Renewable Energy Integration Challenges

(Preparation of state action plan for 10 different states)

By

(Rajnath Ram, Joint Adviser, NITI Aayog)

The average intensity of solar radiation received in India is about 200 MW/km. Among the various renewable energy resources, solar energy potential is the highest in the country. In most parts of India, clear sunny weather is experienced 250 to 300 days a year. The annual radiation varies from 1600 to 2200 kWh/m2, which is comparable with radiation received in the tropical and sub-tropical regions. As per Ministry of New and Renewable Energy, the total Solar Power Potential in India as per recent estimates is about 750 GW.

As per the National Institute of Wind Energy (NIWE), the total wind potential in India ranges from 748 GW at 80m hub-height (and minimum 20 percent capacity factor) to 976 GW (and minimum 22 percent capacity factor). Under the "all farmland included" case the potential with a minimum capacity factor of 20 percent ranges from 984 GW to 1,549 GW. The potential may be even higher when hub-height is increased from 80 m to 120 m.

To fully take advantage of India's RE potential over the next few years, key questions emerges that how the RE can be a game change, this call not only the change in initiatives from central and state governments — beyond policy and programs currently in place but also to support the engagement, participation, and new behaviours of power sector stakeholders including RE industry and developers, grid operators, public and private finance, consumers, and others.

Renewables are different than conventional power technologies. Most renewables have zero fuel costs but they are more capital-intensive than conventional fossil power plants. Keeping in mind the target of 175 GW RE by 2022 and with the renewable electricity resources becoming commercially available in the marketplace, beyond policy and programs currently in place — to support the engagement, participation, and new behaviors of power sector stakeholders including RE integration challenges need greater attention.

NITI Aayog developed India's Renewable Energy Roadmap 2030 (February 2015) and published a Report of the Expert Group on 175 GW RE by 2022 (December 2015), proposing strategic interventions for achieving India's ambitious RE targets of 175 GW by 2022. The efforts involved several rounds of multiple-stakeholder discussions, concluded that to encourage Renewable Energy, it is felt that there is a need to align the multiple activities which were under taken up by different agencies.

In order to achieve this objective and enable this coordination, NITI Aayog constituted a two-tier structure consisting of an Advisory Group (AG) and a Steering Committee (SC). The AG is chaired by the Vice Chairman, NITI Aayog with state energy ministers of about 10 states and Minister of Power as members, while the SC is chaired by CEO NITI Aayog, with state energy Secretaries and Secretaries of concerned ministries as the members. The first Steering Committee meeting was held on 20th June 2016 at NITI Aayog, New Delhi.

The Steering Committee (SC) provides a platform among the different stakeholders at the central and state levels to discuss market and infrastructural issues related to management of electricity generated from renewable sources and its integration issue with the grid. The 10 states identified for this activity are: Tamil Nadu, Andhra Pradesh, Telangana, Karnataka, Madhya Pradesh, Maharashtra, Gujarat, Rajasthan, Punjab and Assam.

NITI Aayog has supported the above states in terms of creating state level Working Groups, appointing consultants and resources for the preparation of the State Renewable Electricity Capacity Addition Roadmap—an action plan to achieve the states' 2022 renewable energy target and addressing the issue of RE-Integration. The Confederation of Indian Industries (CII) is assisting NITI Aayog in this regard.

Further, with the continuing megatrend of urbanization in India, the possible use of rooftop photovoltaic plants offers an outstanding opportunity to contribute to a climate-neutral energy supply that is integrated into urban space. Therefore, the aspects of safety, reliability, and costs concerning the integration of rooftop systems into the distribution network on such a large scale have to be also taken due considerations.