will require a relevant alternative infrastructure
deployment and that has to be strategically designed
in advance to avoid the potential visual pollution
that all the needed antennas could generate. Neither
local authorities nor citizens want urban areas to be
full of antennas and sometimes regulation can slow
down the necessary deployment, hence unlocking
this situation is one of the biggest challenges that we
need to solve.

Many cities and authorities still do not understand
all the implications of 5G and we want to support
them on the transition towards new technologies.
We are now hosting workshops and initiatives to
educate city officials. We believe that infrastructure providers should have a neutral and objective approach in order to offer the best solutions and play a key role in the densification and small cells deployment that 5G will require.

**TowerXchange** Can you share some examples of smart city initiatives being adopted in the U.S. that could be exported across CALA?

**Leticia Latino**, CEO, Neptuno USA: Due to relevance and proximity, we are very focused on Florida. In fact, earlier this month, the South Florida Business Journal named Miami the leader in Smart City initiatives in the state, which makes us very happy as we are headquartered here. Orlando and more specifically Lake Nona are two cities that are at the forefront of smart initiatives.

Philadelphia has recently announced the creation of a smart city master plan, which constitutes a great example of how to implement smart solutions as they have already established all the key planning aspects and goals for the project in advance.

Smart city is a very broad concept. We always use it to refer to technological development, but it has so many different aspects. Coming back to Miami, most of the current initiatives are focused on intelligent mechanisms to measure and control sea levels. The city is installing sensors and tools to measure tide changes, which can be considered another smart city action. Each city starts embracing the aspect of smart city that better suits their immediate needs.

**TowerXchange** Where are smart poles being deployed in CALA (if any) and which add-ons to
they offer? How are the municipalities reacting to this innovation?

Leticia Latino, CEO, Neptuno USA: I know that, due to hurricanes, Puerto Rico is considering different smart poles installation initiatives. In Mexico, municipalities are very keen, but except for very specific cases, they have not taken the definitive leap and haven’t deployed many solutions.

One of the biggest barriers is that MNOs still haven’t figured out how to monetise the cost that will be generated by smart poles and solutions and neutral infrastructure providers need to take the lead and offer solutions to the operators as sharing access to these new infrastructure formats will be crucial.

TowerXchange: What type of energy requirements do these poles have and are your clients integrating renewable solutions in them (eg. solar panels, mini wind turbines)?

Leticia Latino, CEO, Neptuno USA: For smart tech poles, the equipment installed on the pole determines energy requirements, as it happens in traditional towers. Our smart poles offer the possibility of attaching a small solar panel to the structure, but that would not be enough to feed the equipment of three operators, although it could cover energy requirements of at least one of them.

These smart solutions also need backup systems and the whole industry is considering the implementation of this backup and emergency systems.

TowerXchange: The CALA industry has been evolving dramatically over the past couple of years and towercos are shifting to infracos by now offering fibre and sometimes energy management across their portfolios. How is this affecting the way Neptuno works and how are you adapting to these changing strategies?

Leticia Latino, CEO, Neptuno USA: The property and use rights of light poles and public spaces of each country are very important factors to take into account when developing these initiatives. When the use of public spaces is not regulated, we can go beyond traditional towers and offer innovative design and solutions that reduce visual impact and pollution.

One of our main priorities is to design smart infrastructure that can be visually integrated into the urban spaces, reducing their visual impact. The industry wants to integrate alternatives that allow them to hide antennas and we are working towards that goal. Towercos and all the companies across the value chain that want to participate in this smart cities movement need to find and offer solutions that fit in with the lifestyle and the architecture of the different cities involved.

We are also seeing many tower companies offering spaces on edge data centres instead of leasing space on the towers. They offer access to those small data centres that are integrated in urban spaces, which highlights the fact that plenty of equipment will have to be installed in edge areas if smart cities want to become a reality.
Explorando las implicaciones de las *smart city* en Americas

Neptuno explica cómo los proveedores de infraestructura necesitan adaptar sus modelos de negocio y prepararse para esta transición

La llegada del 5G y sus implicaciones en el desarrollo de ciudades inteligentes se ha convertido en un punto crucial en la agenda de operadores y reguladores en Estados Unidos y otros países. Los líderes del sector de *smart city* saben que la adopción de tecnología innovadora requiere socios flexibles y dinámicos y un enorme despliegue de infraestructura. La transición hacia ciudades inteligentes obligará a los proveedores de infraestructura a ampliar sus focos de negocio, adaptar su oferta y explorar nuevas tecnologías para prevalecer en este escenario cambiante. En esta entrevista, TowerXchange charla con Leticia Latino, CEO de Neptuno, para conocer los ajustes disruptivos que el IoT y el 5G generarán en los torreros y sus proveedores

**Keywords:** 5G, Americas, Camouflage, Densification, Ericsson, IoT, Neptuno USA, Nokia, North America, Small Cells, Smart Cities, SmartTecPort, United States

Lee este artículo para conocer:

- Cómo las smart cities cambiarán el modelo de negocio de los proveedores de infraestructura
- Los requerimientos e innovaciones tecnológicas de las ciudades inteligentes
- ¿Qué ciudades están a la vanguardia en la adopción de iniciativas inteligentes en Estados Unidos?
- Cómo se está adaptando Neptuno a este escenario cambiante

TowerXchange: ¿Podrías introducir Neptuno para los lectores que no estén familiarizados con la compañía?

Leticia Latino, CEO, Neptuno USA: Neptuno es una empresa que lleva casi 50 años ofreciendo servicios de ingeniería, fabricación e instalación de torres y built to suit, principalmente en Américas. Tenemos más de 10,000 torres instaladas y somos uno de los principales proveedores de todos los contratistas y empresas de infraestructura del sector como Ericsson o Nokia, así como de numerosos operadores de la región.

Recientemente hemos decidido enfocarnos también en reality capture, que consiste en usar tecnología 3D para servicios de inspección de torres, y ya hemos desarrollado un software de sitios para la gestión del ciclo vital de los activos.

Además, el año pasado hicimos un spin off y creamos una empresa llamada SmartTecPort para gestionar y desarrollar todas las iniciativas relacionadas con Smart Cities y su infraestructura.

TowerXchange: ¿Qué tipo de estructuras demandan vuestros clientes en Latinoamérica y Estados Unidos y cuál es la proporción de torres macro tradicionales en comparación con postes y otras soluciones?

Leticia Latino, CEO, Neptuno USA: Para responder con precisión a esta pregunta deberíamos abrir una categoría adicional, ya que la mayor parte de nuestro trabajo—alrededor del 40%— se está
centrando en la revisión y reforzamiento de torres existentes.

Antes, la reevaluación de infraestructura existente no suponía un aspecto demasiado relevante en nuestra actividad, pero la coyuntura del mercado y quizás algunas dificultades en la obtención de permisos están empujando a la industria a apostar por esto. Muchas empresas quieren capitalizar sus bienes y deciden revisar y mejorar su infraestructura para montar más antenas sobre sus activos ya existentes.

Otro 30% de la demanda proviene de *macro towers* o torres tradicionales, y un 20% serían soluciones innovadoras relacionadas con el despliegue de *small cells*. Por último, algo menos del 10% de la demanda se centra en soluciones ecológicas.

