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ORGANIZER

India Smart Grid Forum

India SMART UTILITY Week 2024

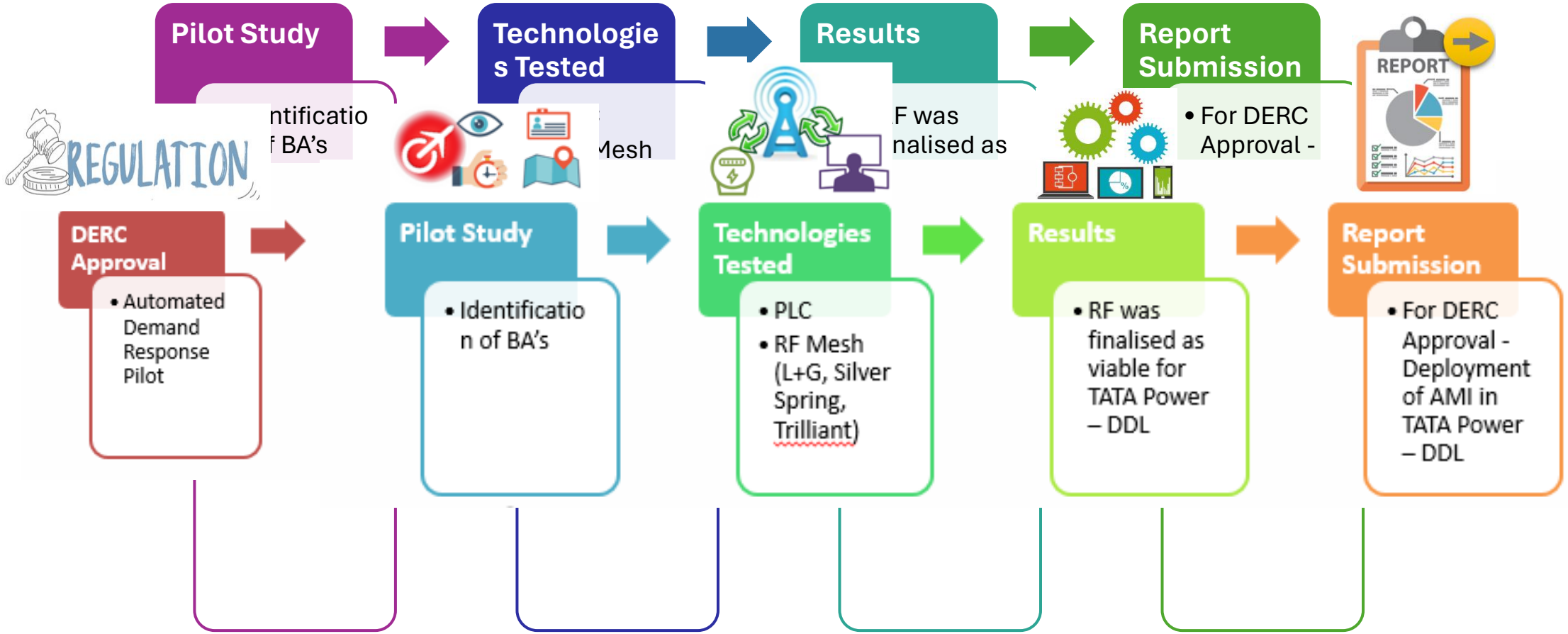
Supporting Ministries

Session 3: Smart Metering Experience from US and Europe
Topic: The Indian Experience at Tata Power-DDL

