Demand forecasts for passive infrastructure equipment and services in Asia - 2019 update

TowerXchange checks in on demand across six different categories of equipment and services in the fourteen most active Asian tower markets


New Delhi, India

Asia remains the largest and fastest growing region in the world both for investment in telecom tower networks, and for the expansion of the independent towerco business model. Once again, TowerXchange is updating its annual country-by-country review, with a deeper analysis of the products and services required in each market. Please note, Afghanistan and Pakistan are now covered in the MENA edition of this report.

Keywords: Access Control, Asia, Asset Lifecycle Platform, Australia, Bangladesh, Batteries, Best of TowerXchange, Build-to-Suit, Cambodia, Capex, China, Construction, DAS, Decommissioning, Energy, Energy Storage, Fixed Price, Hybrid Power, IBS, India, Indonesia, Laos, Lawyers & Advisors, MNOs, Malaysia, Managed Services, Market Forecasts, Market Overview, Masts & Towers, Meetup Preview, Monitoring & Management, Myanmar, O&M, Off-Grid, On-Grid, Pass-Through, Passive Equipment, Philippines, Procurement, RMS, Sale & Leaseback, Singapore, Site Management System ,Small Cells, Sri Lanka, Steelwork, Strategic Consultancy, Thailand, TowerXchange Research, Towercos, Unreliable Grid, Vietnam, Who's Who

Read this article to learn:

- In which Asian countries are a substantial volume of new towers being installed?
- What equipment is being installed on those towers in terms of energy, RMS and access control solutions?
- What has been the progress of small cell, microcell and DAS deployments?
- Who are the leading MNOs and towercos, and what are the prospects for transactions between them?

While gearing up for the sixth annual TowerXchange Meetup Asia, taking place in Singapore, 3-4 December 2019, we offer our readers invaluable insights into the key dynamics of the top Asian tower markets from India to Indonesia, encompassing China, Malaysia, Myanmar, the Philippines, Bangladesh and more.

We're keeping the categories we're reviewing the same as last year, so you can make a like-for-like comparison. We are rebranding one of the categories from its original focus on small cells, DAS and IBS to "Beyond towers" - expanding the scope to include edge computing, fibre, small cells, DAS and IBS.

- Energy: our focus in this category is on primary and backup power solutions, energy storage, hybrid and renewable energy solutions for unreliable grid and off grid.

- RMS, ILM and access control: is there a need for remote monitoring and access control systems on most towers? Are they connecting to a NOC or to a Site Management or Infrastructure Lifecycle Management platform such as those provided by Accruent, Tarantula or Nexsysone?

- As a function of the volume of new build, is there significant requirement for towers and accessories? Or demand for the services of turnkey infrastructure providers in building new towers, decommissioning parallel infrastructure or upgrading existing sites?

- How much demand is there to date for small cells, microcells, DAS and IBS? And what about fibre?

- And finally, is there much prospect for sale and leaseback or towerco consolidation to keep the consultants, lawyers and other advisors busy?

TowerXchange examines the 15 most active Asian tower markets, predicts demand for passive infrastructure equipment and services, and lists the largest towercos and MNOs active in each country. The following matrix is compiled based on hundreds of research calls and meetings with Asia's leading towercos and MNOs in which we've diagnosed their procurement and capex priorities.

Get a deeper understanding of the Asian infrastructure ecosystem and join us in Singapore, 3-4 December for the sixth annual TowerXchange Meetup Asia!

Brief commentary on Asia's less active tower markets:

East Timor: Too small to provide the necessary economies of scale to towercos, therefore TowerXchange has yet to study the market in detail.

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 of Mongolia's ~1,000 towers are shared. TowerXchange has yet to study the market in detail.

Nepal: Axiata's acquisition of Ncell from TeliaSonera may herald the entry of edotco into Nepal. The government is looking to implement a telecom infrastructure provider regime, currently underway and drawing interest from international players. TowerXchange expects to study the market in detail in the coming months.

North Korea: Impenetrable to a Western research firm like TowerXchange, and probably impenetrable to foreign investors!

NG: Digicel seem disinclined to share attractive urban locations, restricting sharing to rural sites in PNG. With no towercos present, there is no impetus for TowerXchange to study the market in detail.

