Telecom Network Report Ed4 2017
A Network Revolution
HetNet and Densification, Towers & Small Cells, Network Virtualisation

A time of transition
1G to 5G
Hardware to Software

Chapter Summaries
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Sample Pages

May 2017
StatPlan Energy Research
EXECUTIVE SUMMARY

PART 1 ELECTRICITY TRANSMISSION TOWERS AND MONOPOLES

Chapter 1 - INSTALLED BASE OF ELECTRICITY TRANSMISSION TOWERS & MONOPOLES

The global installed base of transmission towers and monopoles is analysed in numbers of towers by region and country and forecast from 2016 to 2020.

Chapter 2 - ELECTRICITY TRANSMISSION TOWERS MARKET

The global demand in $ value for towers and monopoles is analysed by region and country and forecast from 2016 to 2020.

Chapter 3 - LONG TERM DEMAND CYCLES FOR ELECTRICITY TOWERS AND MONOPOLES

The growth of transmission line networks is a fundamental driver of the markets for towers and poles, both in line length and voltage. Long term demand is a function of the age of the towers and the expansion of the networks.

Chapter 4 - MONOPOLES vs. LATTICE TOWERS

The March of the Monopoles - long established in the US, EHV monopoles are breaking into new markets with innovative new designs, replacing lattice towers, especially in Europe. This trend is driven by pressure on rights-of-way, visual criticism of lattice towers and public fears of EMF dangers to children.

Chapter 5 - TYPES OF TOWER OR PYLONS

Lattice towers are designed for different functions and stresses and there is wide variation in cost; suspension towers, tension towers, angle suspension towers, dead-end towers, transposition towers. Tower installation is a dangerous and complex procedure and has an impact on costs.

Chapter 6 - ELEMENTS OF LATTICE TOWER DESIGN

Many designs of transmission tower exist and are used in different situations. Some of the basics are discussed here with diagrams of designs and the different elements of a tower.

Chapter 7 - SERVICE LIFE AND MAINTENANCE OF STEEL LATTICE TOWERS AND MONOPOLES

The service life of steel monopoles and lattice towers can be severely curtailed after a period of time without preventive treatment. Deterioration goes through three identifiable stages before the structure collapses, each with cost implications.

Chapter 8 - COMPETITIONS FOR TOWER DESIGN

Increasing public awareness of and resistance to lattice towers is leading to imaginative designs for new poles and towers.

Chapter 9 - MANUFACTURERS OF LATTICE TOWERS AND MONOPOLES

Production capacity of the 34 major producers of lattice towers and monopoles is tabulated with market shares. The leading companies are profiled.
Towers and Poles Report
Chapter Summaries

PART 2 ELECTRICITY, TELEPHONE & STREET LIGHTING POLES

Chapter 10 - UTILITY POLES INSTALLED BASE BY COUNTRY AND UTILITY

The installed base of poles – electricity, telegraph and street lights – is analysed by country for 2016, with a split by voltage levels; MV sub-transmission, primary distribution and LV secondary distribution and reticulation. Street lights have been included for the first time.

Chapter 11 - INSTALLED BASE OF POLES BY COUNTRY AND MATERIAL

The installed base of utility poles is analysed by material - wood, steel, concrete, composite – and analysed by country.

Chapter 12 - GROWTH OF THE POLE POPULATION

The total installed base of poles is forecast from 2016 to 2020 by country.

Chapter 13 - DEMAND FOR POLES IN UNITS

Demand for utility poles in units is tabulated by region and country and forecast from 2016 to 2020.

Chapter 14 - DEMAND FOR POLES BY VALUE

Demand for utility poles in $ value is tabulated by region and country and forecast from 2016 to 2020.

Chapter 15 - THE VALUE CHAIN – FROM MATERIALS TO CAPEX

The value chain is a continuous process of adding cost to a product. Depending where you position it, the value changes, the end user’s capex being some five times the cost of original materials. The value chain is analysed with different mark-ups for each of six stages.

Chapter 16 - NATIONAL MARKETS FOR ELECTRICITY AND TELEPHONE DISTRIBUTION POLES

The statistics for utility poles are not very systematic and are variable in extent from country to country. Some countries publish detailed analysis of numbers of towers in their electricity and telephone networks and poles by material but for most countries the data is scattered. Much of the information is anecdotal, contained in reports on other topics, such as wood harvesting and preservatives, materials technology, commodity prices, efficiency issues, LEDs, the development of composites, avian dangers etc. However, with wide searching a surprising amount of data has been accumulated and StatPlan has assembled and maintains an ever-increasing databank for this topic.

Chapter 17 - STREET LIGHTING DEVELOPMENTS

Street lighting is a hot topic at present, because of the developments of the smart city and the advent of energy saving LEDs. This has implications for the pole markets in renewal of old poles and substitution with new materials such as composites.

Chapter 18 - MATERIAL COMPOSITION OF POLES AND SERVICE LIFE

The various materials used for poles – wood, steel, concrete and composite are discussed.
Chapter 19 - COMPOSITE POLES

Composites are analysed in a 23 page section discussing this technology, applications, advantages and disadvantages, market status and manufacturers. Factors such as safety, pricing, the production processes of filament winding and pultrusion are outlined. The launch market in the United States is reviewed, with the increasing use of composite cross arms on wooden or concrete poles, and the beginning of a move from niche market status to wider take-up. Composites are gaining acceptance in the desert climates of the Middle East. After being spearheaded in Scandinavia, composites are being trialed in other European countries, and the first composite distribution pole was installed in the UK in 2016.

