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13th March 2024

India
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Week 2024



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Session : Emerging Technologies for Utilities Distribution System Operators (DSOs)

Presented By

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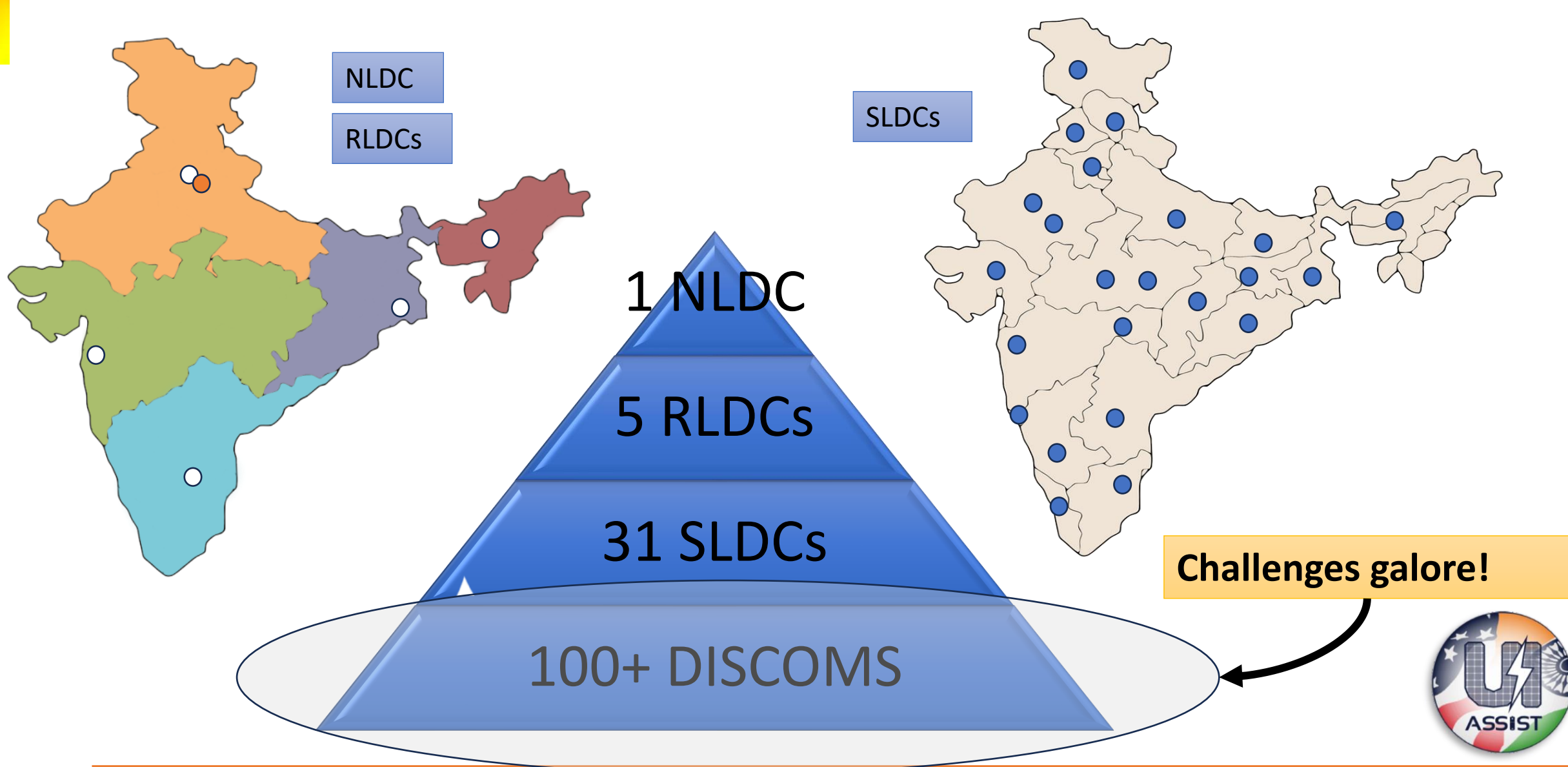
@indiasmartgridforum

INTRODUCTION



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Changing Distribution Landscape



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Global Clean
Electrification
Drive