South Korea: No immediate opportunities for tower industry growth, therefore TowerXchange has yet to study the market in detail.

New Zealand: the country could hold interesting opportunities for towercos. Historically, the three New Zealand operators would not share their infrastructure but the government has changed its policy last year as they are very keen on driving infrastructure development in rural and remote areas. That could lead to some action in the local market.

Vendor opportunity matrix	Energy	RMS, ILM and access control	Tower manufacture	Turnkey infrastructure	Beyond towers (incl. Small cells, DAS, IBS, fibre)	Advisors	Towercos	MNOs
Australia	**Low**	**Medium**	**Medium**	**Medium**	**High**	**Medium**	Axicom Broadcast Australia Telstra Infraco Vertel Aird Towers InSite Wireless Group	Telstra Optus Vodafone TPG

Last year, the country's biggest operator Telstra, which owns approximately 8,000 towers, decided to carve-out all of its non-mobile related assets including data centres, fibre infrastructure, copper, poles and subsea cables into a separate infraco. Telstra's assets are not sufficient to cover clients requirements and the company needs to invest in its improvement.

An Australian Federal court is currently reviewing the controversial proposed merger between Vodafone and newest MNO TPG, who has stopped the construction of its network after the country banned its main partner Huawei. The decision will have a massive impact on the telecom landscape and a court denial could force TPG to resume construction of a competitive fourth network, even if the MNO had to incur a premium to change vendors. In the meantime, market leaders Telstra and Optus will continue pushing operational efficiencies and testing 5G implementation.

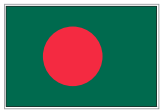
The tower landscape remains relatively static with Axicom, Broadcast Australia and a handful of smaller independent towercos owning around 2,600 towers and a further 1,800 towers having been recently erected by nbn, the Government-owned broadband network.

The market is not growing as fast as expected. The country does not have enough tower stock available to meet coverage and capacity needs, and most towerco deals are small build-to-suits.

Most of the towercos are initially exploring small cells and getting ready for a future 5G transition. Data storage could also be a natural evolution for towercos in Australia. Rural coverage and the need for remote sites s is a potential opportunity for towercos, who are patiently waiting for MNOs to move forward with their network extensions.

Grid power remains available in most of the country and backup power sources are not often used, so Australia is not a big priority for tower power vendors. Power is typically a pass-through so MNOs retain responsibility for power.

Vendor opportunity matrix	Energy	RMS, ILM and access control	Tower manufacture	Turnkey infrastructure	Beyond towers (incl. Small cells, DAS, IBS, fibre)	Advisors	Towercos	MNOs
Bangladesh	**High**	**High**	**High**	**High**	**Unknown**	**High**	edotco Bangladesh TASC Summit Towers iSON Tower Bangladesh AB Hightech Consortium	Grameenphone Banglalink Robi+Airtel Teletalk



In August 2018, the telecom regulator BTRC announced its plans to grant four licenses to towercos - namely edotco, TASC Summit Towers, iSON Tower Bangladesh and AB Hightech Consortium. All four companies are majority-owned by Bangladeshi organisations and will seek to rationalise the country's 30,000 towers, with the intent seemingly being to separate the telecom infrastructure from telecom retail businesses.

In spite of the nominal change, the towerco sector is failing to make practical moves in the country. In fact, to date no towers have been built by towercos and only edotco owns a considerable portfolio.

Recently, the Bangladesh Telecommunication Regulatory Commission (BTRC) has warned Robi and Grameenphone that their 2G and 3G licences could be revoked in light of the dispute over dues that are under scrutiny by the two operators. According to the audits, Robi owes approximately US$102.5mn and Grameenphone nearly US$1.5bn. The crisis between the two operators and the BTRC means that they are currently unable to seek approval for any new service and cannot import any equipment necessary for the maintenance of their network.

In April 2019, edotco announced its partnership with Zass Energy Services (ZES) to start deploying the very first methanol-based fuel cells in Bangladesh. A move that could open doors to more energy vendors once the other towercos start deploying sites across the country.

