

The growing deployment of towers and base transceiver stations (BTSs) has increased mobile penetration in India. However, it has also added to the country's carbon footprint and stretched the energy expense sheets of operators and tower companies. Given the lack of uninterrupted grid power supply in the country, the telecom industry deployed diesel generator (DG) sets as a key source of power for their towers. Eventually, owing to the rapid proliferation of telecom services into every nook and corner of the country, the Indian telecom sector became one of the biggest consumers of diesel in the country, its carbon footprint only second to Indian Railways. This also led to the growing energy bill of tower companies as the energy costs accounted for more than one third of a site's opex.

The situation has changed significantly in the past couple of years as operators and tower companies have made concerted efforts to reduce their dependence on diesel. The industry has deployed several successful energy management strategies such as reducing power consumption at network sites, improving efficiency of existing systems, reducing diesel dependence through energy storage, and deploying renewable energy solutions. As a result, it has been able to convert 100,000 sites into zero-diesel sites. The target at hand, however, is much bigger, given that the country has over 450,000 towers and 1,600,000 tenancies, both of which are steadily increasing with the adoption of 4G services. Further, the precarious grid power supply situation in the country makes it difficult to maintain a continuous uptime of telecom networks, thus preventing a complete removal of DGs from several sites. In addition, there are several operational challenges faced in the deployment of renewable energy technologies, due to which their adoption has been limited so far.

Industry initiatives

The industry has been deploying a host of strategies to reduce diesel usage while maintaining uptime. These include converting sites from indoor to outdoor, and deploying energy efficient storage solutions, solar cooling units, lithium-ion batteries and free cooling units.

Bharti Airtel has been using advanced battery backup solutions such as VRLA and lithium-ion at its tower sites. It has also installed the Auto TRX shutdown feature at nearly 80 per cent of its sites to ensure that the equipment remains switched off during non-peak hours. According to the company, 70 per cent of its installed network base has no air conditioning, which reduces dependency on diesel fuel. In its sustainability report for 2016-17, Airtel stated that it has

achieved 75 per cent reduction in CO₂ emissions per terabyte (TB) in its network infrastructure in the last four years. The operator also achieved a 28.7 per cent reduction over 2015-16. Further, it has saved 1.3 million litres of diesel in its infrastructure operations. The company has over 3,200 solar-enabled towers deployed by its infrastructure partners. In the past five years, 17 rooftop solar plants have been set up at Airtel's main switching centres, with a total generation capacity of 1 MWp. During 2016-17, rooftop solar plants with a total installed capacity of 193 kWp were installed at three locations. Airtel also deployed low-power consuming BTSs, which have reduced its power consumption by a minimum of 30 per cent over the past four to five years. In 2016-17, it deployed 4,301 such base stations. Airtel has also resorted to outdoor BTS deployment, which has helped in reducing its energy requirements by 30 per cent. In 2016-17, the operator deployed 7,206 outdoor sites.

Further, hybrid battery solutions have been implemented in over 11,946 additional sites by Airtel's network partners across the country to reduce the use of diesel. Several indoor sites have been converted into outdoor sites to avoid running air conditioners during favourable ambient temperatures and reduce the consumption of grid power. In fact, free cooling units (FCUs) and solar natural cooling units (SNUs) are being used to replace air conditioners. FCUs have been deployed at 48,973 tower sites, while 50,000 sites have been moved from indoor to outdoor. Meanwhile, trials for solar natural cooling in 381 sites were completed with 300 Wp power systems installed on each site and partner sites by switching off air conditioners and utilising SNUs to meet the energy demand.

The company has also deployed a solar-DG hybrid solution, which uses solar panels of 3 kW-7 kW capacity along with battery banks. With this, Airtel has been able to reduce the DG run hours from 20 hours to six hours a day by providing 18 hours of power. The system is further optimised by a hybrid solar controller. In 2016-17, 3,263 solar hybrid solutions with an installed capacity of 17.4 MWp were installed by Airtel and its partners.

Meanwhile, over 19 per cent of Idea Cellular's telecom towers are operational with hybrid solutions. Further, 10,500 sites have been converted from indoor to outdoor. Over 40 per cent of Idea's BTS portfolio comprises outdoor BTSs, which help reduce energy consumption by 25 per cent. The cumulative installed capacity of hybrid renewable energy technology and power purchase agreements is around 12 MW. Idea, in association with the United States Trade Development Agency, has conducted trials of solar hybrid methanol based fuel cell systems to power telecom towers. Five such sites have already been commissioned. Moreover, according to Idea, 90 per cent of its data centre servers are virtualised. Virtualisation enables us to reduce the power utilisation per day at the data centre from 9 kVA to 3 kVA.

