

Solutions Factory

Circumventing the Challenge of Grid Integration: Can India Integrate its Renewable Energy?

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India is the fastest growing major economy in the world and is likely to retain that spot in the foreseeable future. However, affordability, adequate availability, and reliability of energy in general, and electricity in specific, continues to pose a risk to the pace at which we grow to becoming a five trillion-dollar economy. Globally, renewable-energy-based electricity is becoming one of the most affordable sources of energy. India has been a champion in demonstrating the role of market design in driving the price decline in renewable energy (RE) technologies, and demonstrated one of the lowest tariffs for solar and wind energy in the world.

Preempting the decline in the costs of renewable energy, the Indian government announced massive targets of 175 GW of renewables-based capacity by 2022. This created robust competition in the sector and attracted marquee investors to the Indian renewable energy market. As a result, India has installed more than 77 GW of renewable capacity. However, as India plans to add as much as 100 GW of renewables in the next four years, integrating renewable energy and the associated costs, is emerging as a primary barrier for system operators and prospective investors. Curtailment risk, a risk that a renewable energy plant would not be able to inject to the grid the power it could produce due to transmission constraints, is the centrepiece of the grid integration risk.

With growing competition in the market, the extent to which developers factor curtailment risk into their bids is unclear. When this risk manifests, banks and investors are, or could often be, left with stressed assets. Mitigating this risk could lead to lowered cost of capital for RE projects, effective resource utilisation of installed RE capacity, lower RE tariffs, and in effect, lowered GHG emissions. India is undertaking initiatives to reform utilities and upgrade the grid. But these systemic corrections have a much longer gestation period than the pace at which renewable energy capacity is being added to realise India's 2022 targets.

The deployment of better forecasting and scheduling techniques and storage solutions could reduce the quantum of curtailment to some extent. However, there is a need for risk sharing, through innovative risk instruments, to address the issue of curtailment in the short to medium term. The CEEW Centre for Energy Finance proposes one such instrument called the Grid Integration Guarantee (GIG). Robust take-or-pay provisions to deal with curtailment through the power purchase agreements (PPAs) is another solution.

The Solutions Factory hosted as part of Energy Horizons 2019, CEEW's annual flagship event, designed as a candid and interactive 60-minute session, will try to identify and debate solutions, to de-risk renewables. The participants will include market players such as independent power producers (IPPs), active investors, lawyers, representatives of banks, development finance institutions (DFIs), and civil society actors.

With this session we aim to achieve the following objectives:

- Identify the missing data points, analytical pieces, and mechanisms to monitor and establish the state of curtailment in India and emerging economies around the world
- Discuss both the pre-connectivity (unavailability of transmission line, etc.) and post-connectivity (curtailment) issues related to grid integration
- Establish the important features of the Grid Integration Guarantee and the PPA provisions to respond effectively to the risk posed by the integration of renewables into the grid