India's
Renewable
Target 2030

PM Surya Ghar Yojana

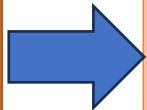
Electric Vehicles

Battery Energy Storage

Demand Response Scheme

Electric Cooking

Passive
Distribution
Network



Massive Change in Physical Layer



Active
Distribution
Network



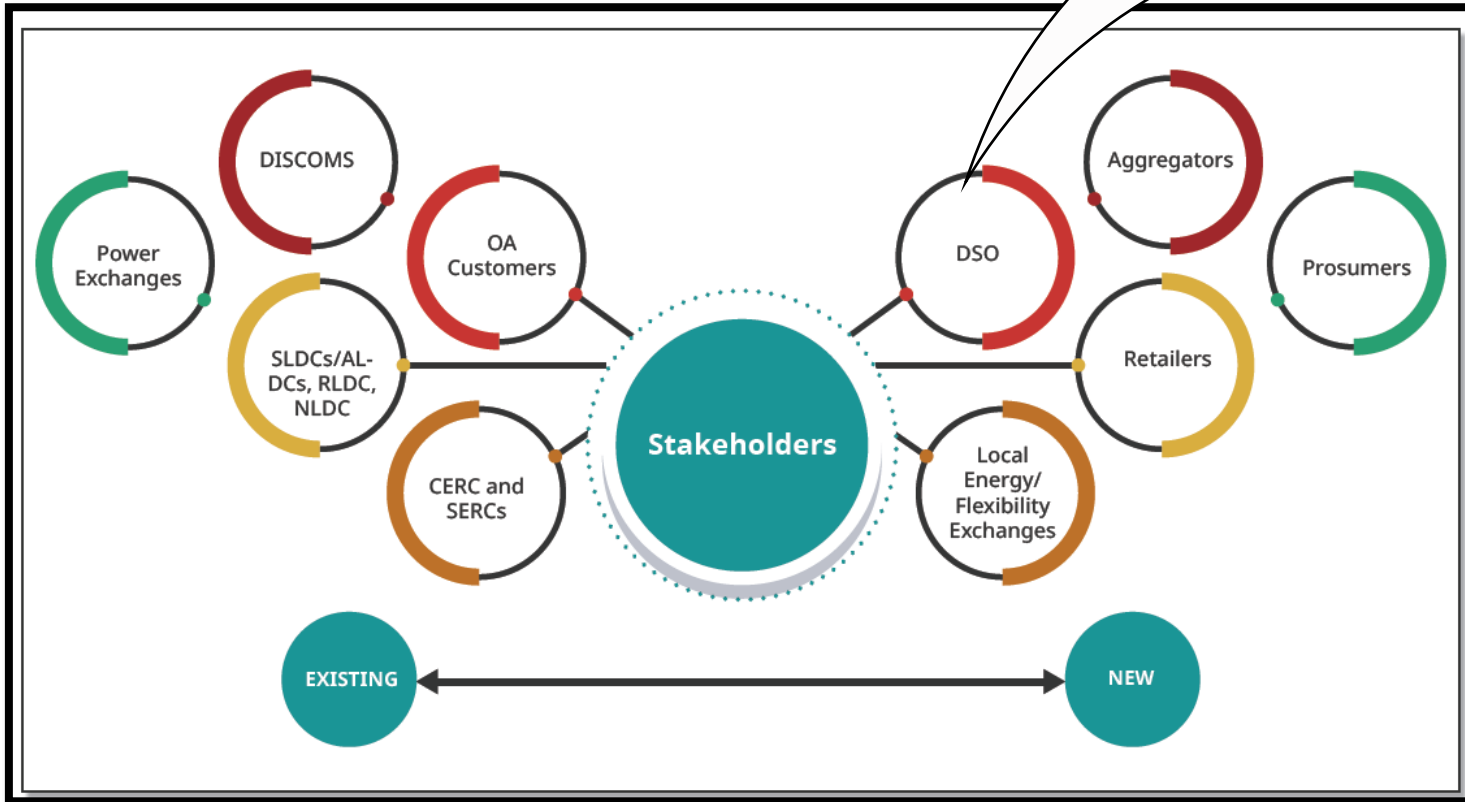
What to expect?

- Epoch change in Distribution system operation philosophy
- Bi-directional power flow
- Lack of visibility
- Emergence of prosumers
- Handling of flexibility services
- Data handling
- Market access
- Change in consumption trends
- Business as usual – NOT an option!

