

Host Utilities



Co - Host Utilities



ORGANIZER



India SMART UTILITY Week 2024

Supporting Ministries



MINISTRY OF POWER
GOVERNMENT OF INDIA



MINISTRY OF NEW AND
RENEWABLE ENERGY
GOVERNMENT OF INDIA



नीति आयोग
National Institution for Transforming India



MINISTRY OF ELECTRONICS &
INFORMATION TECHNOLOGY
GOVERNMENT OF INDIA



MINISTRY OF HEAVY INDUSTRIES
GOVERNMENT OF INDIA



MINISTRY OF JAL SHAKTI
DEPARTMENT OF WATER RESOURCES,
RIVER DEVELOPMENT & GANGA REJUVENATION,
GOVERNMENT OF INDIA



MINISTRY OF POWER
GOVERNMENT OF INDIA
CENTRAL ELECTRICITY AUTHORITY

Session : Emerging Technology for Utilities

Presented By

Dr. G Ganesh Das, Chief – Collaboration & Innovation, The Tata Power Company Limited



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www.isuw.in



@ISUW_India



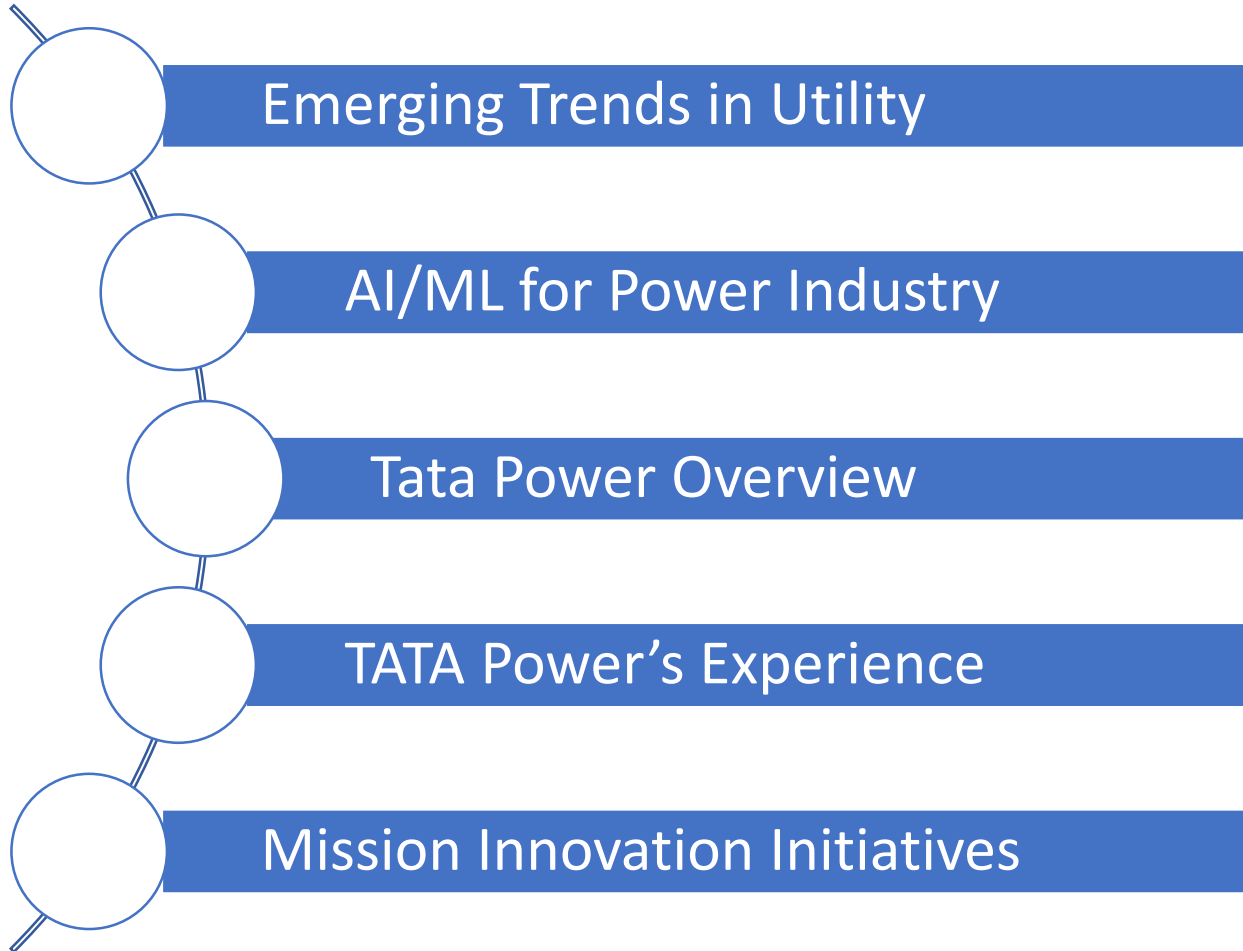
@India Smart Utility Week (ISUW)