4G has been introduced in the country in 2018. To date, Grameenphone's network covers 99%+ of the population, with 12,000+ 2G sites and 10,000+ 3G sites, while Banglalink has a portfolio of 5,890 assets, excluding in- building solutions (IBS), which it may add to its planned tower sale process, bringing it up to about 6,000 total. edotco owns and manages a combined 10,095 towers in the country.

In spite of the current turmoil, Bangladesh could soon become an attractive destination for tower manufacturers, turnkey firms as well as advisors and legal experts. In fact, towercos are surely eager to acquire portfolios from MNOs as well as taking over any new build in the country - and with an average of 800-1,000 towers going up per year, growth is in the cards in Bangladesh.

In terms of energy requirements, the rainy season demands exceptional cell site autonomy which makes Bangladesh a key market for energy, particularly energy storage. edotco has connected over 2,000 of its Bangladeshi sites with its echo monitoring service.

Vendor opportunity matrix	Energy	RMS, ILM and access control	Tower manufacture	Turnkey infrastructure	Beyond towers (incl. Small cells, DAS, IBS, fibre)	Advisors	Towercos	MNOs
Cambodia	**Medium**	**Medium**	**High**	**High**	**Medium**	**Low**	edotco Cam Towerlink	Cellcard/ MobiTel Metfone (Viettel) Smart Axiata Seatel Kingtel Cootel

Cambodia's leading operators, Cellcard, Smart Axiata and Metfone have expanded the reach of their LTE and 4G services and are set to keep extending their networks. Moreover, the establishment of Chinese-backed MNOs Seatel, Kingtel and Cootel is creating a very competitive environment that will drive deployment, and market experts expect around 200-300 new towers to be built in Cambodia per year until 2021, when the emergence of 5G will require new deployment and equipment upgrades. In addition, there is a switch on MNOs' strategy as they are more open to the idea of selling their assets to towercos.

The rapidly expanding Sihanoukville, which has become one of the fastest-growing cities in Asia, and the growth of Casinos and online gaming businesses in the city has attracted the attention of many Chinese investors that are massively driving new data demand and increasing the need for new infrastructure. Moreover, China Tower is expected to make an entrance and regional investors from Malaysia and other neighbouring countries are also looking at the Cambodian tower market.

Cam Towerlink entered the country in 2016 and is currently involved in its first project: to build towers in and around Angkor Wat in partnership with UNESCO. edotco, which has recently acquired 325 from SEATEL, owns 2,680 towers and manages a further 1,000 MNO sites in Cambodia. The company is planning to deploy around 100 sites in the next six months, while industry experts estimate that the country currently needs 10,000 more sites.

Access to grid electricity has expanded in Cambodia to 71.5% but electricity supply is still relatively unreliable and this year, MNOs suffered from major power shortages that impacted their operations and pushed them to explore new back-up alternatives. In addition, 20% of sites are still off-grid in the country. The grid sites are provided both by SOE Electricité du Cambodge and by a range of private microgrids and distributed generation projects. Battery backups are typically installed on all sites, with DG on off-grid, MSC, BSC and hub sites. Power is a pass-through, so MNOs and not towercos remain the buyers of energy equipment.

New sites and antennas will be mainly deployed in Phnom Penh, Battambang and Siem Reap, the country's biggest cities, where demand for IBS and urban solutions is increasing.

Vendor opportunity matrix	Energy	RMS, ILM and access control	Tower manufacture	Turnkey infrastructure	Beyond towers (incl. Small cells, DAS, IBS, fibre)	Advisors	Towercos	MNOs
China	**High**	**Medium**	**High**	**High**	**High**	**High**	CTC Guodong Miteno Jilin Shuno Bright Financial Leasing Beijing GuoLian ZhengTong Beijing RLZY Zhejiang Longpiao Finance Leasing Beijing Netstone 200+ other independents	China Mobile China Unicom China Telecom China Broadcasting Network
	New tower build continues at a staggering pace in China, creating tremendous demand for steel structures, particularly monopoles, lamp posts / smart poles and rooftop poles. China Tower Corporation (CTC) added 84,000 sites in the last year, bringing their total portfolio to 1,954,000, representing a 96.1% market share. Over 200 independent towercos are also active in China, of which the eight with over a thousand towers are listed in the next column. Independent towercos built around 20,000 towers in the last year. The accelerated rollout of 5G is already a driver of co-location growth: CTC's tenancy ratio is up from 1.44 a year ago to 1.58. CTC is responsible for provision of power systems at its sites, and has created a new subsidiary, Tower Energy, to manage it's vast portfolio of backup energy storage systems, and some primary power generation. Tower Energy is already diversifying beyond cell sites to provide energy storage solutions for financial, transportation, medical and electric vehicle customers. Tower Energy has been a pioneer of recycling and re-using lithium-ion batteries from the equivalent of 100,000 electric vehicles. CTC continues to expand into small cells and IBS, their "Social Computer Room" vision can be likened to an edge data centre, while monitoring systems are widely deployed across their portfolio.							