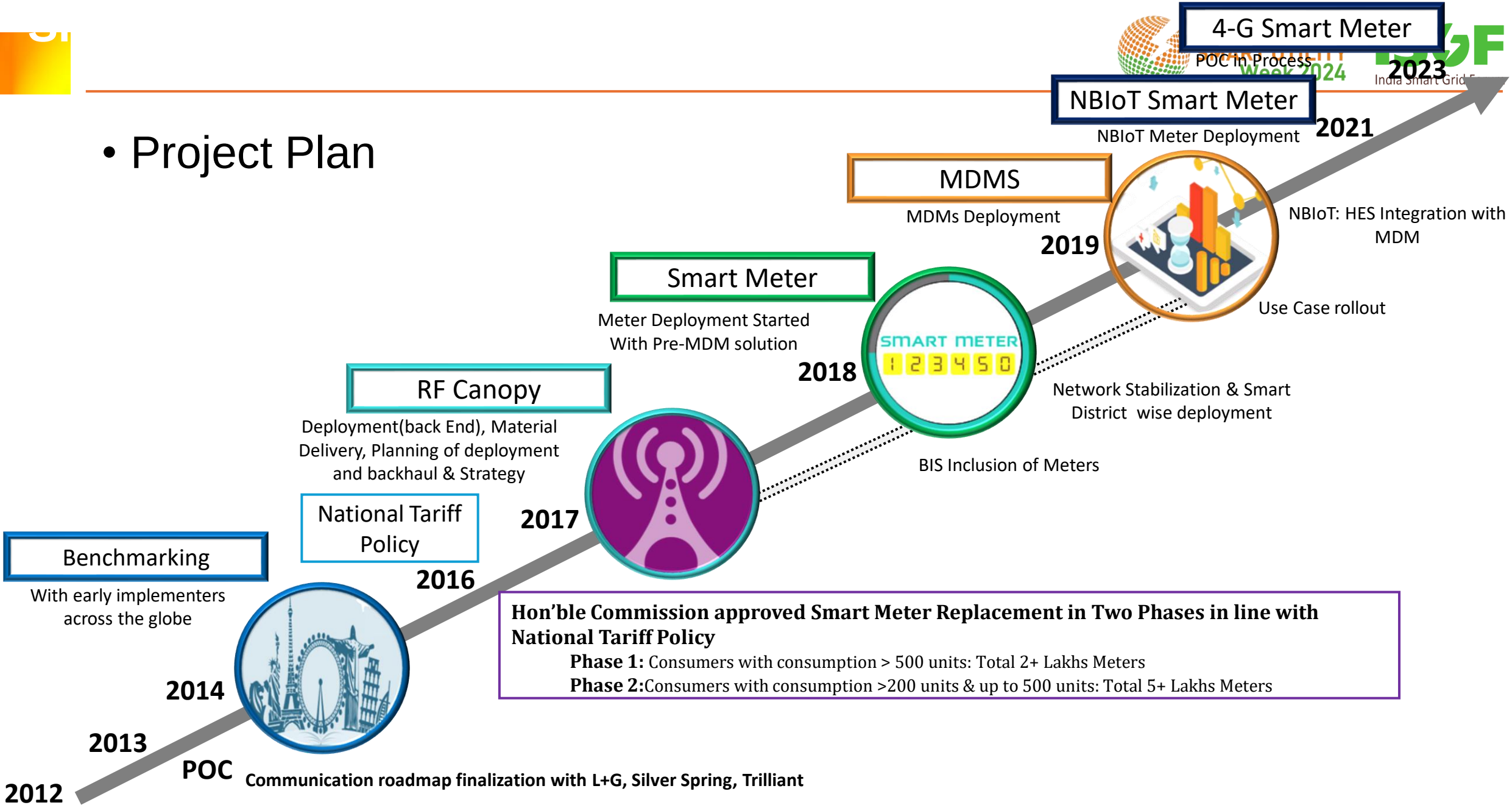
Presented By

Subhadip Raychaudhuri, Head-Engineering+GIS+Energy Audit and AMI Applications, TPDDL

- Pilot Project conclusion for finalisation of technology.