TowerXchange: Cuéntanos un poco más sobre Neptuno Smart Solutions y sobre cómo ves el papel de las torreras y proveedores de infraestructura en las iniciativas de ciudades inteligentes

**Leticia Latino, CEO, Neptuno USA:** Neptuno es una empresa de tradición que lleva décadas centrada en ofrecer soluciones similares. Sin embargo, estamos ante un momento disruptivo que va a cambiar la industria y todos los jugadores involucrados tenemos que reconsiderar nuestro papel y nuestro enfoque para adaptarnos a este momento de cambio.

En esta línea, Neptuno Smart Solutions se está involucrando mucho con asociaciones clave como el *Smart City Council* en Estados Unidos. Ahora mismo todo está por definir y la legislación no es definitiva. En enero de este año se ha presentado en el Congreso americano el *HR513*, un proyecto de ley que tratará de favorecer y acelerar el desarrollo y despliegue de banda ancha, que será un aspecto clave para implementar iniciativas inteligentes en ciudades del país. Una de las consideraciones más importantes en Estados Unidos es la existencia de diferentes planos legislativos, el federal y el estatal, lo que añade todavía más complejidad al desarrollo de estas soluciones. En Neptuno estamos trabajando mano a mano con las ciudades, tratando de comprender y apoyar este desarrollo legislativo, y colaborando con las diferentes instituciones y órganos regulatorios en la creación de un marco amplio y flexible que favorezca el desarrollo de ciudades inteligentes.

Estamos además jugando un papel consultivo, aconsejando a las ciudades y siempre situándonos en la piel de los ciudadanos. El desarrollo de ciudades inteligentes va a requerir un fuerte despliegue de infraestructura alternativa y este tiene que planearse con acierto para evitar...
la contaminación visual que pueden llegar a generar el gran número de nuevas antenas que será necesario. Ni las autoridades locales ni los ciudadanos quieren que los centros urbanos se llenen de antenas y a veces la regulación frena o ralentiza su necesario despliegue, por lo que el desbloqueo de esta situación es uno de los principales interrogantes que debemos resolver. Muchas ciudades todavía no comprenden las implicaciones y el impacto del 5G y queremos apoyarles en la transición hacia nuevas tecnologías. Para ello estamos realizando talleres e iniciativas que eduquen a los oficiales de las ciudades. Creemos que los proveedores de infraestructura tenemos que mantener una postura neutral y objetiva para crear las mejores soluciones y jugar así un papel clave en la densificación que requiere la llegada de 5G y el consecuente despliegue de small cells.

TowerXchange: ¿Podrías compartir algunos ejemplos de iniciativas de ciudades inteligentes desarrollados en Estados Unidos y que podrían ser exportados a Latinoamérica?

Leticia Latino, CEO, Neptuno USA: Por relevancia y proximidad, nosotros estamos muy centrados en Florida. De hecho, a inicios de marzo, el South Florida Business Journal nombró a Miami como la ciudad líder en iniciativas SmartCity en la Florida, lo cual nos alegra mucho ya que somos una empresa basada en esta región. Orlando y más específicamente la Ciudad de Lake Nona, son ciudades que están a la vanguardia en el desarrollo de iniciativas inteligentes.

Filadelfia también acaba de anunciar la creación de un plan específico para el desarrollo y adopción de estas iniciativas, lo que constituye un buen ejemplo de cómo se debe realizar esta implementación pues ya han establecido aspectos clave de la planificación y objetivos del proyecto.

Smart city es un término muy amplio. Nosotros siempre los utilizamos para referirnos al desarrollo tecnológico, pero tienen numerosos ámbitos. Volviendo al caso de Miami, gran parte de las iniciativas actuales se centran en mecanismos inteligentes para controlar el aumento del nivel de la marea. La ciudad está instalando sensores y herramientas de medición para controlar las fluctuaciones en las mareas, lo que también puede considerarse como una iniciativa de ciudad inteligente. Cada ciudad comienza por abrazar el aspecto de Smart city que mejor se adapta a sus necesidades inmediatas.

TowerXchange: ¿Dónde se están desplegando postes inteligentes en CALA y qué añadidos ofrecen? ¿Cómo están reaccionando los municipios a estas innovaciones?

Leticia Latino, CEO, Neptuno USA: Sé que por el impacto de los huracanes se están discutiendo varias iniciativas para la instalación de smart poles en Puerto Rico. En México, las municipalidades también tienen mucho interés, pero salvo caso muy puntuales no se ha dado el salto definitivo y no se han implementado muchas soluciones de este tipo. Una de las principales barreras es que los
operadores todavía no saben cómo monetizar el costo que genera el despliegue de soluciones y postes inteligentes y aquí los proveedores neutrales de infraestructura deben aparecer en escena para ofrecer soluciones a los operadores, pues compartir el acceso a estos nuevos formatos de infraestructura será fundamental.

TowerXchange: ¿Cuáles son los requisitos energéticos de estos postes? ¿Hay un interés por parte de tus clientes en integrar soluciones renovables para suministrar electricidad en estas soluciones?

Leticia Latino, CEO, Neptuno USA: En los smart tech poles, los requerimientos energéticos vienen dados por el equipo que le vas a poner al poste, de la misma forma que en las torres tradicionales. Nuestros postes inteligentes ofrecen la posibilidad de instalar un pequeño panel solar en la estructura, pero no sería suficiente para dar energía a los tres operadores, aunque sí cubriría las necesidades energéticas de al menos uno.

Estas soluciones inteligentes también necesitan sistemas de refuerzo y tanto nosotros como el resto de empresas del sector están considerando la implementación de estos sistemas de refuerzo y emergencia.

TowerXchange: La industria ha experimentado una gran evolución en la región en los últimos años y los torreros están convirtiéndose en proveedores de infraestructura más completos, incluyendo fibra y gestión energética en su oferta. ¿Cómo afecta este cambio a vuestro enfoque y qué clase de innovaciones estáis desarrollando para adaptaros a estos cambios?

Leticia Latino, CEO, Neptuno USA: Los derechos de propiedad y uso de los postes de luz del mobiliario y espacios públicos de cada país son factores muy importantes para el desarrollo de todas estas iniciativas. La situación ideal se da cuando el uso de estos espacios públicos no está regulado, pues en ese caso podemos ser innovadores y ofrecer diseños que se alejen de las torres macro tradicionales y reducen la contaminación visual.

Una de nuestras principales prioridades es diseñar infraestructura inteligente que se integre visualmente en el espacio urbano, reduciendo la contaminación visual. Las empresas quieren integrar alternativas que permitan ocultar las antenas y estamos trabajando en esa línea. Los torreros y todas las empresas que queremos participar en este movimiento de ciudades inteligentes tenemos que encontrar y ofrecer soluciones que se integren en el estilo de vida y la arquitectura de las distintas ciudades.

También estamos viendo a muchos torreros ofreciendo espacios en edge data centres—in lugar de alquilar espacio en la torre, ofrecen espacios en esos pequeños centros de datos integrados en espacios urbanos apuntando al hecho de que para que SmartCities se convierta en una realidad, habrá una gran cantidad de equipo que tendrá que ser instalado en lo que se define como espacios edge.
How NEXSYS-ONE is driving operational excellence for telecom infrastructure owners

From Project Management to IFRS 16 lease Management to drone survey technology, NEXSYS-ONE’s flexible software solutions create seamless processes to enhance the operating performance of tower companies and mobile operators.