Vendor opportunity matrix	Energy	RMS, ILM and access control	Tower manufacture	Turnkey infrastructure	Beyond towers (incl. Small cells, DAS, IBS, fibre)	Advisors	Towercos	MNOs
India	**High**	**High**	**High**	**High**	**High**	**High**	Indus Towers Bharti Infratel Reliance Jio Infratel American Tower GTL Infrastructure Tower Vision Ascend Saurava Towers	Vodafone+India Reliance Jio Airtel+Tata BSNL MTNL Several small players with <4%

India is still undergoing a deep restructuring of its MNO and towerco scenario with a couple of major headlines including the Indus Towers-Bharti Infratel's merger – which should be finalised within the year – and the sale of Reliance Jio Infratel to Brookfield. Additionally, on the MNO front, BSNL is trying to considerably reduce its workforce to rationalise its balance sheet and this might also lead to a tower sale in the future. That said, the industry remains heavily focused on operational excellence. Here are a few key projects from across the Indian landscape:

Indus Towers aims at deploying 30,000 smart small cells by 2020. The towerco is developing scalable models for smart cities and deploying what they call "NextGen" sites – aesthetically pleasant, multi-functional towers with an 80-90% lower carbon footprint thanks to their diesel-free power backup solutions. So far, Indus has deployed 2000 NextGen sites across including Delhi and the NCR, Mumbai, Pune, Hyderabad, Jaipur, Kolkata, Bangalore, Mysore, Chennai, Chandigarh, Lucknow and Meerut.

In terms of renewable energy, Indus has already deployed solar and biomass solutions across 1,100 sites and plans to scale its renewable programme to cover 50% of all sites by 2021 – a goal in line with its plan to turn into a diesel-free company by the same year. In the meantime, Indus has already halved its diesel consumption and reduced its CO2 emissions by 565mn tons in the past five years.

Indus has also started designing and deploying energy-efficient cooling solutions and initiated the indoor-outdoor conversion programme. Another step has been to replace air conditioners with free cooling units (FCUs). Solar-powered cooling units have replaced ACs at sites with a higher active load. Further innovation includes the deployment of batteries using combo or turbo solutions, variable speed diesel generators and more. In terms of batteries, Indus is embracing lithium-ion products. Additionally, Indus is adopting IoT solutions to increase the level of automation and remote management of site-related issues and insights generated through data analytics.

GTL Infrastructure is focused on energy and opex reduction too. The company is pushing MNOs to swap their 2G indoor BTS with outdoor ones to reduce the dependence on air conditioning. The towerco is involved in reducing the carbon footprint through various operational initiatives including the deployment of solar, wind and clean energy solutions, free cooling units as well as solar photovoltaic solutions. GTL is opting for lithium-ion batteries as well.

Reliance Jio has considerably reduced the use of diesel generators and has installed Lithium-Ion batteries on 80% of its sites. The operator is also working on utilising either solar based solutions (with batteries) or methanol fuel cell systems for the remainder (20%) of its sites with long power outages or completely off-grid.

Small cells are widely in demand in India, especially thanks to Reliance Jio's large scale deployment (approx. 150,000 units) and Smart City projects being developed across the country.

RMS is widely used in India, as are ILM systems.

Seven different ESCOs (ACME Group, Applied Solar, Ardom, Bhaskar Solar, CCE, Pace and OMC) own the power systems at a total of 6,414 sites in India. ESCOs are typically heavy investors in hybrid and renewable energy.

