

# Push Clean Energy with Innovation, Technology



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At the end of January this year, a group of MPs submitted an expert report on renewable energy to the Prime Minister. According to the report, India today has 75 million households without access to electricity. Per-capita consumption in rural households stood at only 8 units per month compared to 24 units in urban households. In 2001-02, the government pledged to provide "electricity for all by 2012", a target that was later deferred to 2017.

We need to meet our energy demand, while focusing on reduction in emissions. This must be achieved by planning power generation on a fuel mix while improving efficiency and controlling emissions through use of technology and clean sources of energy.

The last few years have seen an increasing thrust on renewable energy generation. While the total medium-term potential, say, by 2032, for power generation from renewable energy sources in India is about 1,83,000 MW, the 12th and 13th Five-Year Plans have envisaged an additional capacity of 18,500 MW and 30,500 MW from renewable sources respectively. The government has also offered various incentives to help the sector, but there are challenges to be dealt with.

The National Action Plan on Climate Change has set a renewable purchase obligations (RPO) target of 15% by 2020. The RPO is the minimum percentage of the total power that electricity distribution companies and some large power consumers need to purchase from renewable energy (RE)

sources. RPO creates a minimum market for renewables in the absence of pricing externalities of conventional power generation.

However, the state electricity regulatory commissions set year-wise targets. Though most states have set RPO targets for solar and non-solar renewable energy, compliance is low. To address the mismatch between availability of RE resources in the state and the requirement of the obligated entities to meet the RPO, the government introduced the Renewable Energy Certificate (REC) mechanism.

The REC programme is a good initiative and encourages the optimum use of renewable energy sources. In wind energy, Tamil Nadu, Karnataka, Maharashtra, Gujarat, Rajasthan and some parts of Andhra Pradesh and Madhya Pradesh are resource-rich. While the discoms can meet their RPO in these states by buying wind power, another state that does not have wind or solar generation or potential can trade through the REC mechanism.

Under the REC mechanism, projects are set up in the vicinity of potential sources and developers are given a

choice to either sell this power at the feed-in tariffs or sell it to the state at the average procurement price, comprising all sources of energy.

There are various challenges related to the infrastructure of renewable energy generation and transmission. Wind and solar power require land. Land acquisition is getting more and more difficult and one needs to be close to the evacuation point. Due to the short gestation period of RE plants, the transmission has to lead generation and needs upfront investment.

The basic technical challenge comes from the variability of wind and solar power that affects the load balance, varying demand for reactive power and impact on voltage stability. The Indian grid suffers due to lack of adequate infrastructure for transmission and distribution. The condition is even worse for the southern region that has seen limited capacity additions and is connected asynchronously to the rest of the grid.

Adoption of automation and monitoring systems in transmission and distribution systems is essential. There is also a need to focus on smart infrastructure to reduce energy deficit. In addition to the lack of infrastructure to evacuate renewable energy power, there is also lack of communication systems to capture real-time RE generation data.

Analysts suggest that India's energy demand is expected to double by 2035. With the need for power coupled with the requirement to meet emission reduction targets, it is imperative to increase the fuel mix in the country. Renewables contribute only 17% to our power requirements against 59% generated through coal. Despite the challenges, there is immense potential for the renewable sector in India.



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