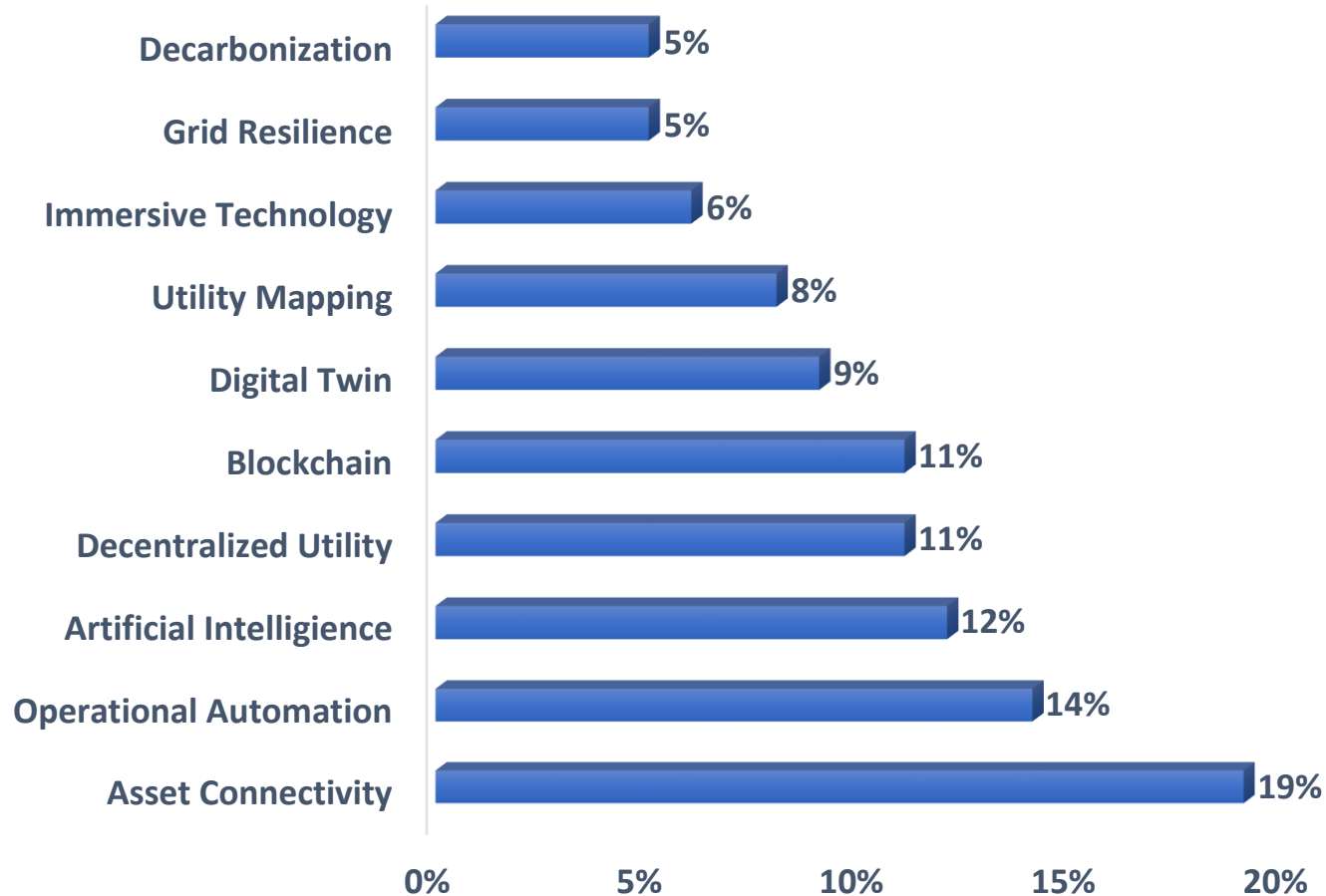
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@indiasmartgridforum