Vendor opportunity matrix	Energy	RMS, ILM and access control	Tower manufacture	Turnkey infrastructure	Beyond towers (incl. Small cells, DAS, IBS, fibre)	Advisors	Towercos	MNOs
Indonesia	**Medium**	**Medium**	**Medium**	**High**	**High**	**High**	Protelindo Tower Bersama STP Mitratel IBS Tower Centratama Persada Sokka Tama Balitower PEKAPE Gihon Tower	Telkomsel Indosat XL (Axiata) Smartfren Hutchison Bolt

Indonesia remains one of the most mature tower markets in the world, with solid tenancy ratios, excellent organic growth, and strong market caps boasted by three major towercos; Protelindo (14,854 towers), Tower Bersama (13,375) and STP (7,000). Additionally, there have been rumours of a potential opening of the tower sector (currently closed to foreign investors) and representatives from the US Government as well as international developers have met with the government to discuss the matter.

Many well established private equity firms with investments in the tower sector are now looking for an exit while MNOs are keen on monetising their assets, which will bring plenty of M&A opportunities and could benefit entering towercos while releasing pressure from telcos that will be in a better position to face 5G investments. Moreover, mature towercos are forced to improve their value proposition and looking at new services and revenue streams.

Organic growth have picked up over the last couple of years, and the increase of data demand, a populated MNO landscape and new 4G rollout plans from Indosat Ooredoo and Hutch—who are expanding outside Java—will continue driving demand for new sites and co-locations. 5G transition and regulatory restrictions in Jakarta and other urban areas will mean smaller sites, small cells and new technologies, while fibretisation demand from MNOs will continue increasing. Market leaders Protelindo and STP are at the forefront of innovation and both fibre and small cells investments are better positioning them for 4G and 5G transition. Specifically, Protelindo is set to explore VSAT cellular backhaul and mini-data centres through its subsidiary iForte. Microcells and other street furniture are also a big focus for towercos. Indonesian towercos build 3,000-5,000 towers, rooftops and infill sites per year. Tenancy ratio growth compares favourably to many other global tower markets, with around 0.13 tenants added per tower per year.

The reliability of the grid in dense urban areas means the opportunity for energy equipment vendors is finite, but there are remote sites requiring significant autonomy, especially on small islands. MNOs are responsible for energy at the macro sites, though end-to-end service is typically outsourced to the likes of Huawei and ZTE, who manage procurement, design, planning, implementation and servicing. We've spoken to RMS and access control vendors with substantial Indonesian contracts.

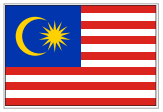
Vendor opportunity matrix	Energy	RMS, ILM and access control	Tower manufacture	Turnkey infrastructure	Beyond towers (incl. Small cells, DAS, IBS, fibre)	Advisors	Towercos	MNOs
Laos	**Medium**	**Unknown**	**Low**	**Low**	**Low**	**Low**	None	LTC Unitel ETL Beeline

Of the four MNOs in Laos, now three are majority owned by the State. In fact, in addition to LTC and Unitel (of which the State owns 51% stakes), VEON has divested to the Government of the Lao People's Democratic Republic its 78% stake in Beeline for US$22mn. #3 MNO ETL was planning an IPO which hasn't taken place yet.

LTC has announced infrastructure upgrades for US$50mn in 2018, and its plans to take the number of Base Transceiver Stations (BTS) to more than 6,000 (from 5,711 as of Q118). In 2017, the operator invested US$82.8mn to improve its networks but with 38% 3G and 10% 4G coverage, TowerXchange expects operators to keep investing in their networks over the next couple of years.

Laos has a surplus of power generation which they export, so grid availability is good in the country, and new sites can be connected to the grid quickly and efficiently. There are still unannounced outages, so backbone sites have DG and battery backup: 4-6 hours battery backup is standard.