- Project Plan

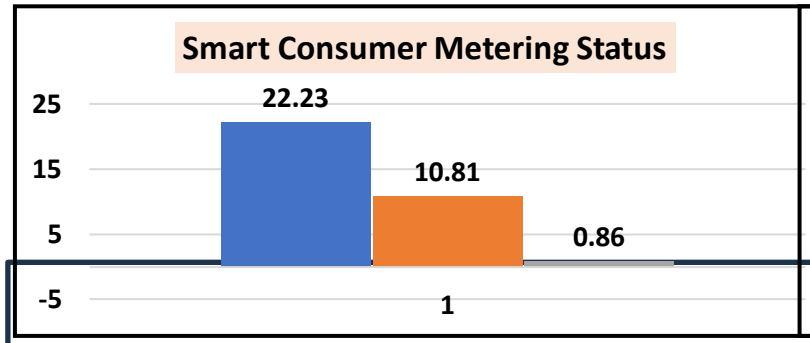


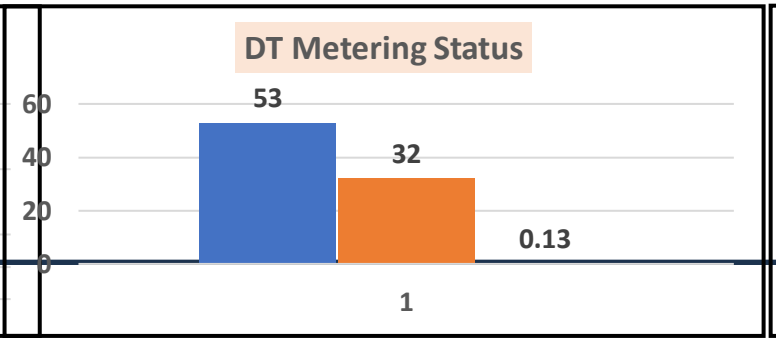
Hon'ble Commission approved Smart Meter Replacement in Two Phases in line with National Tariff Policy

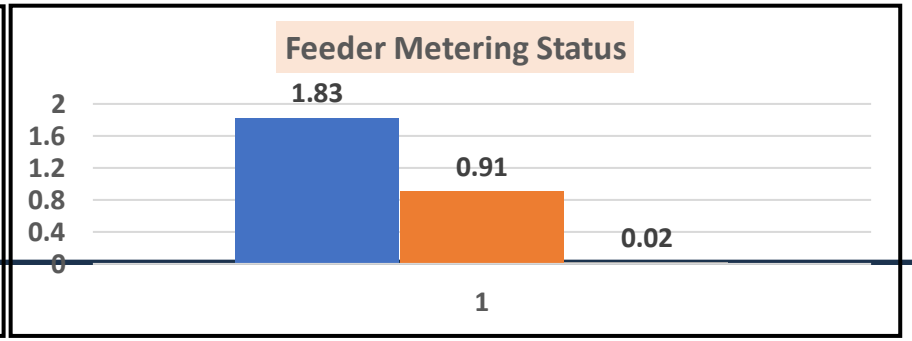
Phase 1: Consumers with consumption > 500 units: Total 2+ Lakhs Meters

Phase 2: Consumers with consumption >200 units & up to 500 units: Total 5+ Lakhs Meters

Smart meter Story in India and TPDDL







Category	Meters Sanctioned (Cr.)	Meters Awarded (Cr.)	Meters Installed (Cr.)
Smart Consumer Metering Status (Cr.)	22.23	10.81	0.86
Category	**Meters Sanctioned (Lac)**	**Meters Awarded (Lac)**	**Meters Installed (Lac)**
DT Metering Status	52.56	33	0.13
Category	**Meters Sanctioned (Lac)**	**Meters Awarded (Lac)**	**Meters Installed (Lac)**
Feeder Metering Status	1.83	0.91	0.02

