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CENTRAL ELECTRICITY AUTHORITY

Session :

Design of the Framework for National Registry of Solar Rooftop PV (SRTPV)

Presented By

Anand Singh, AGM , India Smart Grid Forum

National Registry of SRTPV

- India has over 11 GW of solar PV systems connected to the DISCOM grids (33kV, 22kV, 11kV and LT lines) which the System Operators (SLDCs, RLDCs and NLDC) have no visibility

- Hence, the daily generation (>40 GWh) from these distributed PV plants are not being considered in the daily generation forecasting, scheduling and dispatching activities

- we envisage fast scaling up of rooftop PV systems in the country in the coming years

- To monitor the generation a feeder-wise and DISCOM-wise registry of SRTPV installations. The DISCOM-wise registry can be scaled up to state-wise and a to a national registry of all the SRTPV

- Potential generation from these resources can be taken into consideration while scheduling and dispatching by the state load dispatch centers (SLDCs)

What Needs to be Done?

- Developing a Framework and Designing of the Rooftop PV Registry – Architecture, Data Fields and APIs. This will be designed DISCOM-wise and feeder-wise. The data of all distribution transformers (DTs) and PV units including the inverter details will be captured in the registry
- Historic data of existing PV units will be entered in the registry in the first phase
- Development and hosting of the Registry on a cloud platform - Making this information publicly available while maintaining data anonymity
- It can be handed over to M/s Grid Controller of India Ltd who will maintain the registry with support from respective SLDCs and DISCOMs

Outcome

- **State-of-the-Art SRTPV Registry for the Country**: The development and implementation of a SRTPV Registry that serves as a comprehensive and up-to-date resource for tracking and managing solar rooftop installations throughout the country

- **Scaling up of Solar Rooftop PV (SRTPV) Systems**: Systematic planning and management of SRTPV installations, which facilitates the expansion and scaling up of rooftop PV systems across the nation

- **Real-time Performance Analysis**: Conducting real-time performance analysis, including comparative assessments of daily, monthly, and yearly renewable energy (RE) generation from SRTPV systems. This analysis informs the operation and maintenance activities of these systems

