Smart Solutions

The next big step in 3G/4G data networks

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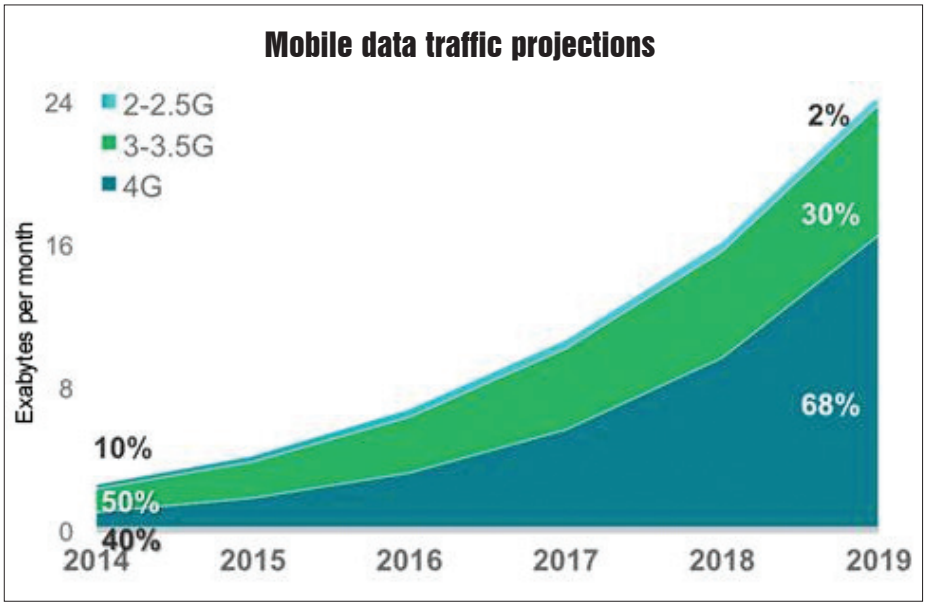
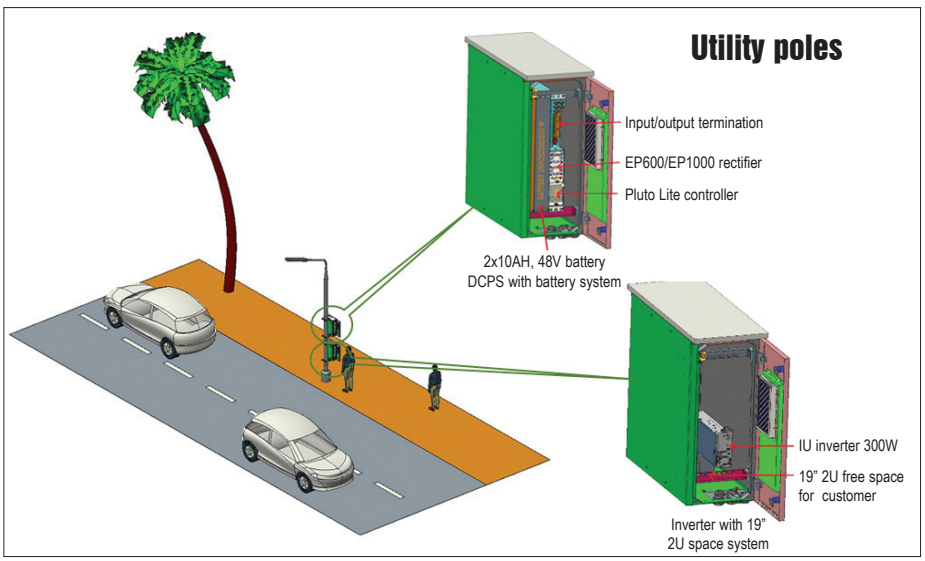
Data requirements are growing on a daily basis, primarily driven by increased mobile internet usage. According to Ericsson's latest Mobility Report, the average global mobile connection uses around 900 MB of data every month, with total monthly global data traffic rapidly approaching 3 exabytes (3 billion gigabytes). There are other forecasts, which state that mobile data traffic will increase by a hundred times by 2020. This kind of exponential mobile data growth can be met primarily through increased spectrum for mobile network usage, increased system efficiency in network equipment and a significant increase in the deployment of microcells and small cells.

