RES and EES situation in India

India is the world's third-largest producer of electricity. The country's installed power generating capacity of 334399.83 MW as of January 2018 is the world's fifth-largest. Over the last five years, India put up 99.21 GW of additional capacity. India has been mainly depending on the fossil fuels for its electrical energy needs. Coal-based power plants serve 61% of the total demand. In order to reduce economic burden, pollution, oil imports and to promote renewable energy sources (RES) utilization, Government of India (GoI) has launched several programmes and policies. RES capacity of the country has increased from 6 MW in 1985 to 57260 MW in 2017. Of the total installed capacity of around 334399.83 MW as on 31st January 2018, and the break-up comprises coal (193821.50 MW), gas (25150.38), diesel (837.63 MW), nuclear (6780.00 MW), hydro (44963.42 MW), and RES (62846.90 MW).

With diversity of producers of electrical energy, India today needs large-scale storage systems that can be economically utilized balancing between the peak and non-peak loads. Electrical energy can be stored using different storage schemes like mechanical storage, electrochemical storage, electromagnetic storage, electrostatic storage, thermal storage, etc. Electrical energy storage (EES) can enhance the grid stability in multiple dimensions. Developed countries like US, Japan and of the Europe have developed some large-scale EES systems, and in many countries like China in Asia and Brazil in South America construction works of large-scale EES are progressing well.

All over the world renewable energy systems (RES) are gaining more popularity in recent years. One of the challenges faced in the increased penetration of RES is the grid stability issues. Diesel or hydel plants usually serve as peak hour energy providers and there are limitations in using these plants with rapidly growing RES penetrations. There are economic and technological limitations in utilizing diesel and hydel plants for generation shifting. Development of EES is important for effective utilization of RES.

Lack of policy and regulation framework for EES, uncertainty regarding peak hour pricing, uncertainty regarding market operations of EES systems, lack of indigenously developed technologies etc. are found to be the main reasons behind limited investments in this sector. In order to maintain the grid stability and incorporate high RES shares, country has to come forward with a clear guidelines and attractive tariff schemes for EES providers to enhance the storage capacity. To stimulate investments and competition in EES sector, the GoI has to update the existing regulatory frameworks and policies without delay.

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