Indus Towers in its latest sustainability report has stated that by 2015-16, it had deployed 50,461 diesel-free sites across 15 telecom circles by utilising clean sources of energy for backup and taking energy efficiency measures. As part of its Shut AC initiative, Indus has been replacing air conditioners with FCUs and NCUs to maximise the conversion of sites from indoor to outdoor. Indus has reduced the use of air conditioners by converting 50 per cent of its total tower portfolio to outdoors. As a result, energy consumption of mobile towers has lowered by 25-30 per cent, while carbon emissions have also been reduced significantly. The company achieved around 10.39 per cent reduction in diesel consumption in 2015-16 over the previous year. The company has also deployed solar solutions at over 1,000 sites, which has helped in reducing its carbon footprint.

As of June 2017, the towerco has over 36,000 towers across green towers, of which 3,000 are solar-powered towers. The company has also implemented hybrid battery bank solutions at various tower sites. Meanwhile, it is focusing on reducing power consumption through the deployment of free cooling units, which utilise the outside ambient air for cooling the shelter.

RET adoption continues to be slow

Renewable energy technology (RET) for powering telecom sites has not taken off in a big way in India. This is on account of high and incremental capex involved for the deployment of RET solutions as most of these are installed in addition to DG, and their low technical and commercial feasibility. Further, the slow adoption of RETs is evident from the fact that while most of the industry participants have been able to meet the carbon footprint reduction targets, this reduction has been achieved by adopting a series of measures other than RET solutions.

In January 2017, the Telecom Regulatory Authority of India (TRAI) came out with a consultation paper on sustainable telecommunications. RET deployment was one of the key issues for consultation. The paper sought views on the renewable energy options available and their uptake by telecom service providers. Industry stakeholders, in their responses, highlighted several reasons that make running telecom towers solely on RETs impossible.

Industry wish list

As per the licence conditions, a telecom operator needs to maintain a network availability of

more than 99.5 per cent. To meet this benchmark, there is a need for 24X7 power supply in all areas of operations. However, grid power availability continues to be erratic not only in rural areas but also in some urban areas. This is the biggest roadblock, which prevents operators and tower companies from completely ruling out diesel dependence from their energy strategy. The industry tries to use rechargeable batteries wherever possible, but these batteries too depend on grid power to some extent.

The industry has been urging the government to improve the grid power situation in the country, given the role that telecom connectivity plays in an individual's life today. The industry has requested the government to extend the preferential electricity tariffs for the telecom tower industry. The telecom industry currently has one of the highest electricity tariffs despite being granted infrastructure status in 2012, which allows electricity to be made available at preferential tariffs, besides other key benefits such as accelerated depreciation (AD), viability gap funding and tax holidays. The industry has requested the government to make necessary provisions in the draft National Energy Policy for the same.

The government can offer a host of other financial and non-financial incentives to encourage operators and tower companies to reduce their carbon footprint. Fuel subsidies can be made available to operators, either through the Universal Service Obligation Fund or any other alternative mechanism particularly in remote areas, which are facing a significant power deficit. Funds can also be made available through other government agencies such as the Ministry of New and Renewable Energy and Bureau of Energy Efficiency, to encourage the deployment of alternative energy sources. Further, capital subsidy could be provided on the cost involved in setting up renewable energy solutions. The government should also look at import subsidies and AD benefits for energy-efficient solutions.

Relaxation in standards

While responding to TRAI's consultation paper on sustainable telecommunications, several industry stakeholders had cited PwC's Technical and Financial Feasibility Report of RET and Carbon Footprint, released in 2014, which stated that the carbon footprint from the telecom industry was only about 1.5 per cent of the total carbon footprint from all industries in the country. It also stated that TRAI's recommendations of 2012 on green telecom were far more stringent than international standards. Needless to say, the regulator's targets, where RETs were envisaged as the prominent technology for powering towers, have largely remained unmet.

The industry, is therefore, urging the government to follow a light touch regulation in this regard. Further, given the current distressed financial state of telecom operators and ongoing changes in the sector's competitive landscape, it would be better to continue with the approach of self regulation and voluntary compliance.

The industry has already achieved a 44 per cent reduction in energy consumption per BTS, as far as active load is concerned. On the passive side, infrastructure sharing has led to almost 45 per cent reduction in energy consumption across a BTS site. Further, conversion to outdoor BTSs, deployment of FCUs and use of new tower configurations such as distributed antenna systems have also led to substantial savings (2.5-4 tonnes per site).

Conclusion

Driven by the mass adoption of 4G and implementation of the Digital India and Smart Cities programmes, the number of tower sites is likely to go up. The increasing deployment of new sites and the growing load on existing sites will add to the energy consumption of the sector. While the industry is highly inclined towards achieving the bigger goal of effective and efficient energy management, it cannot do so without relevant government support. The availability of consistent power supply is a key prerequisite in this regard.

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