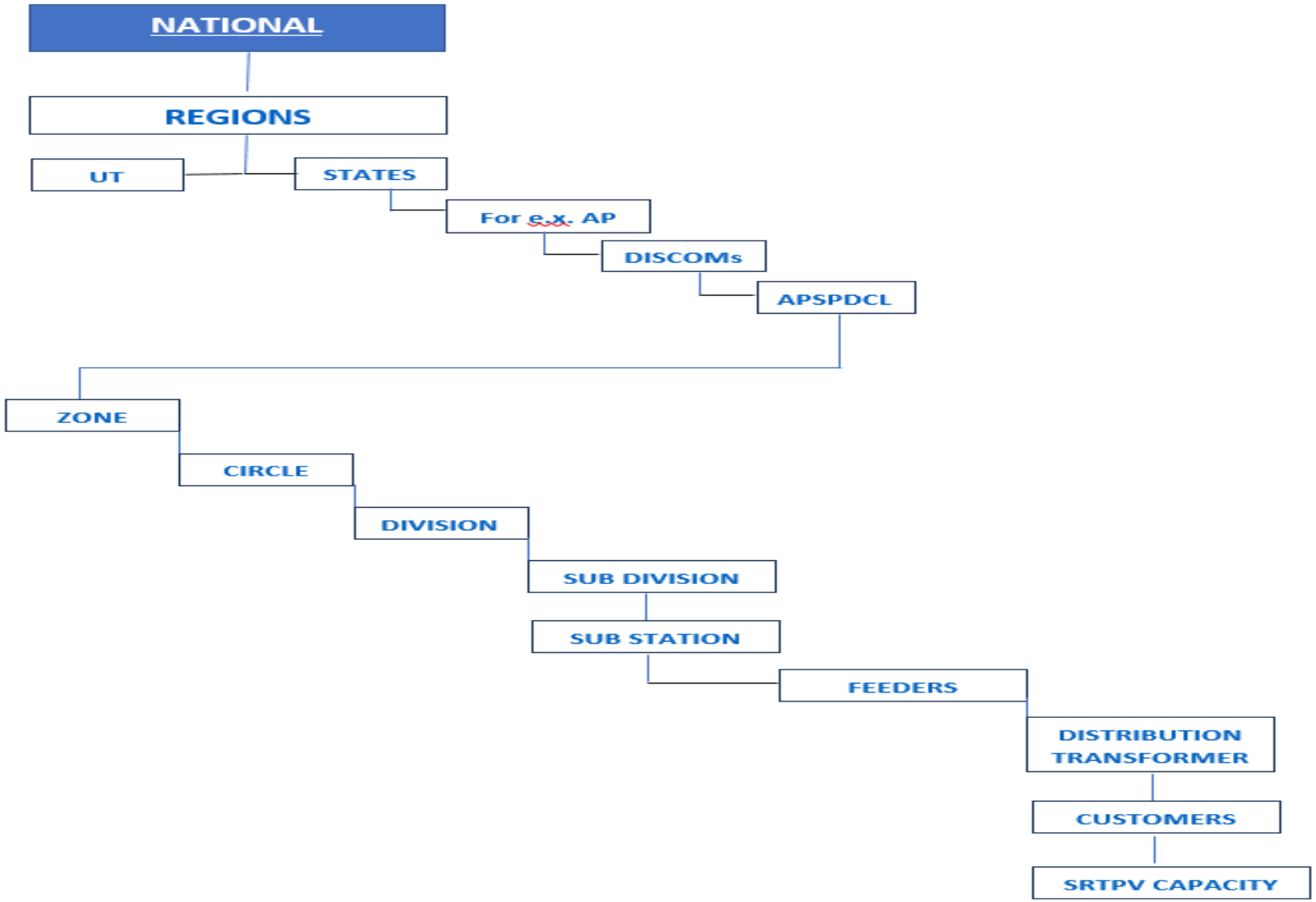
- **Generation Forecasting for Distributed RTPV**: The capability to forecast generation from distributed Rooftop PV (RTPV) systems, facilitating integration into daily forecasting, scheduling, and dispatching operations managed by State Load Dispatch Centers (SLDCs) and Regional Load Dispatch Centers (RLDCs)

- **Efficient Grid Infrastructure Management:** Increased generation from SRTPV systems reduces the electricity transmitted to local feeders, consequently lowering distribution losses. This efficiency will help in deferment of investments in grid system upgrades

ISGF is working with BIS and other Stakeholders for adoption of Smart Inverter Standards for DER connectivity with the grid

With Smart Inverters, Real-time Monitoring and Control of DER will be possible - *The SRTPV registry will be a very valuable asset, as we upgrade to regime of real time monitoring and control of DERs*

