Renewable Energy Management Centers in India

05th Jun 2017

Power Grid Corporation of India Ltd
Indian Power System: Paradigm shift in Generation Portfolio

Generation: 327GW
Renewable: 57.2GW
Peak Demand: 159GW
Annual Consumption: 1142BU

Generation: 534GW
Renewable: 175GW
Peak Demand: 234GW
Annual Consumption: 1566BU

- Renewable: 32%
- Hydro: 17%
- Nuclear: 8%
- Gas: 11%
- Coal: 59%
- Coal: 51%
Renewable Penetration in India-2022

- Target
  - 33-35% Reduction in Emission Intensity
  - 40% of electricity from non-fossil fuel
  - Carbon-Sink to absorb 2.5 to 3 billion tonnes of CO₂

COP-21 Commitment
By 2030

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Green Energy Corridors: Components

- Transmission System Strengthening at Intra State (InSTS) as well as Inter State level (ISTS)
- Renewable Energy management centers equipped with RE forecasting, scheduling & monitoring systems
- Dynamic reactive Compensation (SVC/STATCOM) at strategic locations
- Grid Scale Energy Storage
• RE Forecasting is critical in addressing uncertainty of VERs, facilitating grid integration of RE

• Establishment of Renewable Energy Management centers (REMC) equipped with Forecasting systems envisaged as part of control infrastructure of Green Energy Corridors

• REMCs at RE resource rich State, Regional & National level are proposed to be co-located with respective Load dispatch centers

• 11 nos. REMCs envisaged in states LDCs (7), respective Regional LDCs (3) and NLDC (1)
Background of REMCs_India

- German Govt. through GiZ provided technical assistance for preparation of REMC DPRs

- Govt. of India (GoI) assigned Power Grid Corp to implement REMCs
  - Estimated Cost – About 55 million Euros (USD 62 million )- Funded by GoI

- PGCIL to hand over the REMC upon its commissioning to respective owners (SLDC/RLDC-POSOCO)
REMC Locations

- Rajasthan
- Maharashtra
- Karnataka
- TN
- MP
- Gujarat
- AP
- NRLDC
- SRLDC
- NLDC

Map with regions marked: Rajasthan, Gujarat, Maharashtra, Karnataka, TN, MP, AP.
REMCScope of works

- Forecasting of RE generation on Very short term (15 mins), day-ahead, Intra day and week-ahead basis
- Real time tracking of generation from RE sources and its geo-spatial visualization
- Scheduling solutions including for QCA/Project Developers
- Close coordination with respective LDC for RE generation and control for smooth grid operation
- Single source information repository and coordination point for RE penetration (Static /dynamic data)
REMC main modules

SCADA

Forecasting tool

Scheduling Tool
REMC Architecture

FSP- Forecast service provider (power); WSP: Weather service provider
• Performance based payments terms
• Performance based retention terms
- Forecast available for a single area/location have different strengths & weaknesses due to weather situations
- Statistical combination of multiple forecasts using auto adaptive algorithms shall help in generating blended/accurate forecast
- Optimised Forecast to be generated at aggregated/state as well as pooling station level/QCA/Generator level

**Fx Combination & Aggregation module**

- Internal power fx (WSP)
- Combination & Aggregation module
- Final Forecast Output
Way Forward

- Implementation of REMCs in India progressively from Sep’18: 1st Project award in June’17

- Operationalisation of REMCs for SR, WR & NR packages

- 2nd Phase REMCs in few other states are to be taken up
Thank you
REMC Locations

- Rajasthan
- Maharashtra
- Karnataka
- TN
- MP
- Gujarat
- WRLDC
- SRLDC
- NRLDC

REMCEC Locations

- NLDC
  - NRLDC
    - Raj
  - WRLDC
    - MP
    - Guj
  - SRLDC
    - TN
    - AP
    - Kar
Salient features of RE Forecasting Tool

- **Data Exchange**
  - Share Static, Historical and Real Time SCADA data with Forecast Service Providers (FSPs)
  - Collect Power forecast from different FSPs as well as Internal Fx tool
  - Transfer of power forecasts to scheduling Tool
  - Historical data from Repository

- **RE Forecasting**
  - Use forecast from different FSPs and internal forecast system to generate blended final forecast
  - Week Ahead, Day Ahead, Intraday & short term forecasts

- **Analysis module**
  - Accuracy Analysis of power forecasts which has implication on payments terms – performance based payments
  - Performance based retentions terms for FSPs (after two years)