Most of the NEXSYS-ONE organization has a background in telecoms infrastructure, a fact which has given them unique insight into the operational and administrative challenges infrastructure owners face today, whether that’s complying with international standards or simply coordinating field techs to resolve cell site problems. They’ve built a solution which is designed to work with existing platforms and technologies to deliver maximum efficiency as well as removing complexity from the lives of PMOs, C levels and field teams. We spoke to David Gater, Global Head of Business Development at NEXSYS-ONE, to find out how the solution has evolved and how it’s working for the telecoms industry today.

Keywords: 5G readiness, Asia, Asset Lifecycle Platform, Asset Register, Co-locations, Europe, Europe insights, Health and Safety, Insights, Leasing and Permitting, Logistics and warehousing, MENA, Middle East, NEXSYS-ONE, Project Management solutions, RMS, Site auditing, Site quality Management, Software Solutions, USA, Work Force Management

TowerXchange: Please introduce NEXSYS-ONE, your history and footprint.

David Gater, Global Head of Business Development, NEXSYS-ONE: NEXSYS-ONE was initially an internally developed platform for a global systems integrator deploying and operating 350 network technologies across 40 countries since 2001. Today we operate globally and serve multiple channels through towercos, tier one operators, and systems integrators from our HQ in Dubai with presence and subsidiaries in key strategic locations: Myanmar, United Kingdom, The Philippines, USA, Germany, Australia and Iraq.

NEXSYS-ONE is a proven software platform differentiator that enables the rapid deployment and maintenance of mobile network infrastructure across the globe. The product is a cloud native, configurable “off-the-shelf” platform incorporating industry best practice and functionality enabling support for multiple technologies and applications across a wide variety of uses. We capture the network requirements around quality assurance, project management, tower sharing, IFRS compliant lease management, work force management, procurement and supply chain processing, warehouse and asset management, health and safety, access and RMS solutions, fibre/TRS/RF tracking and risk management.

TowerXchange: You offer several modules, spanning different functions within telecom infrastructure owners’ businesses, can you talk to us about the models, how they work and typically what your customer uptakes are like?

Read this article to learn:
- Who NEXSYS-ONE are and their global footprint
- How NEXSYS-ONE observes the difference between the key markets in which it operates
- The measurable ROI NEXSYS-ONE can deliver and use cases from the field
- How NEXSYS-ONE can help drive 5G rollout
David Gater, Global Head of Business Development, NEXSYS-ONE: For the complete 360 operational requirements for building and maintaining todays network infrastructure we offer these modules based on innovative scalable software solutions improving efficiencies and performance whilst eliminating unwanted costs due to lack of visibility or operational process failures. If you use one or all modules they can be tailored to ensure processes throughout the organization and through the platform are interconnected and seamless enabling transparency of synchronisation and synergies across the organisation through enhanced visibility.

Due to our unique history and telecom experience we have open dialog with our clients speaking directly the same language, understanding the underlying issues and being able to tailor our solutions to meet their individual needs and solve complex problems. Our best sellers are by far TOWER-ONE closely followed by TASK-ONE where

Source data: Statistics were obtained by Lemcon Networks, a Telecom global systems integrator under Lemminkainen Finland who used Nexsysone for 10 years from 2001 to 2013

Value propositions

350,000 cell sites deployed using NEXSYS-ONE / LNT

Used in 40 countries across all continents

Serving the Telecos industry since 2001

COST SAVINGS
- Less extra site visits 39%
- Payment performance 40%
- Process efficiencies 56%

OPERATIONAL
- ORG
- Effective organization levels to deliver rollout peaks and troughs within a structured team when using NEXSYS-ONE to control the rollout.

IMPLEMENTATION LEAD-TIME
- 35d
- Reduction of the implementation lead time to deploy the cell site from site acquisition to final operational acceptance.

ASSET HANDLING PERFORMANCE
- Less lost assets 20%
- Less HW defects 15%
- Asset visibility improvements 45%
- Using ASSET-ONE to Management and control project assets and logistics management processing.

SITE WORKS PERFORMANCE
- 78%
- 78% increase in performance of first time visits completing all tasks compared to previous time using excel to track work tasks

REDUCED STAFF CHURN
- 81%
- 81% less staff churn within a company or Project when proper efficient tools are used to deliver the organizations services.

TENANT RATIO IMPROVEMENT
- 45%
- Tenant ratio increase using TOWER-ONE when allowing access via the web portal to multiple potential tenant clients

STAFF-ONE
- 30%
- Competence development performance with STAFF-ONE usage to advance skill sets across the organization. % indicates the increase in new trainings
our customers immediately benefit from our off the shelf functionality.

The key modules of NEXSYSONE consist of:

**TOWER-ONE** Tower-one offers customers a tower sharing solution to centralize all site information into one platform whilst enabling unique techniques to obtain additional tenants per site. The TOWER-ONE project management solution tracks and reports any project to completion. This module is the most used module of NEXSYS-ONE for tower companies and mobile operators.

**TASK-ONE** is our award winning comprehensive task management solution that coordinates deployment and maintenance field activities. It features a reliable and accurate interface that processes organization or supplier task work flows processes to completion.

**ASSET-ONE** tracks assets across all warehouses, vehicles and cell sites by bringing together operations to manage inventory, repairs, spares management and reporting. It makes asset information available to all involved personnel in the network, engineering, logistics, finance and planning.

**FIBER-ONE** with FIBER-ONE you’ll have the visual interface to help you understand and manage your entire Fiber optic network deployment. FIBER-ONE delivers information in a seamless, map-based data format and provides an array of software solutions to help deploy and maintain your fiber network. FIBER-ONE makes it easy to enter, update and understand the connectivity of your network. You’ll be able to quickly establish and insert connections within splice enclosures, patch panels, optical network devices and passive optic network splitters used in the fiber network.

**SITE-ONE** enables IoT sensor monitoring of the cell sites to measure and monitor energy usage and fuel consumption, track access and potential theft of cell site equipment. The uniqueness of the NEXSYS-ONE RMS solution is that its connected also with a satellite backhaul for emergencies when the cell networks fail.

**SAFETY-ONE** provides customers with the visibility and oversight required to effectively implement their health and safety management systems by driving the ownership and accountability needed to ensure compliance with legislative and corporate responsibilities.

Each module fits a purpose to ensure processes throughout the organization are seamless. Modules are interconnected to push and receive information to synergise departments. Our customers typically
enjoy the visibility and transparency our modules offer. Customers also prefer our scalable solutions to meet their exact requirements.

TowerXchange: Tell us about how your solutions work in different markets. What kind of pressures do you see MENA tower owners coming under and how does that differ from elsewhere in the world?