National Solar Registry Dashboard Framework

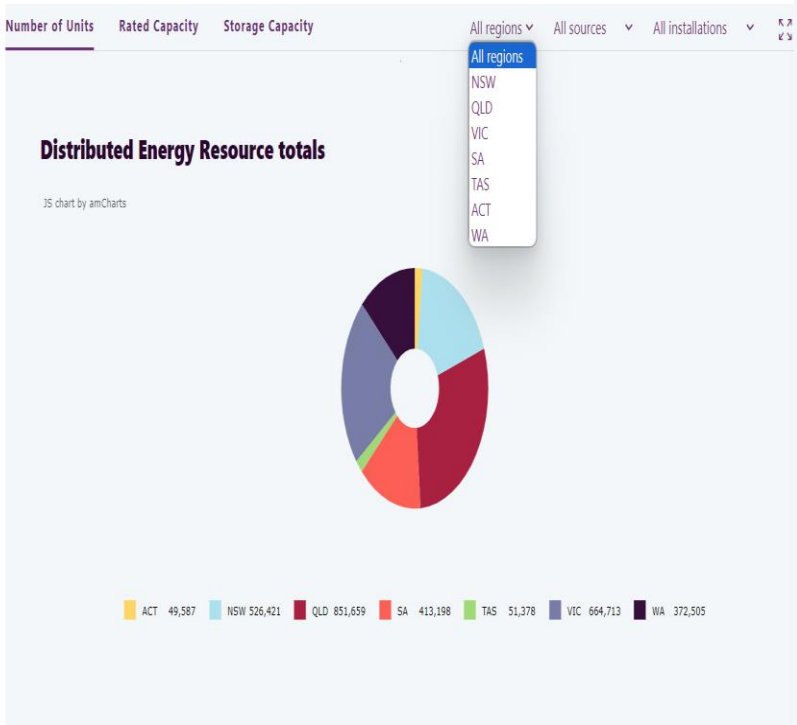


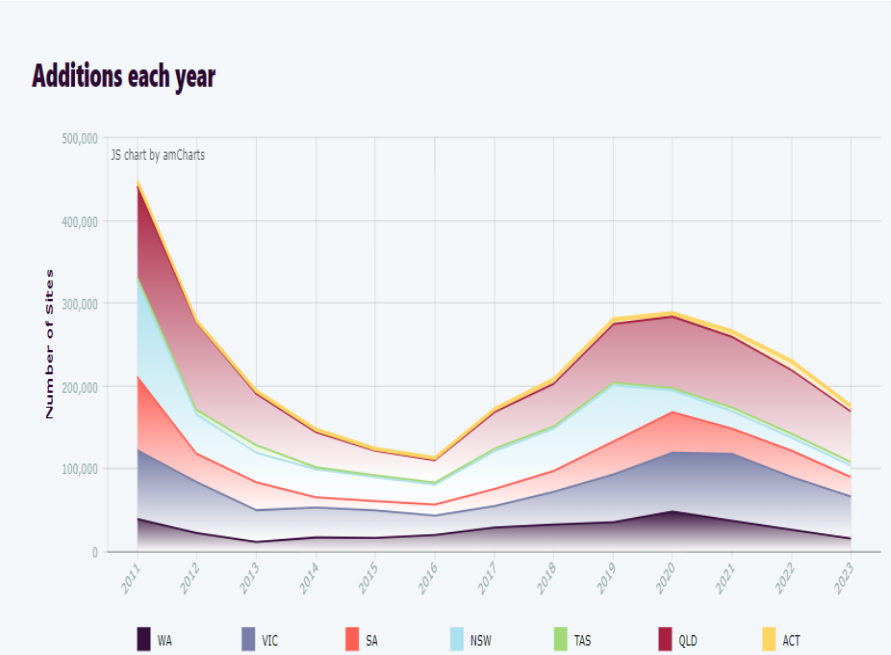
Future Outlook – Dashboard (all DER Equipment's)