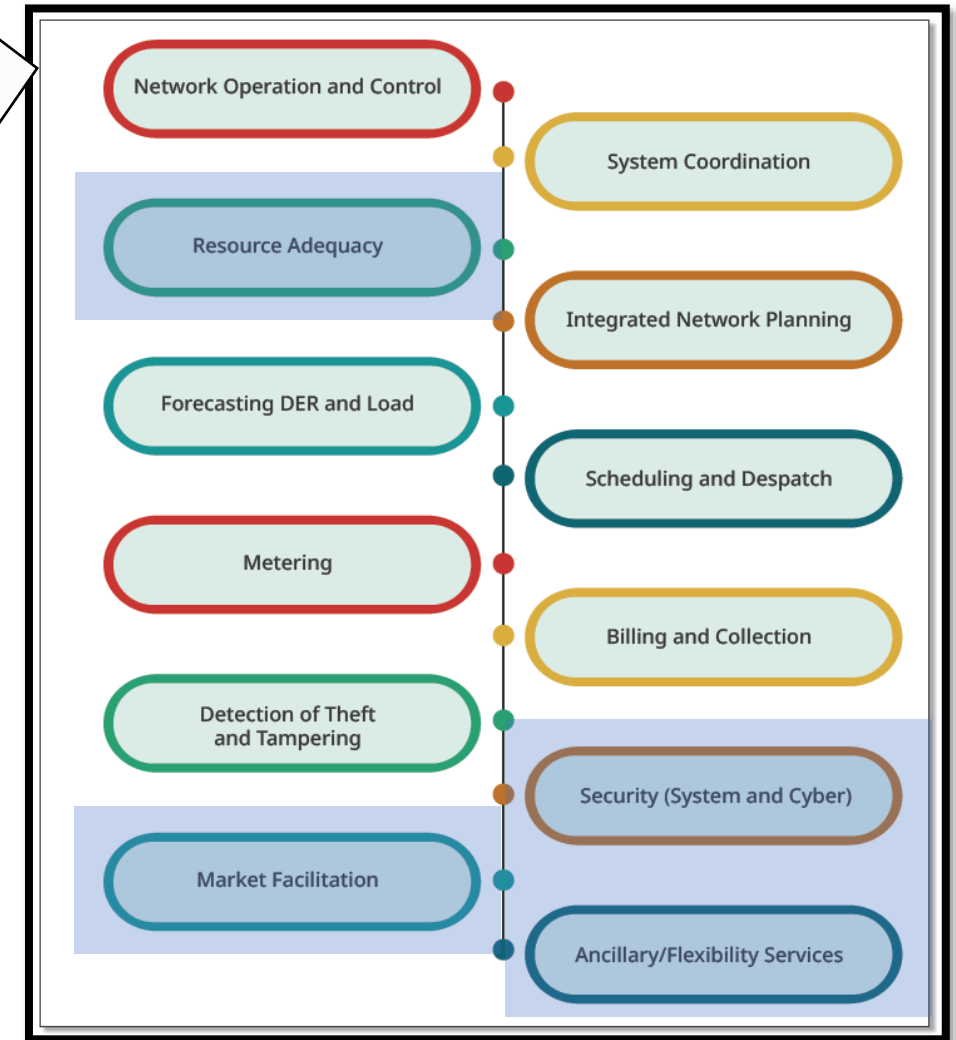
**DSOs
Absolute Must!**

What is DSO and what does it do?

Existing and anticipated new stakeholders in large scale DER Setup



Typical DSO functions in DER integrated ADNs





Why DSOs in India?



- Renewable targets (2030 and beyond) with push from various scheme like ***Suryaghar***, can be not achieved effectively without DSOs!
- Passive distribution systems becoming active at exponential rate– need DSOs to handle, BAU not workable!
- Levelized Expenditure to create DSO: Rs 0.33 paisa / kWh, i.e., typically, 1% - 5% of CAPEX for urban DISCOM! Very cheap compared to benefits!
- Benefits for Distribution Utilities: Reduced O&M, Avoided costs of outage, deffered capital investment, improved reliability, efficient extracting of flexibility
- DSOs – enablers of net zero target of 2070

Previous Discussion on DSO in India



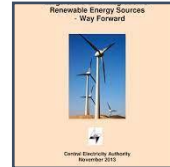
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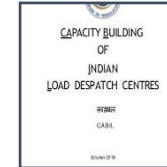
SAMAST, 2016

- Need for a robust institution as a system operator, which should be neutral, independent, transparent, non-discriminatory and equipped with skilled manpower.
- **DSO on bylines of SLDC was also elaborated.**
- DSO will be an independent operator having no conflict of interest.



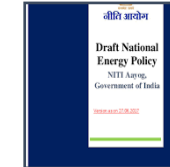
Report of technical committee on large-scale integration of renewable energy, 2016

- **DSO is envisioned to perform a more comprehensive array of functions to ensure more optimal utilization of DERs.**
 - Envisages that the proactive DSO should support consumers such as Prosumer, Aggregators, TSO, etc., with faster (realtime), more transparent, and granular data. It should also manage different contracts and new consumer relationships.