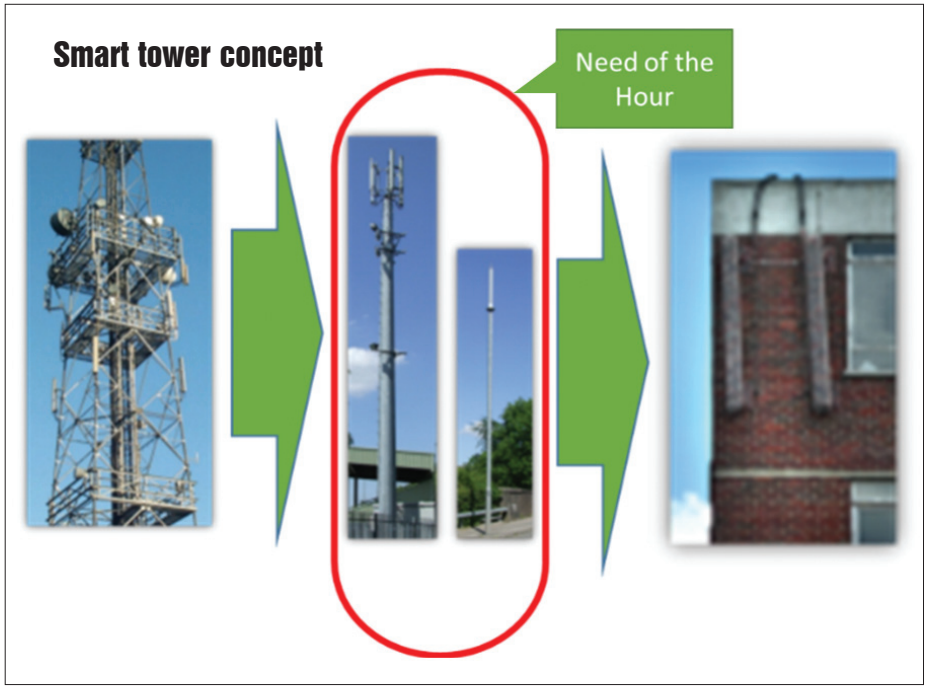
Need for smart infrastructure

Cell sites are primarily evolving from macro to micro configuration, which will gradually develop to picocells and femtocells. Currently, the majority of mobile networks are macro cells, which cover large areas up to 1.5-5 km radius, and carry voice, SMS and limited data. The next big step in this evolution chain is the deployment of microcells that can be closer to the users in public places like streets, offices, residential areas, airports and malls. It has been estimated that microcells will outnumber the existing macro cells by up to ten times in the near future. This dynamically evolving cell site infrastructure needs to be smart and equipped with the following features to meet the rising data demand:

- Safety: The location of sites will now shift from secured lands to public access locations. In this situation, the safety equipment and structure is of utmost importance to avoid any mishaps.
- Security: Earlier the sites that were unmanned and had restricted access will now move to crowded areas where the public can access sites every second.
- Aesthetic: The present cell towers will be replaced by aesthetic structures, which can fit seamlessly into the existing urban landscape.
- Low carbon footprint: The use of fossil fuels such as diesel at tower sites increasingly contributes to carbon emissions. Hence, there is a need to reduce the use of diesel and utilise renewables like solar power.
- Small footprint and easy deployment: Since these sites will be set up on streets,







they need to occupy a small area and be deployed overnight so as to cause limited inconvenience to the public.

- Fibre-ready: As these sites are installed along pathways, connecting fibre from nearby fibre pipes should be easier. Therefore, provisions need to be made for transmission equipment and modems inside the mast.

Smart solutions

- Smart tower concept: In order to meet these requirements, an innovative smart tower concept has been developed. A smart tower or micro site plays a vital role in data flow in dense urban areas by adding the required capacity while restricting signal with low interference to the neighbouring cells.
- Ground-bearing mast solution: Under the smart tower concept, a micro site is erected on a circular pole with a width of 3 metres and is installed on pavements along roadsides. The mast has a height of 12-25 metres. It contains an antenna, a remote radio unit and a platform on its pinnacle and has provision for installing fibre equipment. The mast is hollow from inside and a vertical space is provided inside for a baseband unit. The mast also contains DC switched mode power supplies and a lithium-ion battery with two to six hours of backup. In order to protect the instruments from developing heat inside the hollow space, the internal body of the pole is covered with a thermal heat-resistant foil that helps in reflecting solar heat rays and keeps the interior space cool. Since such masts are more likely to be erected in public places, other features like safety, security and aesthetics are included in the structure, which makes it a smart solution. Apart from this, provisions such as street lighting, billboards and security cameras can be installed on the exterior. This design is built to withstand wind speeds of 180 kmph. Moreover, the electrical and grounding system complies with various local standards.

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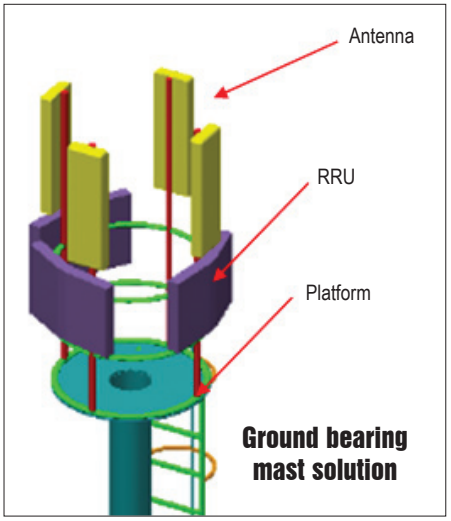

- Rain shelter/Bus stop solutions: The possibility of creating innovative bus shelters for the benefit of the public is also under consideration. In this concept, a solar-powered bus shelter is erected with a street light pole, which holds a solar sheet. An IP55 metal enclosure for mounting the DC power system (DCPS) and batteries with I/P cable glands are attached to the pole. The IP55 metal enclosure is positioned below the seating arrangement to place the battery backup for the solar panel.
- Utility poles: Yet another solution is to make use of the utility poles available in urban areas and convert them into mini sites. This can be done by mounting the DCPS battery cabinets on street lighting poles. These cabinets weigh up to 30 kg and this design is mainly used to meet wind speeds of 120 kmph.

Conclusion

The above-mentioned solutions are adaptable as per requirements and wind speed. They can also be modified for rooftop locations to avoid signal blocking. The adoption of these smart solutions can not only help meet the rising demand for data services but also help build a greener network. ▲