Vendor opportunity matrix	Energy	RMS, ILM and access control	Tower manufacture	Turnkey infrastructure	Beyond towers (incl. Small cells, DAS, IBS, fibre)	Advisors	Towercos	MNOs
Malaysia	**Medium**	**Medium**	**High**	**High**	**High**	**Medium**	edotco OCK Omnix Naza Communications YTL Sacofa Touch Matrix D'harmoni KJS Common Tower Infra Quest Yikedbina Perak Asia Space Desabina Others	Celcom (Axiata) DiGi Maxis U Mobile Yes 4G Webe ALTEL Redtone



Malaysia is one of the most advanced and innovative tower markets in Asia. Towercos own 64% of Malaysia's towers, led by edotco's portfolio of 4,000 towers, 3,500 of which were carved out from from Celcom. A further 3,200 towers are owned by 14 different State-backed and other independent towercos. OCK Group owns ~400 sites and Naza Communications and Omnix Malaysia are also active. There are an estimated 22,800 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).

5G is a top priority for the government and they have even created a 5G taskforce that will support the transition and help the industry with its rollout. MNOs are now building new sites and fiberising their towers while trying to figure out whether partnering with pure fibre players, other MNOs or towercos is the best solution moving forward, while towercos remain cautious about fibre integration in a very populated fibre landscape.

Innovative leader edotco is exploring new technologies including carbon-fibre structures, multi-tenant small-cells solutions and high capacity antennas for stadiums and public spaces.

While around 5% of Malaysia's cell sites are off-grid, data demand has driven the load on some sites beyond capacity, so battery banks are widely used. Demand for infill sites makes Malaysia ripe for the exploitation of street furniture, with DAS and IBS starting to be deployed by edotco and MNOs. edotco has already selected its RMS and site management system, consolidated in their echo service, which is provided to over 3,000 of their Malaysian sites. Both towercos and MNOS also exploring hybrid solutions for their off-grid sites (around 10%) and most of the telco players are gradually switching to lithium batteries in an effort to go greener and reduce theft.

Vendor opportunity matrix	Energy	RMS, ILM and access control	Tower manufacture	Turnkey infrastructure	Beyond towers (incl. Small cells, DAS, IBS, fibre)	Advisors	Towercos	MNOs
Myanmar	**High**	**High**	**High**	**High**	**Medium**	**High**	IGT Apollo edotco PAMEL EFT MNTI KPR ATM Towers OCK NTD Myanmar Technology Gateway (MTG) MNTH DLRE CommBiz ITMB MAPCO KBZ (rooftop only)	MPT Telenor Ooredoo Mytel

Myanmar is one of the most dynamic and interesting markets in Asia, with 62% of the assets owned by towercos.

Last year, operators Ooredoo, Telenor and MPT secured 1800MHz spectrum for 4G rollout and the entrance of 4th player Mytel has prompted several local new towercos to launch. Mytel has recently sealed a BTS deal with new towerco MNTI and has already invested more than US$1bn in infrastructure, including the rollout of 30,000km of fibre-optic cable as well as deploying 5,000 base transceiver stations. Market leader IGT is deploying 300 more towers before the end of the year.

Myanmar has one of the lowest electrification rates in Asia. There are around 15,827 towers in the country and almost 75% of them are off grid, with towercos expending between US$800-1200/month to provide energy in remote locations, where robust primary / backup power systems are needed. Energy storage is therefore an operational priority and the use of lithium-ion batteries is expanding in the country. New operator Mytel is installing lithium-ion batteries in all their remote sites as they guarantee a longer life cycle. Most towercos are exploring renewables, with solar appearing as the most reliable alternative. edotco has recently taken over the provision of energy services for 1,250 Ooredoo including power in its offer for the first time, a trend that other towercos might follow. The Malaysian towerco is actively exploring infrastructure innovations across Asia, and has installed the very first carbon fibre tower in Myanmar, while evaluating the possibility of installing a few bamboo towers using local materials as part of their innovation and sustainability policy.

ESCOs play an increasing role in Myanmar, where IPT PowerTech operates the power systems at 2,200 Ooredoo and PAMEL sites, while Voltalia secured an initial 171 site contract with MNTI.

Moreover, the huge data boom is also pushing towercos and MNOs to explore small cells, rooftops, street furniture and any kind of urban solutions, most of which will have to be supported by fibre.

