Topic 4 : Impact of Renewable Energy Sources on the Power Scenario in Developing Countries

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S.S Mani received his Bachelors Degree in Electrical Engineering from Regional Engineering College (Presently, National Institute of Technology), Calicut in 1979, MS in Quality management from Birla Institute of Technology, Pilani, in 2012 & Post Graduate Certificate Program in Project Management from Indian Institute of Management, Indore during 2013-14. Currently, he is the General Manger of Renewable Energy Projects in NTPC Ltd, India. NTPC is India's Largest Power Utility Company and, as on Nov 2013 NTPC is having an Installed Capacity of 42 GW with 10 MWp of Solar PV Power Capacity & another 20 GW including 100 MWp Solar PV Projects are under construction. He was responsible for the Construction & Commissioning of 5 MWp Solar PV Project in Port Blair/Andaman & Nicobar Island in India. This Project is NTPC's 'Numero-Uno' Green Field Renewable Energy Project & was commissioned in a Benchmarking Schedule, thereby bagging the Company Award for Best Performance in Project Management (Renewable Projects) for 2012-13.He was also Head of Technical Services/Planning & Systems at NTPC's 2600 MW Coal Based Project at Ramagundam & 350 MW Naphta Based Combined Cycle Power Project at Kayamkulam.

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Abstract

Renewable Energy sources, especially Wind & Solar, are playing a significant role in meeting the ever increasing Energy Demand not only in Developed countries but also in the Developing Economies. This is primarily because of the importance of Energy Security & stringent Environmental Norms/Regulations further accelerated by depleting fossil fuel sources like coal/oil etc. In India, out of the Installed Capacity of 229 GW (as of 2013) about 29 GW only is being supplied by Renewable Sources, mainly Wind (20 GW) & Solar (2 GW). The Global Solar PV Capacity has exceeded 100GW.By 2020 India's Solar Energy Portfolio alone is anticipated to be 20GW. This

Growth also brings in new Challenges and Opportunities for the Industries and Researchers in this area. Technology, Cost Reduction /Tariff –Affordability, Land/Water Requirement vis-a-vis Environmental Impact /Reducing Carbon Foot prints, Renewable Purchase Obligations /Renewable Energy Certificates, Low Market Value of CER/Carbon Credits, Bulk Energy Storage Batteries for Solar Plants during Non-Solar Time etc are of Vital Importance. Though Wind & Solar are environmental friendly in respect of reducing carbon footprints, other environmental and economic challenges are posed from sustainability metrics like requirement of scarce/costly resources like land and also water (for Solar PV Modules Washing and for Solar Thermal).Further Wind Turbine Generators raises issues like acoustic pollution/inconvenience to the fauna in the Eco System like Habitat loss, Bird Migration etc. Technological issues that are of equal importance inter-alia include Wind Turbine Generators of High Capacity (2-5 MW),gearing up for gear less transmission, Logistic Constraints for moving Over Dimensional Consignments like WTG Blades /Nacelle etc to Remote Locations, Off Shore Wind Farm Potential-Wind Resource Assessment (WRA), IGBT Technology Inverters of Higher Capacity (1MW and above)/Outdoor Design for Solar PV Plants, Development of Low Cost (Polycrystalline) PV Modules, Motorized Sun Tracking System, Motorized Seasonal Module/Structure Tilt Angle System ,developing site specific Wind & Solar Radiation/Insolation Forecasting software Models for Energy Estimation on day ahead basis for scheduling by Load Dispatch Centers, reactive power metering & managing power system harmonics/load variations/grid disturbance due to fluctuating load/frequency etc.