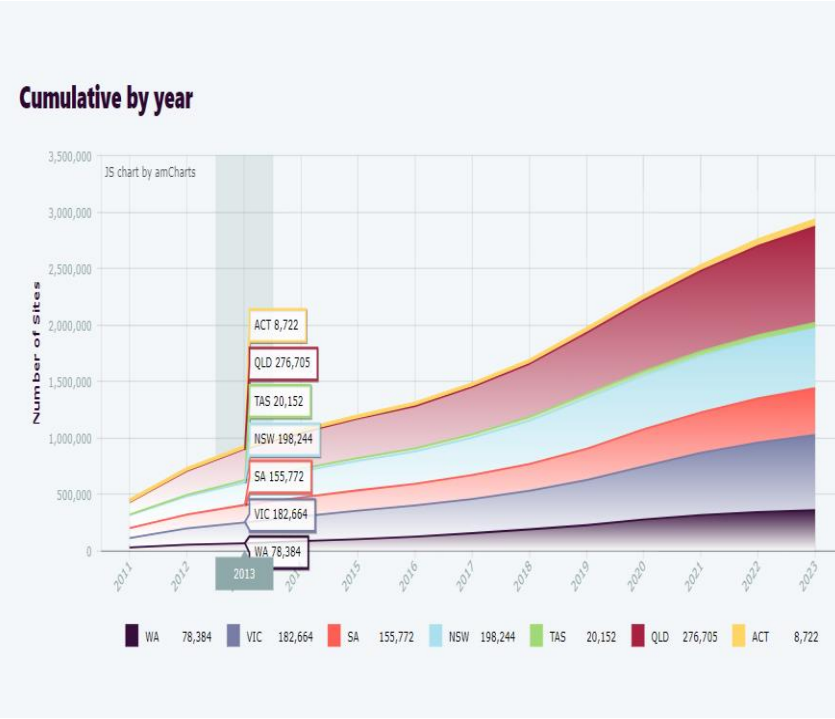
	NATIONAL	REGIONAL	STATE	DISCOM
For PV, Wind ESS, Heat Pumps and Other				
Numbers of Installations				
Rated Capacity (Cumulative)				
Additions in Previous Year				
Additions in Current Year				
Cumulative Generation Previous Year				
Cummulative Generation Current Year				
Cummulative Generation Previous Month				

International Experience Australia

- Australian Energy Market Operator (AEMO) mandated rooftop registry in 2019 And went live in 2020
- Now they are upgrading the Rooftop Registry to DER Registry – Western Australia has completed the DER in 2023 wherein there has been an addition to the Equipment Type of Solar PV – such as Battery Storage, Electric Vehicles, Hybrid Inverters
- Other regions are upgrading the Rooftop Registry to DER Registry which is likely to be completed by 2025







Data Fields Captured in AEMO Australia Portal

51 DATA FIELDS			
NMI (National Meter Identifier)	DER Equipment Type	The Standard(s) which apply to the DER Equipment	Rate of Change of Frequency (RoCoF)
Approved DER Generation Capacity	DER Equipment Unit Count	Vnom-max (sustained Operation Overvoltage Limit)	Voltage Vector Shift
DER Load Capacity	Equipment Manufacturer	Fstop (over frequency)	Inter-Trip Scheme
Export Limit	Equipment Series	Fstop-CH (under frequency)	Neutral Voltage Displacement
Import Limit	Equipment Model Number	Inverter / DRED Interaction	AEMO Device Identifier
Installer Identification	Equipment Serial Number	Voltage Response Mode / volt-watt response	Network Operator Asset Device Identifier
Connection Agreement 'Job number'	Commissioning Date	Reactive Power Mode	DER Device Type
Number of Phases Available	DER Equipment Status	Fixed Power Factor Mode	Number of DER Devices
Number of Phases with DER Installed	Equipment Injection Capacity	Power Factor Curve / Power Response Mode	Manufacturer
Islandable Installation	Equipment Withdrawal Capacity	Power Rate Limit Mode / Changes in AC Operation and Control	Model Number
Central Protection and Control Parameters	Electric Vehicle Supply Equipment (EVSE) Ownership Status	Rotating Machine Voltage / Reactive Power Regulation (In case of Wind Power)	DER Device Status
AC Connection ID	Authorised Agent	Rotating Machine Ramp Rate	Nominal Rated Generation Capacity
Network Operator Asset Identifier	DER Management Method	Rotating Machine Frequency Response Mode	Nominal Rated Load Capacity and Storage Capacity

What Next?

- **The development and Should we limit to RTPV Registry or expand to include full DER information ?**
- **Which agency of GoI should be responsible for maintaining the Registry ?**
- **How the data collection and data entry of existing RTPV systems (DER systems) can be managed ? Who will do this? And how soon this can be completed ???**
- **Which platform the Registry should be hosted – NIC or Public Cloud?**

THANK YOU

For discussions/suggestions/queries email:

anand@indiasmartgrid.org