Vendor opportunity matrix	Energy	RMS, ILM and access control	Tower manufacture	Turnkey infrastructure	Beyond towers (incl. Small cells, DAS, IBS, fibre)	Advisors	Towercos *	MNOs
Philippines	**Medium**	**Medium**	**High**	**High**	**Medium**	**High**	*Signed MOUs with DICT China Construction ISOC Infrastructures ISON ECP Tower edotco RT Telecom IHS Towers China Energy Equipment Co. Aboitiz InfraCapital Inc MGS Construction Inc. American Tower Frontier Tower Associates Phil TowerConsortium JS Cruz DT Towers Korea's Shinheung ALT Global Solutions Inc. LCS Holdings Inc. China Construction First Group Corp. ACODA Towers CREI Management Services FZE Tamoin Industrial Services Corp. EEI Corp. Tiger Infrastructure Pte. Ltd	Globe PLDT Dito

After two years of regulatory disputes, Mislatel has finally received its mobile license. The new Filipino operator, which is rebranding as Dito Telecommunity, has 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 the company is in advanced commercial and technical conversations with vendors and infrastructure partners, aiming to start its rollout after the summer. Dito has to build 3,000 sites in less than a year and all key industry stakeholders are patiently awaiting for DICT's to release the common tower policy before making the final move.

For now, incumbents Globe and PLDT won't sell any assets but the market will soon bring plenty of opportunities for new builds and network upgrades. The Philippines is one of the most underserved markets in Asia and new MNO Dito—fully supported by China Telecom's financial strength—will be relying on towercos and turnkey providers to fulfil its commitment, while incumbents Globe and PLDT will step up their games to maintain their position on this new, competitive scenario.

With exponential data growth and both PLDT and Globe already testing 5G, new infrastructure providers should consider fibre and small cells. Urban areas will be the immediate target for Dito in order to achieve the committed level of coverage, so light poles, smaller sites and urban antennas will be in demand.

For now, all three operators will continue focusing on urban areas, but some off-grid solutions and plenty of back up and green power alternatives will be required when they start expanding coverage to more rural and remote areas.

Vendor opportunity matrix	Energy	RMS, ILM and access control	Tower manufacture	Turnkey infrastructure	Beyond towers (incl. Small cells, DAS, IBS, fibre)	Advisors	Towercos	MNOs
Thailand	**Medium**	**Medium**	**Medium**	**Medium**	**Medium**	**Medium**	DIF	AIS DTAC (Telenor) True MY(CAT) TOT

Thailand's #2 MNO True Move has sold 788 telecoms towers, 1,795km of optical-fibre cable and 3,700km of fibre to the Digital Telecommunications Infrastructure Fund. The assets were valued at THN15.7bn (US$513mn), and True Move will lease back some of the towers and fibre through 2033. True Move also acquired shares in the Digital Telecommunications Infrastructure Fund worth THB4.74bn (US$154mn), maintaining their stake in Thailand's leading towerco, which had issued new shares, at 30%.

To date, DTIF is the only entity owning towers beyond MNOs. The fund owns over 13,000 towers and 1mn km of fibre.

Recently, the long-term dispute between AIS and state-owned TOT has been resolved. The two MNOs had been embroiled in a five-year dispute over the ownership and right to use 13,000 towers, which TOT claimed fell within a build-operate-transfer agreement. The resolution sees a TNB300mn (US$9.8mn) monthly service fee for AIS to continue using the towers replaced by a ten-year deal in which AIS pays to lease TOT's towers, and TOT uses AIS's space and maintenance services. The deal is reportedly worth THB28bn (US$915mn).

TOT is also planning to finalise its merger with the other State-run operator, CAT Telecom, by Q2 2020.

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.

While grid power is widely available, electricity continues to become more expensive, fueling appetite for renewables and energy efficiency.