David Gater, Global Head of Business Development, NEXSYS-ONE: Our global experience indicates the majority of tower owners will face the same key challenges in the near future where infrastructure needs to be strengthened and future proofed ahead of 5G combined with some requirement for acceleration of co-location and an industry need to reduce OPEX. Some MENA countries have infrastructure, security and access challenges but, the same fundamental pressures remain around the push for colocation, minimizing site costs, increasing tenant ratios, providing adequate tower services and processing to completion lease contracts with landlords or tenants. Our out of the box solutions meet the many local pressures and requirements for customized features, The IFRS 16 compliant lease Management solution we offer is proving a very popular pressure point eradicator with our clients.

TowerXchange: Talk to us about the benefits of your platform. As well as delivering higher standards in software to support tower management, is there a measurable ROI which comes from your solutions?

David Gater, Global Head of Business Development, NEXSYS-ONE: I mentioned earlier that our offering is a cloud based, configurable off-the-shelf platform, enabling multiple technologies and applications across a very wide variety of uses which resonates with our customers, this proven software platform combined with unrivalled industry expertise provides as a differentiator to most deployment and maintenance organizations where the most notable benefits can be noted as: 39% less site visits, 40% improvement in payment lead time, 45% tenant radio improvements, 56% process efficiencies, 78% improvement of implementation quality, 20% reduction in lost assets, 15% reduction in hardware defects and a staggering 35-day turnkey implementation lead time improvement. In 2017 the NEXSYS-ONE module Task-One was awarded as best task management and ticketing system of UAE.

TowerXchange: Can you give any use cases of where your solutions have been implemented and how they have helped your customers with
key decision making or meeting critical business objectives?

David Gater, Global Head of Business Development, NEXSYS-ONE: The financial burdens on a company who operate without detailed visibility into their operational performance can be substantial. In the US, a turf vendor customer required immediate transparency across its operations for a major Tier-one operator with complex deployment processes. With our web service API capabilities, we synchronized their internal financial systems with the operators supply chain platform and deployment management system. NEXSYS-ONE bridged the gap between the systems whilst empowering additional control with advanced features to enable visibility and transparency throughout their organization. Our customer could see immediately in which areas needed focus so we worked together and found areas of improvement where they were failing or losing money and implemented tailored solutions to improve their operations or renegotiate their contract terms when clearly, they were not in their favour.

TowerXchange: Infrastructure will have to change significantly to meet the needs of 5G rollout. Can you talk to us about how NeXsysOne can support the changing shape of infrastructure, and any new solutions you’re working on to develop this?

David Gater, Global Head of Business Development, NEXSYS-ONE: We’ve been around in the telecoms sector since the beginning. We’ve gone through the technology life cycles before and we’re truly excited to welcome 5G. The networks will indeed change substantially and so will the user experiences. 5G requires a huge back haul capacity upgrade that by no means should be underestimated. Coordinating such an upgrade requires proven software solutions as FIBER-ONE. Mobile operators have already embraced the challenge and FIBER-ONE is in big demand. Cell site capacity upgrades and configuration change management requires proven work force management systems, that are tailored around Telecom implementation processes. Between TOWER-ONE, ASSET-ONE and TASK-ONE, every aspect to upgrade networks to 5G is covered.

The industry cannot underestimate the volume of work required to upgrade networks through 5G and beyond. The evolution of the systems used in most cases to support the deployment and maintenance of required infrastructure are no longer fit for purpose. Operators, systems integrators, OEMs and towercos will need to make bold decisions and implement new “user” friendly project management solutions with advanced features that seamlessly process the required complexity.

Our journey as a company has and is enabling and guiding many organisations to consistently and continually implement, maintain and upgrade tens of thousands of network infrastructure through the 2G > 3G > 4G technology evolutions. NEXSYS-ONE delivers on the tough questions being asked from tomorrows networks, whilst preserving the old with increased efficiency. We welcome the challenges the future brings and would encourage interested organisations to get in touch so we can enable effective management of this complexity for them.
Creating a safe and efficient tower ecosystem through access control innovation

Sera4 on the evolution of its cutting edge products and key market trends

Five years ago, Sera4 was a pioneer in offering keyless access control to MNOs and towercos in Mexico. The company has now expanded its footprint across many countries in CALA as well as globally, and is driving efficiencies among towercos, their clients and vendors thanks to its integrated control access system. Sera4 provides a cloud-based Network Operations Center (NOC), electronic controllers and smartphone apps that enable secure onsite access.

TowerXchange caught up with Sera4’s CEO David Coode to hear about the company’s expansion and how their solutions are reducing losses and disruption while helping towercos and MNOs in achieving efficiencies.

Keywords: Access Control, Americas Insights, American Tower, Capex, Managed Services, Mexico, Monitoring and Management, Opex Reduction, Sera4, Site Management System, South America

Read this article to learn:

- The evolution of Sera4 products and value proposition
- The top security challenges that towercos and MNOs face in CALA and globally
- How security and access control can drive efficiency across telecoms infrastructure

TowerXchange: Please re-introduce Sera4 for any readers not already familiar with your vision and achievements.

David Coode, CEO, Sera4: Sera4 is a keyless access control company committed to protecting critical infrastructure while making life easier for everyone involved. Five years ago, Sera4’s engineering team came directly from Blackberry, the pioneers of mass-market wireless security. It was only natural that usability, universality and security are all core design principles we carried forward from our experience. We started out serving the telecom market in Mexico and spread throughout Latin America, and now we have a global focus with our business. We have a vision to use technology to bring great value and great experiences to our customers.

TowerXchange: Two years ago, we sat down with you to discuss your plans and activities across CALA. How has Sera4’s footprint evolved and what success stories you can share?

David Coode, CEO, Sera4: Two years ago, we were only establishing ourselves within Mexico. Since then, we have introduced a padlock to our product line. This padlock was specifically designed for the telecom industry and to serve critical infrastructure usually exposed to tough weather conditions and often forgotten for months at a time, and it was selected by American Tower for their sites in Latin America.

We have also launched our next generation of lock controller, the MX5. We have some very
important updates in our servers, which not only enable scaling and reliability, but many new features as well. Additionally, we have expanded into four continents and some adjacent segments such as TV broadcast and transportation network infrastructure.

Our team has also grown significantly over the last four years. We have added some great technical and business talents, and have some scale to extend top quality support to all of our customers. Our ecosystem of partners has established and is really growing well. It is perhaps this ecosystem that helps to create the most value compared to who we were two years ago as it enables new models, such as Access Control as a Service (ACaaS), which is a very easy way for customers to get started with keyless access control.

**TowerXchange: What are some of the main challenges and inefficiencies when it comes to controlling sites access? How are you helping to address those challenges?**

**David Coode, CEO, Sera4:** We’ve discovered over 50 different challenges when it comes to more traditional forms of access control. Each of these are opportunities for optimisation and value creation. The most important challenge is anonymity, when someone knows they are not identified going into a sensitive area, they are much more likely to steal. This has been clearly proven: we have shown vandalism and theft have fallen dramatically each time we install. The other main challenge is around the management of physical keys: getting the right key to the right person at the right time, the risks posed when a key is lost, and the lost time when someone forgets their key. We have seen that no one in 2019 forgets their phone!

Our core technology of keyless access control provides operators and towercos with a way to get efficiency without trading off security. We help customers to adopt this technology by bringing in ecosystem partners as needed to complete solutions and provide a great customer experience during implementation and over the long run.

