



DAILY EDITORIAL ANALYSIS

TOPIC

**DIGITALISATION: NEXT PHASE OF
DISCOM REFORMS**

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DIGITALISATION: NEXT PHASE OF DISCOM REFORMS

Context

- Recently, India crossed **300 GW of non-fossil-fuel installed capacity**, exceeding **54% of total generation capacity**, but integrating rapidly growing variable renewable energy remains a **major distribution challenge**.

About DISCOMs

- They are the last-mile entities responsible for supplying electricity to consumers.
- They procure power from generators, transmit it through distribution networks, manage feeders and transformers, meter consumers, collect revenues and maintain supply reliability.
- Electricity being a **concurrent subject**, distribution of electricity to consumers, including the operations of the **Distribution Companies (DISCOMs) and digitalisation** thereof, falls within the purview of the respective distribution utility, which **functions under the guidance of the respective State Government** and State Electricity Regulatory Commission.
- They are the **weakest financial and operational link** in India's electricity value chain because of:
 - Politically constrained, often non-cost-reflective tariffs.
 - High **Aggregate Technical and Commercial (AT&C) losses**.
 - Delayed subsidy payments and poor revenue collection.
 - Aging distribution infrastructure and inadequate network visibility.

Integrating Renewable Energy Capacity into the Electricity System

- India's renewable-energy expansion has been remarkable:
 - Solar capacity increased from **2.8 GW in 2014 to around 165 GW**.
 - India added a record **55.29 GW of non-fossil capacity in the last financial year**.
 - Over **₹3 lakh crore** has been committed towards distribution reforms.
- The challenge is now shifting from **capacity creation to capacity utilisation and integration**.
- Solar and wind are **variable and location-dependent** unlike conventional generation.
- Their increasing share requires DISCOMs to forecast demand, manage congestion, balance supply and demand, and coordinate storage and power procurement.

Challenges & Issues in Distribution

- High AT&C Losses:** Energy is lost technically or through theft, faulty metering and non-payment.
- Poor Network Visibility:** Many utilities lack a comprehensive, real-time picture of their assets and power flows.
- Renewable Intermittency:** Variable generation complicates forecasting and grid balancing.
- Financial Stress:** Revenue gaps constrain investment in modernisation.
- Uneven Reform Performance:** National averages conceal substantial state-level differences.
- Limited Consumer Centric Metrics:** Reliability, restoration time and billing accuracy are inadequately tracked.
- Skill Deficit:** Digital systems require personnel capable of analysing data and acting on it.

Key Efforts & Initiatives Related to Electricity Distribution

- Revamped Distribution Sector Scheme (RDSS):** It seeks to improve the operational and financial sustainability of DISCOMs through infrastructure modernisation, loss reduction and improved metering. It supports measures such as:

- ♦ Upgradation of substations and distribution transformers.
- ♦ Feeder segregation.
- ♦ Smart metering and modern distribution infrastructure.
- ♦ Greater accountability through measurable performance outcomes.
- **Policy Support for Renewable Manufacturing: Production Linked Incentive (PLI) schemes** have strengthened domestic solar manufacturing, complementing renewable-capacity expansion.
- **Bidding and Regulatory Reforms:** Competitive bidding, improved tariff processes and greater financial discipline have helped create a more predictable investment environment.

Digitalisation: Missing Layer in DISCOM

- Digitalisation can transform discoms from reactive utilities into predictive organisations. It can proceed through **three interconnected layers**:
 - ♦ **Digital Mapping:** Every transformer, feeder, substation and pole should be **geolocated and digitally mapped**. It enables utilities to know what assets they own and where they are located.
 - ♦ **Real-Time Network Visibility:** Live data can show **how electricity is flowing, where losses occur and where congestion or faults are emerging**. Smart meters, sensors and automated systems can provide this operational intelligence.
 - ♦ **Forecasting and Predictive Management:** Once assets and power flows are visible, utilities can forecast **area-wise and hourly demand**, optimize power procurement, schedule maintenance and anticipate equipment failures.

Case Study: Evidence From Rajasthan

- Rajasthan curtailed approximately **11.5 GW of wind and solar power between January and April**, highlighting the gap between renewable generation and grid absorption capacity.
- The experience of **Jaipur Vidyut Vitran Nigam Limited (JVVNL)** illustrates the potential of digitalisation.
- Its digital-twin initiative has reportedly digitalised nearly **four million assets** and processes around **120 million records per day**.
- The initiative is projected to generate savings of nearly **₹200 crore annually**.
- Such examples demonstrate that digital infrastructure can convert data into operational and financial gains.

Beyond Technology: Human and Consumer-Centric Reform

- Digitalisation alone is insufficient. Discom personnel need training in **data analytics, forecasting, asset management and digital decision-making**.
 - ♦ Cybersecurity and data governance must also accompany smart-grid expansion.
- Equally important is a shift towards **consumer-centric performance indicators**.
- Utilities should be evaluated on hours of uninterrupted electricity supply; fault restoration time; accuracy of billing; feeder-level reliability; and consumer grievance resolution along with on installed capacity and financial performance.
- Such metrics would make electricity distribution a measurable public-service outcome.

Way Forward

- India has already committed more than **₹3 lakh crore to distribution reforms**.
- The next phase should make digitalisation integral to this expenditure by requiring utilities to:

- ♦ Make **network mapping and feeder-level data** a condition for future distribution funding.
- ♦ Fund utilities against **verified reductions in losses and improvements in reliability**.
- ♦ Scale smart meters, SCADA, GIS, digital twins and AI-enabled forecasting.
- ♦ Integrate **battery storage, demand response and flexible generation** with renewable expansion.
- ♦ Develop specialised **digital and data-analytics skills** within DISCOMs.
- ♦ Introduce consumer-centric indicators such as **hours of supply, outage duration and billing accuracy**.
- ♦ Strengthen cost-reflective tariffs while protecting vulnerable consumers through targeted subsidies.
- ♦ Encourage **government-DISCOM-private-sector partnerships** for technology deployment and capacity building.

Daily Mains Practice Question

[Q] Discuss the significance of digitalisation in improving the financial sustainability of DISCOMs and integrating renewable energy into India's power system.

Source: HT

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