Vendor opportunity matrix	Energy	RMS, ILM and access control	Tower manufacture	Turnkey infrastructure	Beyond towers (incl. Small cells, DAS, IBS, fibre)	Advisors	Towercos	MNOs
Singapore	**Low**	**Unknown**	**Low**	**Medium**	**High**	**Medium**	None	SingTel StaHub M1 TPG Telecom
	There are no towercos and there is hardly any infrastructure sharing in the mature Singaporean mobile market, but the imminent entry of a fourth MNO may change that and create opportunities for some, although not all, vendor segments. Grid power is reliable in Singapore so energy equipment is limited to simple battery backups. Most of the new sites in Singapore will be IBS, DAS and small cells for infill and indoor coverage. If the fourth MNO is not permitted to share the incumbents' ~1,000 GBTs and ~5,750 rooftop and lamppost sites, then expect some new build, but more likely the new entrant will stimulate infrastructure sharing, and perhaps an opportunity for an independent infraco.							
Sri Lanka	**Medium**	**Medium**	**Low**	**Medium**	**Medium**	**Low**	edotco	Airtel Dialog (Axiata) Etisalat Hutchison Mobitel
	edotco owns and manages a combined 3,400 towers, representing 40+% of the country's 7,500 to 8,000 towers. edotco monitors selected Sri Lankan sites with its echo RMS service. Sri Lanka is reaching the saturation point for the number of towers required to provide coverage. 4G spectrum is available only to Dialog and Mobitel; the remaining operators will need to engage in RANsharing to provide these services. An estimated 1,500 to 2,000 towers or special structures will be required for infill. Grid is at acceptable levels and improving.							

Vendor opportunity matrix	Energy	RMS, ILM and access control	Tower manufacture	Turnkey infrastructure	Small cells, microcells, DAS and IBS	Advisors	Towercos	MNOs
Vietnam	**Low**	**Medium**	**Medium**	**High**	**Medium**	**Medium**	OCK Group Golden Towers Nisco Dozens of small local towercos	Viettel MobiFone VinaPhone Vietnamobile GMobile

Earlier this year, the Vietnamese government announced plans to sell large stakes in state-owned Mobifone and VPTG (which owns MNO Vinaphone) by the end of 2020. MNO privatisation—with a potential entrance of international investment—and the long rumoured sale or carve out of Viettel's towers, could create a whole new and very interesting telecom landscape in the country. And that will indeed attract the interest from regional towercos and infrastructure investors. Moreover, the Ministry of Information and Communications (MIC) is preparing the 2600MHz band spectrum auction, which is expected to enhance LTE coverage and capacity across the country. Winning bidders will be required to begin network deployment within 24 months of receiving their spectrum licence, which will notably drive demand for new sites and equipment.

Market leader Viettel owns and operates around 40,000 sites in Vietnam. Efficiency is now Viettel's operational priority and the company wants to progressively modernise its network towards automation to take advantage of data and ultimately reduce cost. However, their network was built 15 years ago and integrating new monitoring systems, sensors and data analytics tools into their old equipment is presenting a huge challenge. In addition, any potential tower venture from the market leader will require considerable network upgrades on its single-tenant network.

On the towerco front, SEATH owns 2,000 sites and its main shareholder OCK has allocated US$5-8mn for its expansion, with plans to build 200 to 250 sites per year in the country. OCK may seek to consolidate other members of a fragmented group of around 30 local towercos who between them own ~10,000 towers. Golden Towers' has around 350 sites across the country, with a big presence in rural areas, where tenancy ratios are lower, which is compensated by cheap land cost. The company is set for a big expansion as they aim to build 2,500 sites in the next two to three years and has recently closed a BTS deal with MobiFone for 100 towers.

MNOs, who are now partnering with vendors and infrastructure providers on 5G testing, run the whole operation on their towers, from energy management to fibre deployment. Most of the towers are now made in Vietnam and operators do not require sophisticated energy systems nor hybrid solutions since the grid is very accessible and reliable, but the unstable climate forces MNO to heavily invest in batteries and generators for back up. Viettel relies on gensets and lithium batteries for backup - they do not buy acid lead systems anymore - and modern air conditioning and cooling systems are extensively used to reduce energy consumption. Although numbers are not huge, Viettel has worked with a couple local partners and deployed some solar systems in remote locations to overcome grid inaccessibility. In urban areas, in building solutions and camouflage antennas can bring opportunities to infrastructure providers in the country.

JTOWER, an in-building solution (IBS) specialist recently expanded beyond its home market in Japan to Vietnam as it acquired the IBS portion of SEATH for US$10.2mn. This is said to be the largest IBS portfolio in the country, which included over 120 systems.

Organic growth has been limited by the degree of parallel infrastructure, but new spectrum auction, upcoming sector privatisation and 5G rollouts will require plenty of new sites as well as a push in small cells and new urban typologies. 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.