CABIL, 2018

- Sub-group recommends the **establishment of DSOs in each state which would interact with the State LDCs (SLDCs)** to keep the system secure.



Draft NEP, 2021

- **Distribution SCADA system must be implemented by the utilities as a tool with the DSO, on a priority basis.**
- Would play a major role in dealing with DERs, to ensure security and reliability of supply to consumers as well as the security of the grid.
- May be made a separate and independent entity if separation of carriage and content takes place.

Institutional Framework Alternatives in India



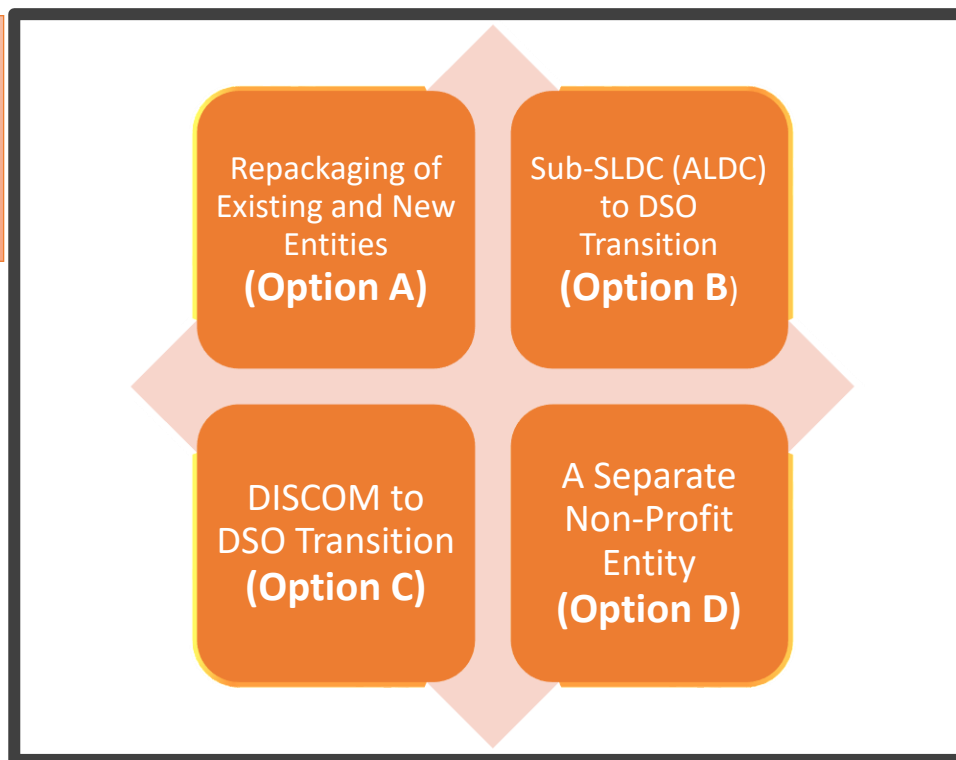
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E.g. –REMCs: State of the art monitoring,
forecasting, scheduling
DCCs
Load Management Units of DISCOMS

Private DISCOMS: IT, SCADA, OMS, GIS,
AMR, SAP's Industry Specific Solution for
utilities (SAP-ISU)

Automatic Demand Response (ADR),
DSM, PV-Solar



ALDC: Coordination between SLDC and
Load Management Unit of DISCOMS

ALDC: Monitoring and control of RES

On Similar lines of SLDC, RLDC, NLDC,
CTU, etc

Customised Model for every DSO – Variant or combination of above models!

States can have multiple DSOs with heterogenous models





White Paper on DSOs in India

A. R. Abhyankar, A. M. Jadhav, Shri Ram Vaishya, A. K. Saxena, Robin Majumdar, Falti Teotia, S. C. Srivastava, Ankush Sharma, Anoop Singh, Abheejeet Mohapatra, Madhav Sharma, Piyush Atul Sharma, *“Transforming Indian Power Sector: Distribution System Operators (DSOs): Need, Frameworks and Regulatory Considerations”*, Inaugurated on 8th May 2023



<https://www.youtube.com/watch?v=Ay2BVzzqFN4>

<https://dst.gov.in/sites/default/files/DSO-White-Paper.pdf>



Thank You!



THANK YOU

*For discussions/suggestions/queries email: **isuw@isuw.in***

visit: www.isuw.in

Links/References (If any)