The emergence of next-generation network (NGN) technologies and increased uptake of bandwidth-intensive applications has led to a surge in data traffic. Riding on 3G and 4G technologies, data services are expected to be the key focus areas for Indian telecom service providers over the next five years. Mobile data traffic in the country is likely to increase nearly hundredfold by 2015 and consumers will stream nearly 600 hours of video content every second. In order to keep pace with this demand, operators will be required to scale up their wireless networks significantly. This will involve huge investments in upgrading networks and transforming backhaul networks while new operators will need to invest in installing telecom equipment and base stations.

Transforming networks

Over the past two years, Indian operators, in line with the trend in other developing countries, have been focusing on expanding their wireless infrastructure to make it compatible with 3G, 4G and HSPA+ technologies. Technology migration has helped them keep pace with the bandwidth growth on their networks. In areas of high data traffic, telecom service providers are investing in channel card upgrades and integrating more channel cards in the existing base stations.

Long term evolution (LTE) is expected to be the dominant 4G technology in the future. Beginning 2013, 4G will be the preferred technology in the global wireless infrastructure market and will be worth $36.1 billion in 2015. Bharti Airtel was the first operator to launch 4G in India. It is expected that 2013-14 will witness a nationwide roll-out of 4G services by leading operators. LTE subscribers in the country are estimated to grow at a compound annual growth rate (CAGR) of over 259 per cent in the next five to seven years. LTE revenues are expected to grow at a CAGR of over 220 per cent during the same period. It is estimated that the country will have more than 12 million active LTE-time division duplex (LTE-TDD) subscribers, generating service revenues in excess of $2 billion by 2015. These revenues will increase to $5 billion by 2017 due to high ARPUs.

Telecom players like Bharti Airtel, Reliance Communications, Vodafone India, Aircel, Idea Cellular, Bharat Sanchar Nigam Limited (BSNL), Mahanagar Telephone Nigam Limited, and Reliance Industries Limited-owned Infotel Broadband are ramping up their infrastructure to offer next-generation services.

With operators expanding their 3G network roll-out to Tier II and Tier III cities, and deploying LTE-TDD access infrastructure, the industry is witnessing an increase in demand for backhaul connections and capacity. Traditionally, for wireless networks, time division multiplexing (TDM) has dominated backhaul deployments. Leasing backhaul access for every cell site involves

large operating expenses, particularly for operators that do not own the last mile. However, 3G and 4G technologies have led to a shift from TDM to packet backhaul.

Indian service providers are going in for IP transition to support NGN technologies. They are also deploying femtocells and HSPA points to reduce backhaul congestion in areas where xDSL is widely deployed. Further, operators are investing heavily in the existing microwave backhaul infrastructure to cater to the growth in data traffic and manage the quality of service.

With the increasing complexity in networks and growth in end-user bandwidth, technological platforms like the automatic switched optical network and automatic switched transport network are becoming an integral part of telecom networks.

In order to address the requirements of an IP-based network, operators are exploring options like IP-based packet transport network solution based on all-packet core integrated with multiprotocol label switching transport profile and IP/MPLS technologies. These solutions could help operators provide unified multimedia broadband services and end-to-end solutions at reduced costs.

New roll-outs and alliances

To upgrade their core networks and increase network capacity, operators are partnering with leading vendors like Alcatel-Lucent, Ericsson, Huawei, ECI Telecom, ZTE, Nokia Siemens Networks (NSN), Fibcom, Commscope, Juniper Networks, Radwin and Tejas Networks.

The past year witnessed GSM expansions, 4G roll-out and renewal of managed services contracts by leading operators. For instance, Bharti Airtel partnered with NSN to launch its LTE-TDD network in the Maharashtra circle. NSN provided a unified network and service management dashboard solution to power its Network Experience Center in Manesar, Haryana. The operator also partnered with ZTE to launch 4G services in the Kolkata circle.

In addition, BSNL awarded a GSM contract to ZTE. As part of the contract, ZTE is supporting BSNL’s 10.15 million GSM lines in the northern and southern zones, and will help the operator

expand its network in these areas.

Infotel Broadband is expected to launch 4G services in early 2013 in the Delhi and Mumbai circles. The company will invest $6 billion-$10 billion over the next three to five years on network roll-outs. It has signed contracts with several global vendors such as Cisco, IBM and Ericsson for procuring equipment. Another player, Tikona Digital, is also planning to roll out LTE services in 2013. Aircel is also expected to launch 4G services in select circles in 2013 and has planned significant infrastructure investment for the same.