Utility Trends in 2024



Source: [Top 10 Utility Industry Trends in 2023-2024 | StartUs Insights \(startus-insights.com\)](#)

Need for Innovations in Utility

- Variability in Fuel Prices
- Intermittent RE penetration in the grid
- Increased threats of Cyberattacks
- Unpredictable Weather/Natural Disasters
- Higher penetration of EVs in the Grid
- Increasing Demand due to shift in Consumer Behaviour

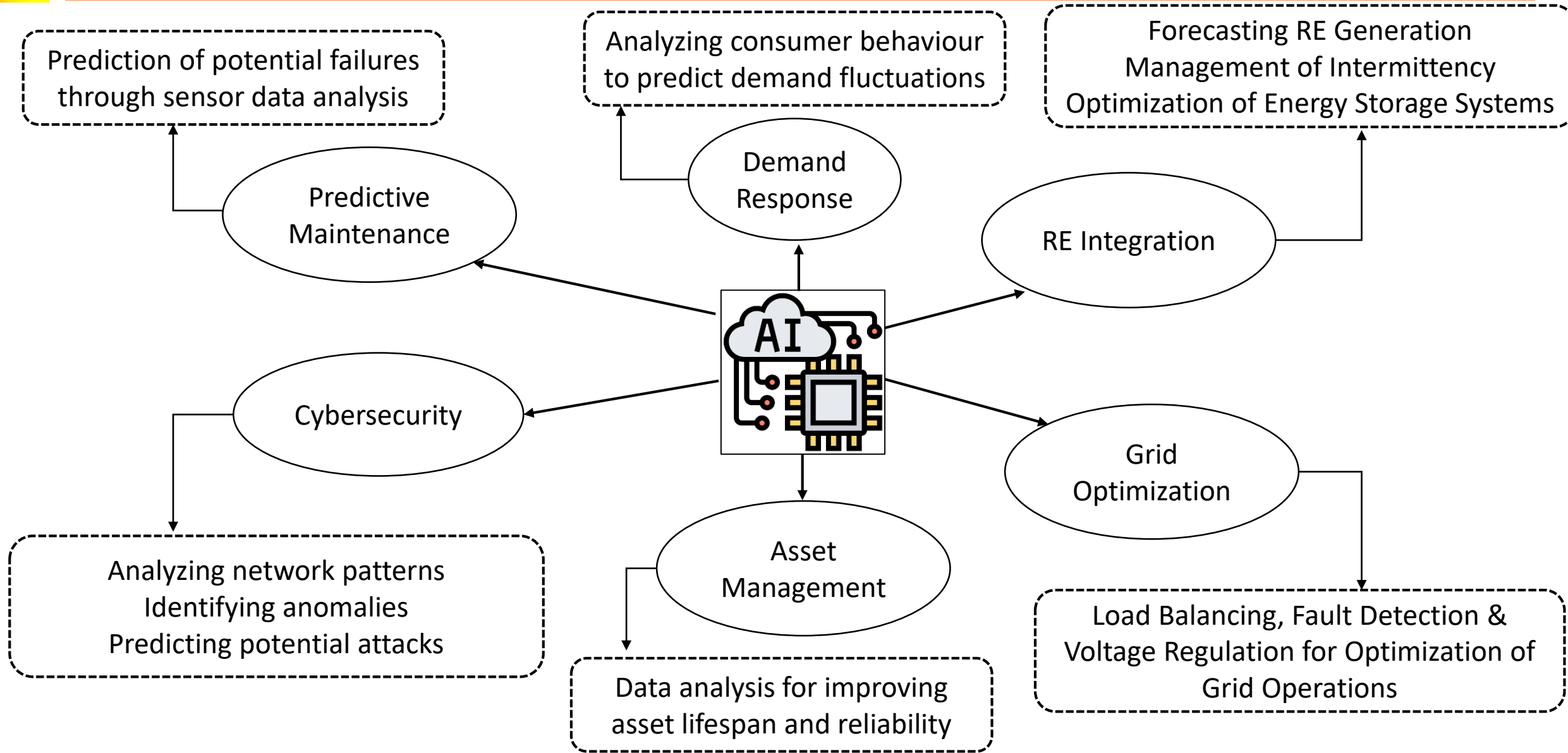
Source: [Digital transformation and the utility of the future | Deloitte Insights](#)

Key AI/ML Applications towards Power Industry



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Tata Power – Leading Transition & Powering Transformation




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Vision → Empower a billion lives through **Sustainable**, **Affordable** and **Innovative** energy solutions.