**TowerXchange: What differentiates your offer and solutions from your competitors and what is unique about your value proposition?**

**David Coode, CEO, Sera4:** We were the first in the market with keyless access control that covered the needs of both towercos with perimeter access and MNOs with cabinet and shelter access. We have the most experience on the market in delivering a solution across all phones that simply works when it needs to. This point is really important, as we promise operational efficiency to our customers so we make sure that it works reliably and without any need for end-user training. Earlier, we took this point for granted, but we are seeing how it is not the case with some other access control solutions.

We are also all about customer experience—it’s deeply ingrained in our company’s DNA. We support them zealously, and when they have special requests we are often able to accommodate them quickly in a way that large companies just cannot match. Sometimes those special requests are for features or customisations, and other times it is in the structure of a business deal. I am personally responsible of maintaining Sera4’s commitment to a great customer experience as we grow.

Though it may seem counter-intuitive, we are somewhat unique in our choice to be great in something as specific as access control. We see many companies in access control spread into
asset tracking, job ticketing or other adjacent value streams. These moves might make sense on paper but we don’t want to compete with experienced firms in adjacent segments while also spreading ourselves too thin.

**TowerXchange:** How are security and efficiency related and how are Sera4’s solutions helping MNOs and towercos to optimise their assets?

**David Coode, CEO, Sera4:** Although we use the word “security” when we talk about reduction of theft, it’s really important to note that security is not the issue: it is identification. No one wants to be identified as the last person on a site before the batteries are discovered to be missing. This psychological deterrent is very effective. But, still, there are those who are brazen and try to steal anyway. I remember meeting with a customer who was bragging about all the thieves that our solutions help them to catch and how many of them are now in prison. Thieves in prison is someone else’s mission, but in every configuration we’ve implemented we see the elimination of the majority of losses and disruptions due to site vandalism.

I think it is easy to imagine how eliminating a physical artefact like a key to open a lock can lead to natural efficiencies. I am consistently surprised when I learn about the real inefficiencies in the field and with the staff involved in key and access log management. Our customers often save more money in efficiency improvements as they do in theft recovery. As I mentioned earlier, this efficiency effect is magnified when both a towerco and an MNO on a site share the same system because the coordination between organisations is often very inefficient. Usually that benefit is most felt by the towerco because the MNO doesn’t feel the pain of how they ask for access in a secure environment, and now it can be fully and securely automated. It’s easy to see how real-time access data can feed business intelligence systems and show how to take the efficiencies to an even greater level.

With reduced losses and greater efficiencies, we can work with our customers on financial models that can save them money as soon as they deploy a Sera4 access control system. Then, with fewer losses, our customers can plan for lower capex budgets while efficiencies lead to lower opex budgets at the same time. Ultimately, this leads to greater asset efficiency for our customers.

**TowerXchange:** With so many different parties operating several elements of the sites, how important is communication across this complex ecosystem and how is your solution driving a dialogue among tower companies, operators and their partners?

**David Coode, CEO, Sera4:** We believe that understanding the players in an ecosystem is critical to delivering a solution that works flawlessly and is feasible to install and service. Communication is critical so that our solutions behave as we expect when installed at customer sites. Of course, this is only possible with a dedicated focus on a market such as Sera4 is focused on telecom. We are in a position to drive the discussion amongst the ecosystem because we have a solution that delivers high value to our customers, while at the same time it is a narrow piece of many RFQs and we partner well with others.

We have seen the value that is created for our customers when the towerco as well as the MNOs are using Sera4 on a given site. When we participate well in the ecosystem, we envision not only gates and cabinets, but gensets, fuel containers, fibre-optic nodes, battery shelters and anti-climbs all controlled easily and without friction from the one phone – something we all carry with us anyway.
Embracing complexity: how Sitetracker is helping infrastructure owners level up their assets

Sitetracker’s platform can help MNOs and towercos in the race to 5G

Working with high profile clients like Verizon, Nokia, Cox Communications and Alphabet is testament to Sitetracker’s results and usability. Now more than ever, telecom infrastructure owners need to understand and manage their assets to plan, deploy, maintain and grow the value of their portfolios. As the number of points of presence globally proliferates at a huge rate, the processes of construction, colocation and maintenance become increasingly complex. We spoke with Sitetracker CEO Giuseppe Incitti, to find out more about how their solutions can help infrastructure owners manage complexity and position themselves for 5G success.

Keywords: 5G, Alphabet, Asset Lifecycle Platform, Asset Register, Co-locations, DAS, Energy Efficiency, Europe, Fibre, Monitoring & Management, Nokia, Operational Excellence, Site Level Profitability, Site Management System, Site Surveys, Site Visits, Sitetracker, Small Cells, Smart Cities, Verizon, Wi-Fi

Read this article to learn:
- Who Sitetracker are and what they have delivered to date
- Why having control and insight into assets is critical for MNOs carving out towers
- What tower owners need to consider when preparing for 5G rollout
- Which smart city solutions Sitetracker has got up and running

TowerXchange: Please introduce Sitetracker, your company, and footprint.

Giuseppe Incitti, CEO, Sitetracker: Our mission is to power the successful deployment of critical infrastructure. As the global standard for managing high-volume projects, the Sitetracker Platform enables growth-focused innovators to optimize the entire asset lifecycle. From the field to the C-suite, our software enables people to perfect how they plan, deploy, maintain and grow their capital asset portfolios. Our customers are market leaders in the telecommunications, utility, smart cities and alternative energy industries, including Verizon, Nokia, Cox Communications, Alphabet, and Tillman Infrastructure. They rely on us to manage millions of assets and projects representing over $19 billion of portfolio holdings globally.

TowerXchange: Tell us about your solutions – can you give any examples of what you’ve delivered in telecoms to date?

Giuseppe Incitti, CEO, Sitetracker: We work with companies across the telecommunication industry, including fibre, engineering, small cell, DAS, and tower companies. Some of our telecommunications customers include Verizon, Cox Communications, ISCO International, and Tillman Infrastructure. Our tower customers, for example, use Sitetracker to manage assets, leasing, co-location, site acquisition, maintenance, and more. So, we’re working with leaders in tower construction, site and tower asset maintenance, and site acquisition who have embraced change and are ready to succeed at this inflection point in the telecommunications industry.
TowerXchange: Sitetracker works across many verticals within critical infrastructure. Can you tell us about some of the similarities and differences between telecommunications and other verticals you work in? What does it tell us about the telecoms market?

Giuseppe Incitti, CEO, Sitetracker: We work with other industries, including utilities and smart city companies, which, similar to the telecommunications industry, have very unique challenges that lay ahead. Utilities are looking at issues like load growth and integrating renewable and distributed resources into the grid. These challenges will result in increased project complexity for the utility industry, so that’s definitely a parallel between telecom and utilities, but that’s not the whole story.

Telecom companies are facing an unparalleled shift in the types of projects needed and how those projects need to be executed. 5G and network densification are completely new challenges that change the dynamic of the industry. At this critical juncture, it’s imperative that industry telecom leaders embrace change. The race to 5G is a uniquely telecom-related challenge.