**** As per National Smart Grid Mission website, Min. of Power, Govt. of India as on 06.02.2024***

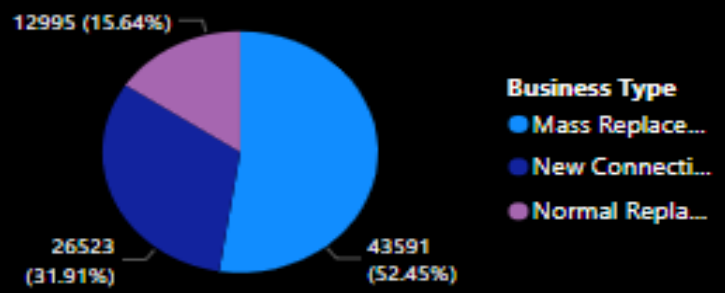
Cumulative Installation (28.01.2024)
4,21,560

Active Connections (28.01.2024)
3,91,051

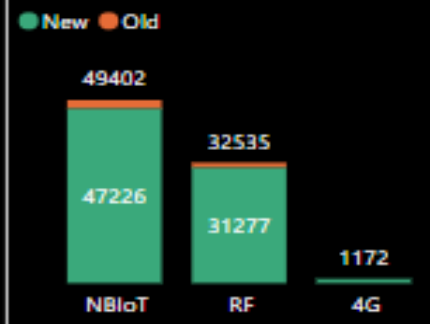
Installation (FY24)
83,109

Installation (Jan-24)
8,246

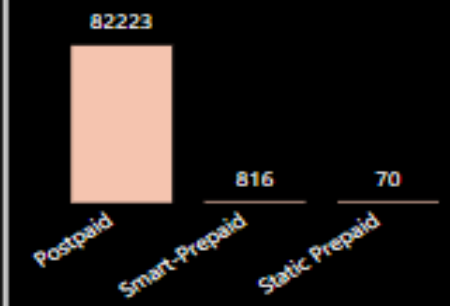
Business-Wise (FY24)



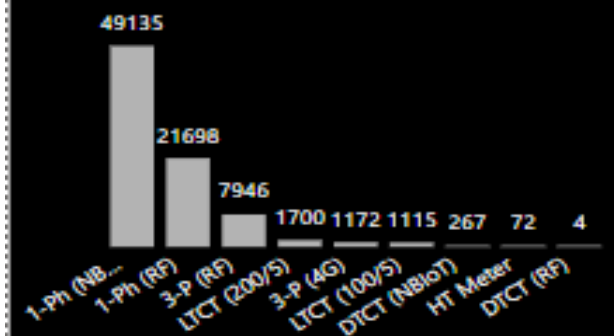
Tech-wise (FY 24)