Chapter 20 - TYPES OF POLES

The different types of pole are described, with their functions, characteristics and service lives.

Chapter 21 – POLE SPAN

The span between poles is a function of the weight of lines they bear and the density of population beneath them. The design of a network involves a trade-off between longer poles which are more expensive but need fewer accessories, or shorter poles which are cheaper but need more cross-arms and other equipment.

Chapter 22 - SPACE ALLOCATION ON JOINT USE UTILITY POLES

Utility poles are used by more than one line or service in many cases. Conventions exist for the allocation of space on the pole; for transmission lines, sub-transmission lines, distribution lines and telephone lines.

Chapter 23 – SERVICE LIFE AND MAINTENANCE OF POLES

The life of wooden poles is prolonged by treatment with wood preservatives but some of these are now banned as environmentally harmful. The treatment is more complex than simply brushing preservative onto the pole and involves pressurised application. Different treatments and requirements exist for other materials such as steel, concrete and composite.

Chapter 24 - MANUFACTURERS OF DISTRIBUTION POLES

Producers of poles of all materials are listed and the leaders profiled.

Chapter 25 – CIRCUITS, PHASES AND CONDUCTORS

The basics of circuits and phases are outlined. These have a vital effect on the design and mechanics for towers and poles as well as overhead lines.

Chapter 26 - RIGHTS OF WAY

ROW – Rights of Way are increasingly scarce and expensive. They are discussed with various alternative schemes outlined.
Chapter 27 – DANGER to AND FROM BIRDS

The danger from birds nesting on or colliding with lines and towers can cause not only harm to the birds but outages to the network. The extent of the problem is analysed, with mitigation and prevention methods outlined.

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   Network virtualisation
   MVNO Mobile Virtual Network Operator and Sub-Brands
   Backhaul and Fronthaul
   Development of the market
   Macro cell sites and base stations
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   The HetNet, Densification and small cells

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Unique mobile subscribers

The global penetration of unique mobile subscribers has risen from XX% in 2010 to XX% in 2016 and is forecast to reach XX% by 2020. Many subscribers have more than one subscription, personal or work, mobile and tablet, which is why in advanced countries the numbers of SIMs, or all subscriptions exceed 100% of the population sometimes by a large margin. The rate of growth has been highest and will continue to be highest in Sub-Saharan Africa, where penetration has risen from XX% in 2010 to XX% in 2016 and will reach XX% by 2020.

Table 1: Global mobile connections by region, 2010 to 2020

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Source: GSMA and StatPlan estimates

Table 2: Global mobile connections by technology, 2010 to 2020

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Table 3: Penetration of 3G & 4G among mobile connections by region, 2010 to 2020

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Table 4: Penetration of 4G among mobile connections by region, 2010 to 2020.

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6. VIRTUALISATION

Introduction to virtualisation in all industries

Virtualisation is a generational innovation in the Information Technology field. It is the ability to simulate a hardware platform in software. Virtualisation is the creation of a virtual, rather than actual, version of something, such as an operating system, a server, a storage device or network resources. All of the functionality is separated from the hardware and simulated as a ‘virtual instance,’ with the ability to operate just as the traditional, hardware solution would. Of course, somewhere there is host hardware supporting the virtual instances of these resources, but this hardware can be general, off-the-shelf platforms. In addition, a single hardware platform can be used to support multiple virtual devices or machines, which are easy to spin up or down as needed. As a result, ......................................

7. NETWORK VIRTUALISATION

Modern telecoms networks contain an ever-increasing variety of proprietary hardware. The launch of new services often demands network reconfiguration and on-site installation of new equipment which in turn requires additional floor space, power, and trained maintenance staff. The innovation cycles accelerate and require greater flexibility and dynamism than hardware-based appliances allow. Hard-wired network with single functions boxes are tedious to maintain, slow to evolve, and prevent service providers from offering dynamic services. Key enabling technologies for this vision include SDN (Software Defined Networking) and NFV (Network Functions Virtualisation). SDN and NFV are complementary but increasingly co-dependent ......................................
Figure 1: NV Vendors considered among NV end users

Figure 2: Regional distribution of MVNOs, December 2015

Table 5: Segments of the MVNO and Sub-brand market

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11. INSTALLED BASE OF MACRO CELL SITES

This chapter is concerned with macro cell GBTs, RTTs and street poles base stations, and does not include small cells base stations. It is important to emphasise that a tower is a structure supporting a base station, not itself a base station and it is a component of the cost of a base station. We use the term ‘tower’ because it is in common use, but we are actually referring to base transceiver stations - BTS. Please refer to the Glossary at the end of this report.

There are XX million telecoms towers installed in the world in 2016, including GBTs, RTTs and street poles, growing at a cagr of XX% to 2021..........................

Figure 3: Global installed telecoms towers by region, 2016

Table 6: Global installed telecoms towers in thousands, by region, 2016-2021

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