Explosive growth in mobile data traffic means companies must make an important choice about their operations. The telecom industry is at an inflection point. As our communities become more connected, the volume, velocity, and variety of telecom-related infrastructure projects are exponentially increasing. Leaders in the industry are adopting purpose-built software to effectively plan, deploy, maintain, and grow the value of their asset portfolios. In order to keep up with the rate of innovation and increasing connectivity, successful companies are improving their operations with technology built for the management of site-based, repeatable projects like new tower construction, co-location, and tower maintenance.

These projects still require roughly the same end-to-end process for planning, deploying, and maintaining assets, including site identification, acquisition, regulatory approvals, design, construction, testing, validation, and more. But, instead of being vertically integrated, mobile network operators are increasingly relying on third-party service providers, who may, in turn, contract-out work to specialists for different project phases. More parties working on a higher project volume means higher complexity, making effective collaboration more crucial than ever before.

Throughout the industry, inadequate technology fails to offer live interaction between project managers and field workers, lacks the agility to handle the increasing variety of projects, and scatters mission-critical information across disconnected systems. We’re seeing this across a lot of other industries, too.

TowerXchange: With so many towers in Europe changing hands or being carved out at the moment, where can Sitetracker add value for tower owners?

Giuseppe Incitti, CEO, Sitetracker: There are over 600,000 towers in the Europe right now and, increasingly carriers are selling their towers to independent tower companies. This provides many benefits to carriers, but it does increase complexity by increasing the number of parties involved in co-location and leasing. Carriers must now work more with tower companies. If we had to sum this all up, we’d say that the industry is facing the greatest level of complexity it has ever seen and we believe the only way to navigate the complexity is through finding operational improvements on your way to operational excellence. That’s where we add value.

TowerXchange: Tower owners are starting to evaluate their macro assets ahead of the load and support changes which will come into play as 5G rolls out – can you give us examples of some of the things tower owners will need to bear in mind, and how that information can best be used?

Giuseppe Incitti, CEO, Sitetracker: As 5G begins to roll out, tower owners will need to maintain and optimize their towers. Tower owners will need to embrace the changing telecommunications landscape and ensure that the pillars of telecommunication, towers, are in the best shape possible to support 5G. This means rigorous maintenance and upkeep, as well as coming up with new ways to make the most of existing towers.

The second thing I would say tower owners need to think about is how co-location will take place in the future. Some carriers are starting to work together
on new builds, investing in the same, shared infrastructure. This means that tower companies could have multiple stakeholders from the outset of a new tower build. Managing complexity like this requires tower companies to embrace new planning and deployment technology in order to adapt to this new era.

TowerXchange: As well as telecoms, you also have a Smart City solution – can you talk to us about the scope of that offering? Do you find it is converging with your telecoms offering as tower companies and Mobile Network Operators begin to move into this vertical?

Giuseppe Incitti, CEO, Sitetracker: So, one example I’ll give is LinkNYC. The City of New York partnered with Intersection to create LinkNYC, a pioneering smart cities program to convert over 7,500 public payphones to kiosks and create the largest and fastest free wifi network in the world. This project lives at the convergence of telecommunications and smart cities. Beyond the challenge of creating an all-new, purpose-built fiber optic network, each kiosk deployment requires approximately 450 tasks, spread across 15 teams, from start to finish. Not only was Intersection deploying kiosks in New York City, but they also took on this project in the UK through their LinkUK program.

In New York, they were able to simultaneously manage over 4,000 kiosk builds effectively in phase one of the project, including coordination across 15 teams and the city government, shorten time to revenue for a $500 million opportunity in digital advertising over 12 years, efficiently forecast project completions, and share deployment progress with all stakeholders through dynamic maps.

Intersection recognized that they were embarking on a new, innovative kind of program and needed a correspondingly innovative way to manage it. Sitetracker enabled the entire LinkNYC team — from Intersection’s project managers and executives to vendors’ field workers and city representatives — to instantly see the status of all of their projects through easy-to-use reports, dashboards, and dynamic maps. Sitetracker keeps the public informed, too: a map of Link locations on LinkNYC’s website, showing in real time which kiosks are online and coming soon, is a standard Sitetracker feature.

In addition to this kind of tracking, the LinkNYC team is able to understand the maintenance status of all of their assets and keep a schedule of maintenance projects, ensuring that kiosks kept in working order. The Sitetracker Platform also enables Intersection to perform work management for each of these projects, ensuring that the right people with the right skills are in the right place at the right time.

We see Sitetracker as a solution for companies looking to embrace change, whether that means new types of projects at the intersection of telecom and smart cities or a new way of managing projects to scale with demand.
Scalable solutions for a converging infrastructure landscape

STULZ is building on a strong pedigree in cooling to offer shelter and edge solutions to evolving customers

As tower owners face increasing pressures to improve efficiency in their passive infrastructure and prepare for 5G rollout across their networks, STULZ have leveraged their 40 year history in providing cooling solutions for MNOs, towercos, datacentre providers and other infrastructure owners to offer modular, scalable solutions which meet modern infrastructure needs. TowerXchange caught up with Johann Mater, Global Key Account Manager at STULZ, to find out more about how STULZ has seen the market developing and how their new solution will help infrastructure owners avoid costly mistakes.

Keywords: 5G, Air Conditioning, Energy Efficiency, Europe, IoT, Operational Excellence, Outdoor Equipment, Passive Equipment, Rectifiers, STULZ, Site Visits

Read this article to learn:
- STULZ’s history and credentials in the market
- The dynamics in mature markets driving tower owners to upgrade their passive infrastructure
- The importance of TCO and tangible savings which can be made in efficient cooling solutions
- How STULZ’s modular shelter and edge datacentre solutions can help avoid costly missteps
the conversations we had were about CAPEX, we were always finding the most effective solutions and training our partners and consultants to look at the TCO but procurement teams were only paying attention to CAPEX. They didn’t pay the electricity bills so they had no awareness or personal interest in going for the most efficient units. Over the past couple of years this attitude has changed a lot, the hyperscalers and big datacentres are using so much power that we’re talking about a cost difference of six figures in some cases, so it’s playing a much bigger role. Europe still has cooling with a raised floor but new ideas are coming from datacentres and we will see this change soon.

TowerXchange: We find European tower owners are starting to pay much closer attention to squeezing operational cost savings/efficiency out of their networks. Tell us how STULZ can deliver measurable results to mature tower portfolios?

Johann Mater, Global Key Account Manager, STULZ: We’ve worked with European MNOs for many years. Eight years ago we set up a joint development with an MNO partner to help them become the most efficient telecom operator in terms of towers. We provided specialised equipment for shelters with integrated free cooling to cope with efficiency requirements in non-urban areas. Through this joint dev we were able to save up to 95% of energy costs per container by using a unit paid off within half a year. Joint dev allows us to dev what companies really need.

TowerXchange: The European market has changed rapidly over the last five years and 2019 is set to evolve further. Do you see a distinct difference in the way MNOs, towercos and other infrastructure providers approach the way their portfolios are managed?

Johann Mater, Global Key Account Manager, STULZ: They have always been quite focussed on energy, the awareness was always there, but it’s increased recently. I actually don’t see a big difference, I see that people are more looking at serviceability and service capabilities, and specialised service is playing a big role as well.