Going forward, with increasing penetration of 3G and 4G services, the industry will move towards network upgradation, unified threat management, and switching and routing. It will witness significant investments in Ethernet and IP-based networks by operators, as development of these networks will be crucial for offering high quality data services to users.

•Quality of power: The telecom industry has one of the highest uptime requirements (99.99 per cent) for continuous and reliable power supply. Therefore, operators need to deploy a solution that does not impact their service quality or increase losses. Even a minute of downtime results in huge revenue losses. Also, since telecom tower systems require constant power supply, battery storage has to be optimised according to the site irradiation trends.

•Savings in operational expenditure: The operational expenditure on deploying any renewable energy system must be lower than that for the power source it replaces. This is one of the key metrics that operators examine in order to ensure financial viability.

•Space constraints: This factor is particularly relevant to solar and biomass projects. A 1 kW solar power system would require an area of 7-8 square metres. Acquiring space is a major challenge in urban areas. However, in suburban and rural areas, land is available and solar power is an ideal solution.

•Supply chain availability: The scope of an operator’s business depends on the availability of a supply chain. Therefore, any renewable energy technology adopted for a telecom network must have a secured supply chain.

•Need for a large battery bank: Alternative energy sources require a large battery bank to ensure reliable supply, which results in an increase in costs and in the number of backup hours. Therefore, the break-even period for alternative energy systems is four to six years.

Future growth drivers

The main factors that will drive the adoption of renewable energy sources in the telecom sector are:

•Expansion of towers: With urban areas reaching saturation in terms of coverage, operators are looking at Category C cities (suburban areas) for their expansion programme. As establishing renewable energy systems at greenfield sites involves fewer issues than brownfield projects, these areas are suitable for renewable energy-based off-grid systems, as the cost of land is also low in remote regions. In order to meet the TRAI mandate, operators prefer to deploy green solutions at new sites.

•Fiscal incentives: Fiscal incentives have played an important role in promoting off-grid applications. The high capex is a key deterrent for operators to adopt renewable energy sources for power. In this context, fiscal incentives may drive adoption in the initial years.

•Rising cost of diesel: Diesel is a regulated commodity in India but is likely to be deregulated in the future. Diesel prices have been increasing, and the trend will gain momentum after deregulation. With another 100,000 towers expected to be established over the next two years, the telecom industry will not only drive the demand for diesel, but will also be responsible for about 8.4 million tonnes of carbon dioxide emissions. Moreover, diesel usage involves the issue of pilferage. These challenges are likely to force operators to adopt renewable energy solutions.

•Falling costs: A decline in the prices of solar wafers, cells and panels over the past two years has resulted in lower solar project development costs. Manufacturers are starting to achieve quality and reliability standards in the mass production of these applications. There would be further innovations as the prices of technological components are declining, and entrepreneurs are studying local conditions and assessing user requirements. Since the affordability of these applications is the main impediment to their adoption, lower costs and a corresponding decline in retail prices will be critical for driving demand going forward. For instance, the cost of

electricity generation from stand-alone solar photovoltaic (PV) plants has reduced from Rs 15 per kWh to around Rs 10 per kWh in the past two years, while that from diesel generators is around Rs 15 per kWh (assuming an average diesel price of Rs 36.50 per litre and the diesel consumption of a typical genset at 0.4 litre per kWh). With economies of scale in the PV module segment, the cost of developing such projects would reduce further while diesel prices are likely to increase.

Also, increasing commercialisation of off-grid applications and technological innovation by entrepreneurs are also driving down the manufacturing cost of basic solar off-grid applications.

The way ahead

Going forward, an additional 100,000 towers are likely to be established, driven by the deployment of new technologies like 3G and long term evolution. This tower roll-out will result in a high demand for diesel, which will add to operators' opex. Though diesel prices in India have been below the cost of procurement (regulated by the government), the recent price hike and the likelihood of these prices being pegged to international market rates in the future weaken the business case for using this fuel for power generation.

Therefore, the trend of switching to renewable energy will strengthen in the coming years. The small beginnings that have been made on this front will see significant growth with more companies adopting alternative energy sources to meet their power needs. Innovations, and research and development will also play a significant role in this regard.

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