Current Portfolio Capacity ~ 14.3 GW


Thermal & Hydro


 **9032.5 MW**
Thermal*
(Installed capacity)

 **880 MW**
Hydro
(Installed capacity)

 **443 MW**
Waste Heat / BFG
(Installed capacity)

T&D

 **4194 ckt km**
Transmission
(Line length)

 **12.9 million**
Distribution
(No. of customers)

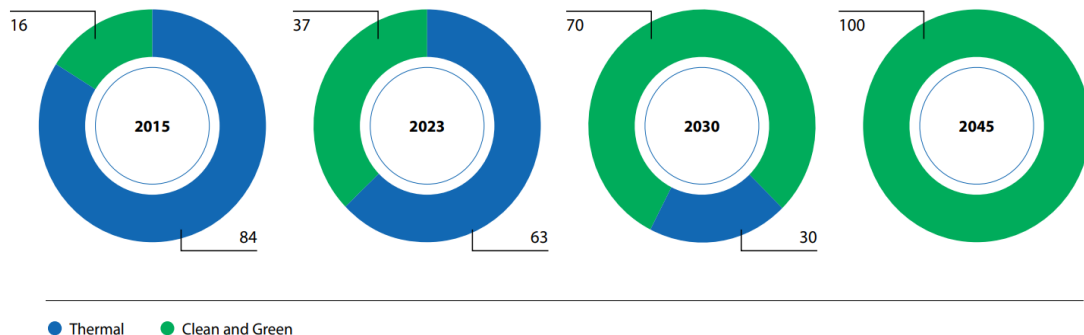
Renewables

 **932 MW**
Wind
(Installed capacity)

 **3136 MW**
Solar
(Installed capacity)

1,314 MW
Solar & Hybrid
(Capacity under construction)

Evolving Generation Mix (%)



EV Charging
Over 3700+ points in



Rooftop Solar
1650+ MW, 275+ districts



Solar Pumps
60,000+ pumps

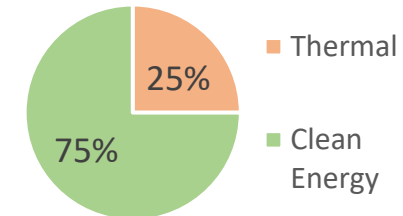


Microgrids
194+ Microgrids



Home Automation
40000+ units sold

Future Targets



**30 GW
Capacity
in 2027**



**Water
Neutral
by 2030**



**Zero
Waste to
Landfill
by 2030**



**Carbon Net Zero
by 2045**

Emerging Technology – Few Field Experiences (1/3)



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- Under the Horizon 2020 Framework, the Indian and European Local Energy Communities for Renewable Integration and the Energy Transition (IELECTRIX) project aimed towards increasing renewable energy integration into the distribution network.
- With an overall budget of 10.7 million euros, the project was coordinated by Enedis France of a duration of 42 months with 15 European Partners and 1 Indian Partner.

Indian Demonstration: SHAKTI

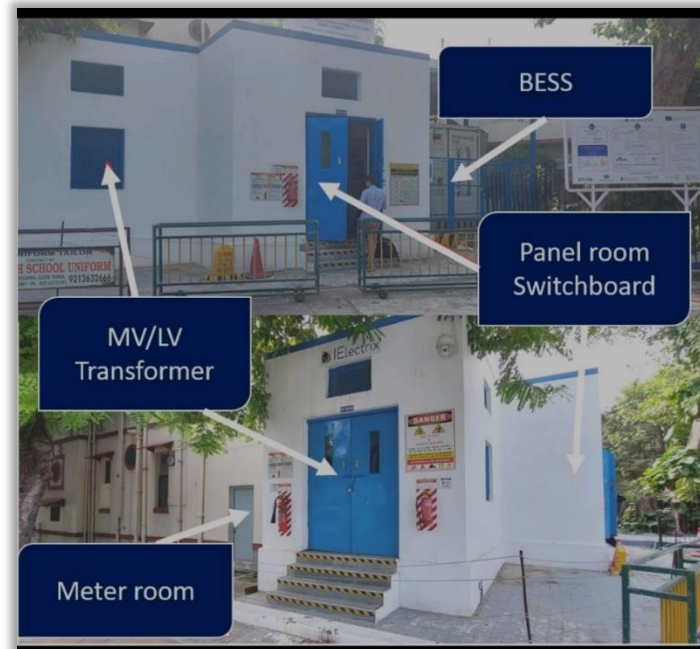
- Through a cooperation agreement between Enedis and TPDDL, the demonstration aimed at showcasing the implementation of Local Energy Communities (LEC) using local PV units and self-consumption approach through innovative solutions at a district level in New Delhi, India.