TowerXchange: As 5G rolls out we’re going to see new equipment placed on towers and much higher demands placed on the network. How ready do you think European tower infrastructure is, and what advice would you give to tower owners wanting to prepare their networks?

Johann Mater, Global Key Account Manager, STULZ: The challenge with 5G is that there are no fixed parameters and definitions yet. I would really like to see what the speakers say about it at Meetup Europe. Nevertheless, 5G is a great opportunity for us: it’s the start of IoT, connected vehicles etcetera, and we are looking forward to creating a future with 5G companies and helping them find the right solutions. With our True Edge system we are perfectly prepared for the requirements of providers and towercos that are specialized on 5G and Edge development. The STULZ portfolio offers everything from cooling on a component level up to turnkey solutions. At the moment, we are just waiting for our customers to give us the go-ahead so that we can start planning and realizing their projects.

When it comes to the demands of 5G, everything is going to change: densities in shelters will increase, telecoms equipment has new requirements, cooling equipment will need to change. Particularly looking at the energy efficiency trend and evolution of cooling equipment over the last few years – if it’s over five years old it might be worth considering new technology. It might even make sense to think about a holistic conversion towards a turnkey solution. STULZ can help with their tools to identify the TCO and ROI of these new systems.

TowerXchange: We’re seeing a shift towards infill and convergence between communications infrastructure networks, particularly in urban areas. How has this affected your offering and what can clients expect from you in future?

Johann Mater, Global Key Account Manager, STULZ: Our portfolios starts with cooling solutions from 500W to 2MW, so we can offer anything from watts to kilowatts to megawatts. The full range is there and can be implemented into our turnkey solutions. When it comes to infill and convergence, we have edge solutions so we can go from one solution with fire suppression, UPS backup and cooling up to a full datacentre made of modules. Scalability is important as customers want to start small and pay as you grow. Scalability is a given. We have been working on this solution for the last three years and 2019 is the year when we will bring the whole solution to market. Despite the fast pace of the 5G market, our “True Edge” solutions are scalable and modular, so they are designed to meet the needs of our customers in an ideal way - for every conceivable scenario. By combining the customer’s expectation with our expertise, we will be able to customize our solutions to make it fit for their environment – turnkey means you can scale what you like instead of re-inventing the wheel each time ■
TSS: Reliable solar solutions tailored to each client’s needs

TSS have installed over 1,100 sites and have 15 years’ experience in low-maintenance solar solutions

TowerXchange: Please introduce your company – where do you fit in the telecoms infrastructure ecosystem?

Erik Blokhuis, Sales & Marketing Manager Telecom, TSS: We were founded in 2003 by ex-Shell Solar engineers, people who had been working in solar since the early 90’s. So the calibre of expertise here has been high from the very beginning. We don’t just focus on the solar panels alone but are pushing the envelope technically, rather in the commercial applications of solar technology as a primary energy source. We create highly reliable solar and hybrid systems, take full system responsibility in delivering a functional and reliable solar system in a project, from design, engineering delivery and commissioning. All in collaboration with our client, and always tailored to the site’s requirements.

TowerXchange: Please tell us about the performance of your solution in the field – who is using it and what results have been achieved? What is your installed base at cell sites worldwide?

Erik Blokhuis, Sales & Marketing Manager Telecom, TSS: Over the last 15 years we have installed over 1,100 sites across Africa, Southeast Asia, the Middle East and Europe. Most of the work we do is to provide reliable power for remote telecoms units. And to be clear, we’re a solar energy driven company, we believe in renewable energy technology and its benefits and it is at the core of what we do. Lots of the time these have been within the oil and gas sector where reliability is paramount for mission critical and remote applications.

Keywords: Batteries, Capex, Energy, Energy Storage, Hybrid Power, KPIs, Masts & Towers, NOC, Off-Grid, Opex Reduction, Renewables, Solar, TSS, Unreliable Grid, Who’s Who

Read this article to learn:

- The experience of TSS’s management team and field technicians
- How passive cooled solar can reduce both capex and opex
- Options for tailoring a solar solution to your needs
- How the in-house TSS charge controller keeps their system reliable
- How the TCO of solar systems changes as power demand increases
We want to minimise points of failure and guarantee the uptime our clients expect. We ensure long battery lives and minimum service intervals by doing a proper system sizing, using fewer components, and less complex designs. This reduces the points of failure. Fewer components mean less capex, and fewer points of failure means lower maintenance opex. This is what gives us our high reliability and a better total cost of ownership (TCO).

As we are an engineering and system integration company, specific client requirements can also be taken into account.

I can provide a few examples. In Algeria, we installed a number of off-grid solar systems last year with custom designed three meter high solar module support structures to mitigate the existing theft risks in that area. We recently also got awarded another project in Algeria for 45 off-grid solar energy systems. Those systems will be installed on 15 meter high monopoles, also as an anti-theft solution.

For a VSAT service provider in Indonesia last summer we installed and commissioned a 500W stand-alone solar energy system with 96 hours (four days) of battery autonomy and a simple network management protocol (SNMP) uplink to their network operations centre (NOC). This helped demonstrate the reliability of solar and battery back-up versus using diesel gensets to the local authorities involved in the project.

TowerXchange: You engage with customers from design and project management to training, remote monitoring and system integration – please talk us through a “typical” collaboration between TSS and a cell site owner.

Erik Blokhuis, Sales & Marketing Manager Telecom, TSS: As an off-grid solar system integrator we take full responsibility for the complete system in a project, but there is no one-size-fits all solution or configuration. We work with the client to establish what they need from their sites in terms of performance, whether they need a pure solar system, or zero-diesel solution as you could call it, or something hybridised and then we get to work. There’s lots of room for optimisation based on the individual site specifics or client’s specific needs.

We recently developed a new solar module support structure, specifically designed to reduce handling and transportation costs and to support local...
manufacturing in Asia or Africa. We don’t see the added value of shipping support structures from Europe to those markets and there is also an increasing preference or regulatory requirement for local content in those markets.

The on-site installation can be either undertaken by the client themselves, their preferred local third-party contractors, or TSS selected local third-party contractors. The installation will be overseen on-site by a TSS field service technician who will be doing the commissioning and hand-over to client.

Remote monitoring and control is paramount to effectively managing remote off-grid telecom installations. TSS have developed a flexible and customisable cloud-based remote monitoring and control application together with one of our IT partners. This solution allows our clients to cost effectively monitor and control the TSS solar hybrid systems 24/7 remotely from any internet connected device. We also enable clients to feed our systems data directly into their own Network Operations Centre software.

TowerXchange: The most frequent complaint about solar power systems TowerXchange hears from towercos and MNOs is that they can be too complex for their current field service partners to effectively maintain. How do you overcome such concerns?

Erik Blokhuis, Sales & Marketing Manager Telecom, TSS: We do provide training, so that maintenance teams in the field can understand our systems, but honestly the maintenance requirement for our solar and hybrid systems are minimal. That’s how we’ve designed it, to keep it simple. Things can be a bit more demanding in terms of maintenance requirements if there’s a diesel generator involved, but if you just have solar panels and storage batteries there should be very little to maintain and very little should go wrong. You would just need to clean the solar modules periodically. It does not get any simpler, really.

