

Telecom towers across the country have the challenging task of providing uninterrupted telecom services to more than 1 billion subscribers. Moreover, as per the licence conditions, a telecom operator needs to maintain network availability higher than 99.5 per cent at all times. Availability of power on a 24x7 basis is, therefore, a prerequisite for ensuring seamless communication and maintaining the quality of service.

However, the absence of uninterrupted, grid power at the majority of the sites has forced companies to rely on non-grid sources, the most common alternative being diesel gensets. Consequently, diesel costs make up a significant part of the overall opex of a tower site.

In addition to cost implications, the use of diesel has had serious ecological implications as well. The annual carbon dioxide emission on account of diesel use at the telecom tower sites is estimated to be around 10 million tonnes. The telecom industry thus contributes to around 1 per cent of the country's total carbon dioxide emissions, which is much higher than the global standard of 0.7 per cent.

Diesel pilferage is another major challenge in rural areas. According to industry estimates, telecom tower companies lose around Rs 22 billion every year on account of diesel theft, which further adds to the overall costs.

The need to reduce opex as well as the carbon footprint has led telecom operators and tower companies to experiment with alternative power sources. Renewable energy can help tower companies reduce emissions, energy costs as well as diesel logistics costs.

Renewable solutions for tower sites

Solar power is currently the most commercialised technology among the renewable energy technologies used for powering towers. It is best suited for rural areas, which offer vast expanses of land for panel installation. In urban areas, solar panels mounted on rooftops are gaining acceptance. With the decline in panel prices in recent years, solar is becoming a more financially feasible option, apart from being the most easily deployable among the renewables.

Another popular renewable energy source is biomass, which is an economically and commercially viable solution for rural sites with an average load of over 5 kW and grid outages of more than eight hours. The use of jatropha oil, a biofuel available in sufficient quantities in rural areas, for powering telecom sites is also currently being tested. Some sites are also using fuel cells and wind energy for meeting the electricity needs.

Industry initiatives

The telecom industry has taken various suo moto initiatives to minimise the consumption of diesel at tower sites and increase their reliance on renewable energy sources for their energy needs. According to the Tower and Infrastructure Providers Association (TAIPA), the industry has installed 89,000 diesel-free sites as of September 2016, wherein the diesel consumption is less than 400 litres per year or approximately 1 litre per day. Moreover, the industry has adopted innovative cooling methods such as fan coil unit cooling, DC air conditioning and rack cooling, which consume less power than traditional air conditioning. In addition to these, free cooling units and natural cooling units have been deployed, which reduce AC running hours on sites whenever the temperature of the surrounding environment (ambient temperature) is lower than the shelter temperature. Companies have also attempted to achieve substantial energy savings by replacing indoor base transceiver stations (BTSs) with outdoor BTSs. Besides, the sharing of towers has led to significant savings in fuel costs incurred on operating the BTSs.

On the operator front, Bharat Sanchar Nigam Limited (BSNL) has recently completed the installation of 2,199 solar-powered mobile towers in Naxal-affected regions across 10 states. The project was executed by BSNL with the help of domestic vendors Vihaan Networks Limited and Himachal Futuristic Communications Limited at a total cost of Rs 35.68 billion.

Meanwhile, Bharti Airtel in February 2016 announced the migration of 40,000 of its telecom towers across the country to green technology as part of its Project Leap. These towers are designed to operate largely on battery hybrid, lithium-ion and solar hybrid solutions with very little diesel consumption.

Under Project Leap, Airtel is aiming at establishing a world-class and future-ready network, while committing to bring down its carbon footprint emission by 70 per cent by 2018. Additionally, Airtel has adopted a range of other innovative methods for reducing energy consumption like reducing power consumption by switching off the unused capacity of its telecom towers during lean periods. It is also reducing power consumption and airwave

emissions by optimising signal transmission between the network and the device. Going forward, the operator plans to adopt solar and new battery technologies in a big way and double its green telecom towers by 2020. The company has already installed rooftop solar power capacity base of 770 kWp and plans to increase this capacity to 1 MWp in the coming months and enhance renewable energy wheeling by solar/wind/hydro on core sites, thereby consuming more than 65 GWh of green energy annually. It is also investing heavily in state-of-the-art radio technology that will help optimise both power and space. Of the operator's total network installed base, 60 per cent has been deployed on a zero footprint architecture with no air conditioning, thereby reducing dependence on diesel.

In January 2016, Reliance Jio Infocomm Limited announced that it is deploying green telecom towers in Maharashtra that will utilise only one-fourth of the power consumed by the existing conventional towers. These pollution-free towers operate on lithium-ion batteries, thus eliminating the need for space and diesel generators.

Progress on RESCOs

In 2012, the telecom industry adopted the renewable energy service company (RESCO) model, under which the latter sets up renewable energy-based power plants near telecom towers and sells power to the telecom companies at a predetermined cost on a pay-per-use model and with committed long-term power purchase agreements (PPAs). The power generated by the RESCO is off-grid and can also be sold to the communities in the areas near the power plants.

However, till now, the model has had limited uptake, with only two RESCOs engaged for deployment of renewable energy technologies at 1,100 sites as of September 2016. Challenges with regard to scalability, financial viability and non-bankable business model have deterred the adoption of the RESCO framework, which otherwise holds immense potential in addressing energy management needs at tower sites.

Policy push

On the policy front, the Department of Telecommunications (DoT), through a directive issued in January 2012, mandated stringent targets for implementing green technologies in the telecom sector. As per the directive, 50 per cent of rural sites had to be powered by renewable energy

sources by 2015 and deployments needed to go up to 75 per cent in rural areas by 2020. While the intent behind them was much appreciated, these guidelines were considered too ambitious, almost unrealistic, given the financial and technical challenges faced by operators. Following a series of representations by the tower industry, DoT referred the matter to the Telecom Regulatory Authority of India (TRAI) for review in March 2016. TRAI has reportedly been asked to review the green energy norms after a DoT-led inter-ministerial panel suggested that the directives issued in 2012 be recalibrated after assessing the current status of renewable energy technology (RET) deployment and also taking stock of the new stirrings in the RET space, especially with the advent of new cost efficient energy solutions and advances in battery technologies for mobile networks.

Challenges and the way forward

Although go-green has emerged as a popular theme in the telecom space over the past few years, the stressed financial position of operators has dissuaded them from investing the huge sums needed to set up capacity to generate energy from alternative sources. The large-scale capex requirement for deploying renewable energy solutions is challenging at a time when companies are struggling to meet even their operational expenditure. In addition, most renewable energy sources need to be accompanied by appropriate storage technologies, which further adds to the capex.

However, given the fact that the energy needs of the telecom sector will continue to grow even more over the next few years, with the deployment of a large number of mobile towers and increased uptake of data services, the government will have to look for ways to provide tower companies with financial incentives. These could take the form of tax holidays or accelerated depreciation to make up for the additional capex required for deploying renewable energy solutions.

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