Key Objectives

- Maximise the penetration of local energy in the LV Grid.
- Increase the local consumption of Renewable Energy.
- Improve the resilience of the local energy system.

Implementation

- Mobile Storage System and Smart Substation.
- Adapted Demand Side Management.
- Islanding Capacity of Microgrid in case of outage.



Snapshot of the installed system

Partners

ENEDIS
L'ELECTRICITE EN RESEAU

Schneider
Electric

Odit

GECO
GLOBAL



TATA POWER-DDL



Battery Energy Storage System Initiatives



10 MWh Li Ion BESS

- Demand Side Management/Peak Reduction
- Frequency Regulation for ancillary market
- Renewables Firming
- Transmission/Distribution System Deferral



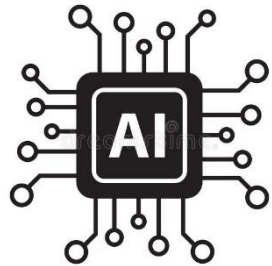
Community Energy Storage at Distribution Transformer

- DT Augmentation prevented to manage summer peak
- Reactive Power & Peak Load Management
- Deviation Settlement Mechanism
- Black Start facility



20 kW/ 20 kWh Compact Pole Mounted BESS

- Adherence to Delhi Electricity Supply Code - Low Voltage vis. Power Quality
- Zero Footprint solution in Metro Cities
- Reduction of Technical Loss
- CAPEX Deferral in Laying New LT Feeders and DT augmentation



AI/ML Initiatives



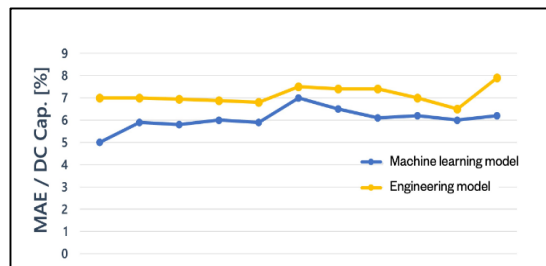
Satellite Imagery Analytics

- Satellite based proactive vegetation management for 11 KV feeders
- Vegetation height at 3D risk detection
- Change detection for encroachment risk monitoring



Optimization of Hydro Power Generation

- Inflow prediction through forecast of annual rainfall
- Optimized short term and long term generation plan
- Peak Demand vs Price Curve analysis towards scheduling power generation for maximizing revenue



AI/ML for Solar Forecasting

- Solar generation forecasting model through data and regulatory framework analysis
- Improvement of overall forecasting accuracy
- Reduction in penalty based due to improved forecasting

DST Mission Innovation - Clean Energy International Incubation Centre (CEIIC)



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विज्ञान एवं
प्रौद्योगिकी मंत्रालय
MINISTRY OF
SCIENCE AND
TECHNOLOGY

सत्यमेव जयते

- Lab Space: Smart grid Lab, Delhi
- Pilots: Industry/Utility use cases
- Strategic Co-investment with Social Alpha
- Power/Utility Sector Expertise

Industry Partners

- Funding: Lab Equipment's & Resources

Government Partner

TATA TRUSTS

- Funding Incubator Building Construction

Philanthropic Partner



Powered by SOCIAL alpha

Startups 42+

- Funding Program, Operations, Seed Capital investments
- Social Alpha Engine: Innovation Curation & Venture development expertise

Operating Partners

CEIIC Offerings

- Design for Manufacturing
- Mentorship Network
- International Collaboration & Partnerships
- Market Access
- Launchpad
- R&D & Funding Support
- GTM Strategy Support
- EIR Fellowship Programme

DSIR recognized The Smart Grid Lab as “In-House R&D Unit”. First for any National Utility

Demonstrated Technologies

- ❑ 10 MW BESS
- ❑ SCADA & ADMS
- ❑ GIS
- ❑ Urban Islanding
- ❑ Automated DR
- ❑ Power Quality Monitoring
- ❑ Sensor & IoT for LT monitoring
- ❑ Smart Metering
- ❑ Cybersecurity



Thank You

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