Our solar systems are passive cooled energy systems. We have no active cooling systems and fans and no moving parts, so wear and tear is limited and the internal energy consumption is extremely low. Maintenance involves tightening a few battery and support structure screws and employing a cleaning company to keep the solar panels clean and at full capacity. We really wanted to minimise last mile risk. Plus, we also only work with Tier One vendors in the markets in which we operate so local maintenance support is covered.

We see a transition in the telecom market to move from diesel based off-grid energy systems towards “zero diesel solutions.” However, until today the large majority of stand-alone solar power systems installed in the telecoms market apparently do not run trouble-free 24/7 throughout the year. Expected battery lives are not met either, negatively impacting upfront TCO and ROI calculations. As a result, quite a few MNOs and towercos consider solar with batteries unreliable and still prefer diesel gensets as a mandatory back-up despite the associated high maintenance and fuel costs.

However, we would say, and have proven over
time, that a well-designed and correctly sized solar energy system with battery storage can be highly reliable, hardly requiring maintenance and minimising opex, making a good business case for the additional capex.

**TowerXchange: What's the sweet spot for your solutions in terms of grid availability and the load your solutions can support?**

Erik Blokhuis, Sales & Marketing Manager Telecom, TSS: We focus exclusively on off-grid applications and areas with very unreliable grids. But in terms of sweet spot for installed sites, we can run standalone solar and battery combinations to any capacity, the only limiting factor is space.

For example on towers with multiple tenants you increase the energy demand but also minimise the space on the tower on which you can install solar panels. For single tenant towers, with energy demands up to 1kW or 1.5kW continuous, it is very straightforward to deploy the pure solar solution. Alternatively for sites with higher energy demand we can install solar modules on the ground at the site and when there is not enough space the hybrid systems come into play, and secondary energy source can be a diesel generator set, or it could be wind or any other energy source. We are flexible and look at the optimum solution per site.

**TowerXchange: How many hours of sunshine is necessary for your renewable energy solution to start to become a viable option? How is increasing solar cell and battery efficiency affecting that?**

Erik Blokhuis, Sales & Marketing Manager Telecom, TSS: Any site between the two tropics with high solar irradiation is a good site, but we have also installed quite a number of sites in Europe. That might involve using more solar modules, changing the tilt angle for optimal solar yield, but the solution is flexible. Solar module efficiency is improving and that helps us produce more energy on a restricted amount of space.

An example of supporting higher solar efficiencies and lower internal energy usage are the TSS in-house developed charge controllers; they are world leading for use in high temperatures and harsh environments without any de-rating and without forced cooling as offered by other vendors. The increasing efficiency of solar modules have made us
redesign a new version of our TSS charge controller to harvest the maximum solar energy, supporting our client's ROI and TCO targets.

As batteries are the big ticket items in a solar energy systems, we continuously strive to achieve the best battery lifetimes for our clients to guarantee the system performance and to secure their investment. Therefore we continuously test and enhance our TSS battery charging regimes in close cooperation with battery OEM’s like EnerSys and Saft.

**TowerXchange:** What magnitude of fuel and O&M savings can be realised using your solutions, and how does TCO compare with traditional diesel-oriented energy solutions over an eighteen month, three year and five year scenario?

**Erik Blokhuis, Sales & Marketing Manager Telecom, TSS:** With rising fuel prices, environmental concerns and increasing pressure on opex reduction, the business case for solar based energy systems is getting better and better.

To give you an indication, for sites up to 1kW and 1.5kW continuous load, the ROI for a stand-alone solar with batteries system can be as low as one year compared to a 24/7 running diesel generator. Maintenance visits are generally reduced to just once every six months to one year depending the location, and diesel cost is completely eliminated. Above 1.5kW continuous load, the ROI for solar diesel hybrid solutions can be anywhere between two to five years maximum depending on the actual site load, solar irradiation, fuel costs and local logistical conditions and costs. With fuel subsidies been significantly reduced nowadays in many countries including the Middle East, deploying solar is a good measure to mitigate the opex risks of these future fuel price hikes.

To give you a real life example, the diesel runtime and fuel consumption reductions we have observed in our solar diesel hybrid trial project in the Middle East are excellent. Compared to a typical 15kVA diesel genset running continuously and directly connected to the load, we have achieved on average 91% reduction on runtime and over 83% on average reduction on diesel consumption. The number of site visits based on runtime and refuelling have been reduced from once every month to just once a year. Compared to a typical 15kVA DG+Batteries solution running eight hours cyclic per day at 80% load, the average runtime reduction we achieved is close to 80% and the average fuel consumption reduction 50%. The number of site visits based on runtime and refuelling have been reduced to just once a year instead of four times a year based on a 250 hours’ runtime service interval.

The advantage of deploying solar goes further than just opex reductions. It allows the reduction of site
visits which directly reduces the health and safety risks associated with the crew’s mobilisations and demobilisations. As health and safety is an increasingly important KPI for companies nowadays it strengthens the case for deploying solar.

**TowerXchange: SLAs often demand 99.5% or higher uptime – tell us about the reliability and autonomy of your solution and your after sale advice and remote monitoring services.**

Erik Blokhuis, Sales & Marketing Manager Telecom, TSS: TSS’s core business is supplying solar based energy systems to mission critical applications where uptime and reliability are of paramount importance. In order to ensure operations we have a unique fall-back functionality incorporated in our charge controller which kicks in should the digital controls fail. This mode extends the reliability of the system and provides the operator more time to get to the site. Besides this we can also offer a dual set up which allows to switch off 50% of the system for maintenance purposes while the other 50% still provides energy.

**TowerXchange: How is your solution scalable to accommodate the increasing power requirements as multiple tenants are added to a site?**

Erik Blokhuis, Sales & Marketing Manager Telecom, TSS: If there is enough space on site to install additional PV modules to increase the amount of solar output then that will always be the preferred choice. In Gabon for example, the client’s load has increased over the years so we have upgraded the system three times. If the increased load is within the foreseeable future, the best thing to do is to factor in a percentage spare capacity to cater for future increased load requirements. For multiple tenant sites, which are generally above 1kW continuous load anyway, a solar diesel hybrid system will be deployed, and the increased energy demand can be either provided by additional PV modules or by increasing the diesel genset runtime or adding a wind turbine for example.

**TowerXchange: Please sum up how you would differentiate your solution from your competitors?**

Erik Blokhuis, Sales & Marketing Manager Telecom, TSS: Off-grid solar has been our core business for the past 15 years and we have a proven track record of over 1,100 off-grid systems reliably running all year round in the most remote and harsh environments. We have 100% passive cooled solar energy systems that reduces maintenance and energy usage. We continuously test and enhance our battery charging regimes to get the most out of our batteries. We are so confident of our capabilities that we actually are happy to discuss with our clients providing them performance output guarantees for as much as long as seven years. To finish, I’d like to call upon the MNOs and Towercos to challenge us with their off-grid energy issues!
See you at our future events!

**Meetup Europe 2019**
9-10 April, London

**Meetup Americas 2019**
9-10 July, Boca Raton

**Meetup Africa 2019**
8-9 October, Johannesburg

**Meetup Asia 2019**
3-4 December, Singapore

**Meetup MENA 2020**
28-29 January, Dubai

TowerXchange

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