Renewable Energy and Smart Grids in India

Reena Suri

Executive Director

India Smart Grid Forum

About India Smart Grid Forum (ISGF)



- A Public Private Partnership initiative of Ministry of Power, Government of India established in 2011 and registered as a Not-for- Profit Society
- Responsible for accelerated development of smart grid technologies in the Indian power sector with development of global standards, technology selection, training and capacity building
- 200+ members comprising of ministries, utilities, technology providers, academia and research
- Evolved as a Think-Tank of global repute on Smart Grids and Smart Cities
- 8 Working Groups: Grid Modernization & Smart Cities; IoT, Smart Metering, AI & Analytics; Digital Architecture and Cyber Security; Policy, Regulations and Business Models; Renewables & Microgrids; Flexibility & Electric Mobility; Smart Gas; Smart Water

Key Objectives of ISGF

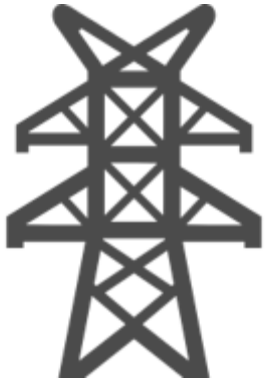
- *Policy advocacy, standards development, training and capacity building for utilities*
- *Knowledge dissemination on emerging technologies and best practices through case studies, reports, white papers, bi-lateral and multi-lateral workshops, technical seminars etc.*
- *Support Utilities and Regulators for Grid Modernization and Smart Grid Roadmaps and Regulations*
- *Platform for exchange of ideas and information to support development of use case scenarios for India*
- *Conduct feasibility studies on new technologies and assist in pilot deployments in India*

Overview of Indian Power System



One Nation – One Grid

- **India has the 3rd largest power system in the world**



Modern Transmission System:

- **800 kV and 500 kV HVDC Lines**
- **765 kV and 400 kV AC Lines**
- **5 Regional Grids with regional and one National Control Centre**
- **Each state has their own State Load Dispatch Centres**



370 GW capacity
300 million customers - One Grid covering >3 million SqKm operating in one frequency



Electrification

- **619000 villages and 99.99% households electrified**
- **26.3 million households electrified in 17 months (Nov 2017 to March 2019)**

Overview of Indian Power System

- Central Government and State Govt owned Generation, Transmission and Distribution companies
- As well as Private Generation, Transmission and Distribution companies – role of private sector in Generation is about 40% but in Transmission and Distribution it is less than 5%
- 72 Distribution Licensees in India
- Central Electricity Regulatory Commission (CERC) and 29 State Electricity Regulatory Commissions regulate the Electricity sector in India

Renewable Energy Scenario

- Pursuing a target of 175 GW RE by 2022
- Already commissioned 87 GW RE that contribute about 8% of the total energy consumed presently (Hydroelectric plants not included in this 87 GW) – majority coming from Wind about 40GW
- To meet India's INDC commitments per Paris Agreement (which is 40% electricity from non-fossil resources by 2030) we have set the new target of 450 GW RE by 2030
- Most of new RE will come from Solar and Wind including Off-Shore Wind
- 450 GW is expected to contribute >40% of energy by 2030 (87 GW is already contributing 8% energy)

Renewable Energy Integration Scenario

- Transmission Grid is “smart” with state of the art Communication and Automation Systems – 5 Regional Control Centers and a National Control Center with SCADA/EMS and 1100+ Phaser Measurement Units (PMUs)
- “Green Corridors” - high voltage transmission lines connecting large solar and wind farms that connects RE generation with regional pooling stations
- Renewable Energy Management Centers: (REMCs): 11 REMCs with sophisticated tools for RE forecasting integrated with weather forecasting data under implementation and 4-5 already commissioned. REMCs are in the 7 RE rich states in the Northern, Western and Southern regions, 3 in the respective regional control centers and one at the National Control Center
- ISGF estimated about 17 GWh of ESS for integration of 175 GW RE by 2022
- Pilot projects on ESS being undertaken in different regions and results being evaluated

Smart Grid and Digitalization Scenario

- The private sector utilities in Delhi, Mumbai, Kolkata and Ahmedabad have implemented several Automation and IT systems and are advanced stages of smart grid journey
- Under a program by Ministry of Power (R-APDRP and IPDS), 1400 large towns in the country have implemented basic IT and automation systems in their electricity distribution grid – AMR for 11kV feeders and distribution transformers, GIS maps covering all electrical assets and consumers, IT networks, call centers, billing systems, data centers etc.
- 11 Smart Grid Pilot Projects (5000 to 35000 customers) implemented successfully in different states; now larger projects are being taken up
- Ministry of Power made plans for launching 250 million smart meters in next 4 years and soon100 more towns with SCADA DMS – this is expected to be announced very soon

Thank You

www.indiasmartgrid.org
reena.suri@indiasmartgrid.org
@suri_reena