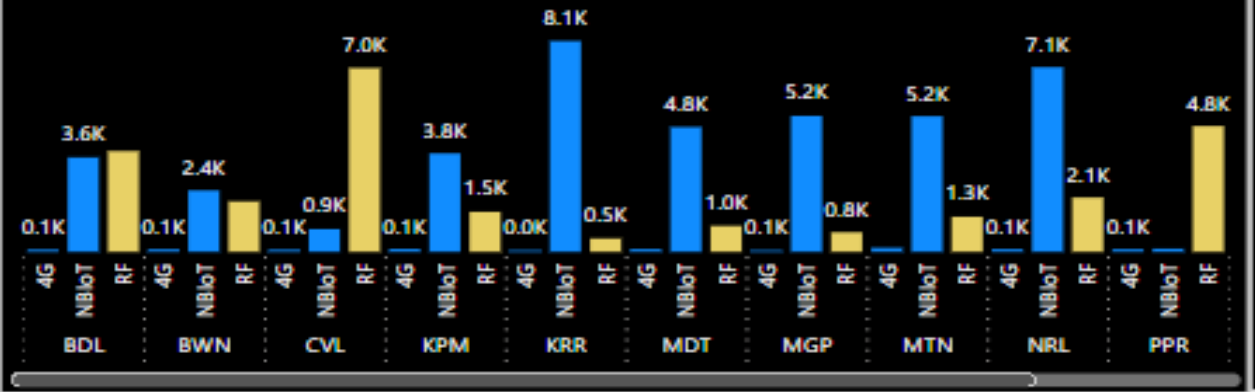
Prepaid/Postpaid



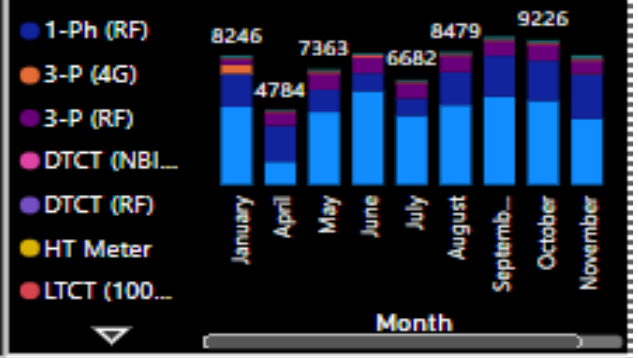
Installation by Meter Type (Cumulative FY 24)



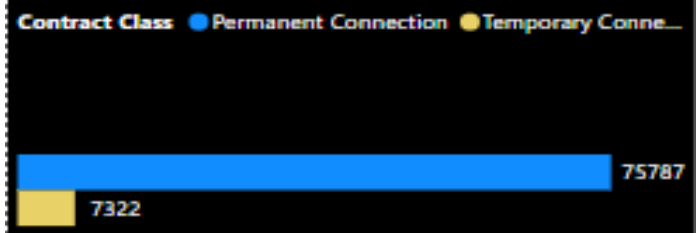
District-wise Deployment



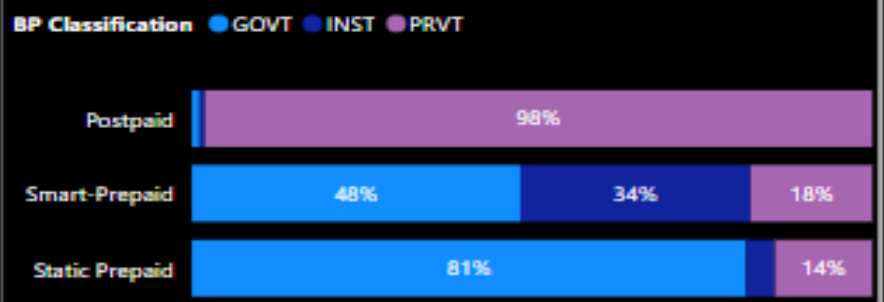
Installation by Meter Type (Monthly)



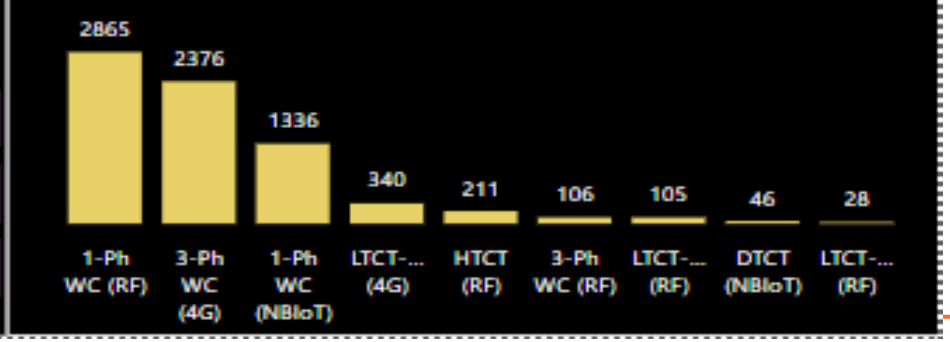
Contract Class-Wise Deployment



Prepaid/Postpaid (BP Classification-Wise)



Stock Position by Meter Type



Capability Building

Workshop on Smart Metering & AMI

Session by OEM on Metering Technology

SOP for online DT Meter Replacement

BA Training

Location wise Behavioural training sessions

Safety

HOTT - Practical exposure of working on live DT meter

Safety Behavioural Training for BA

JSA cum safety bag

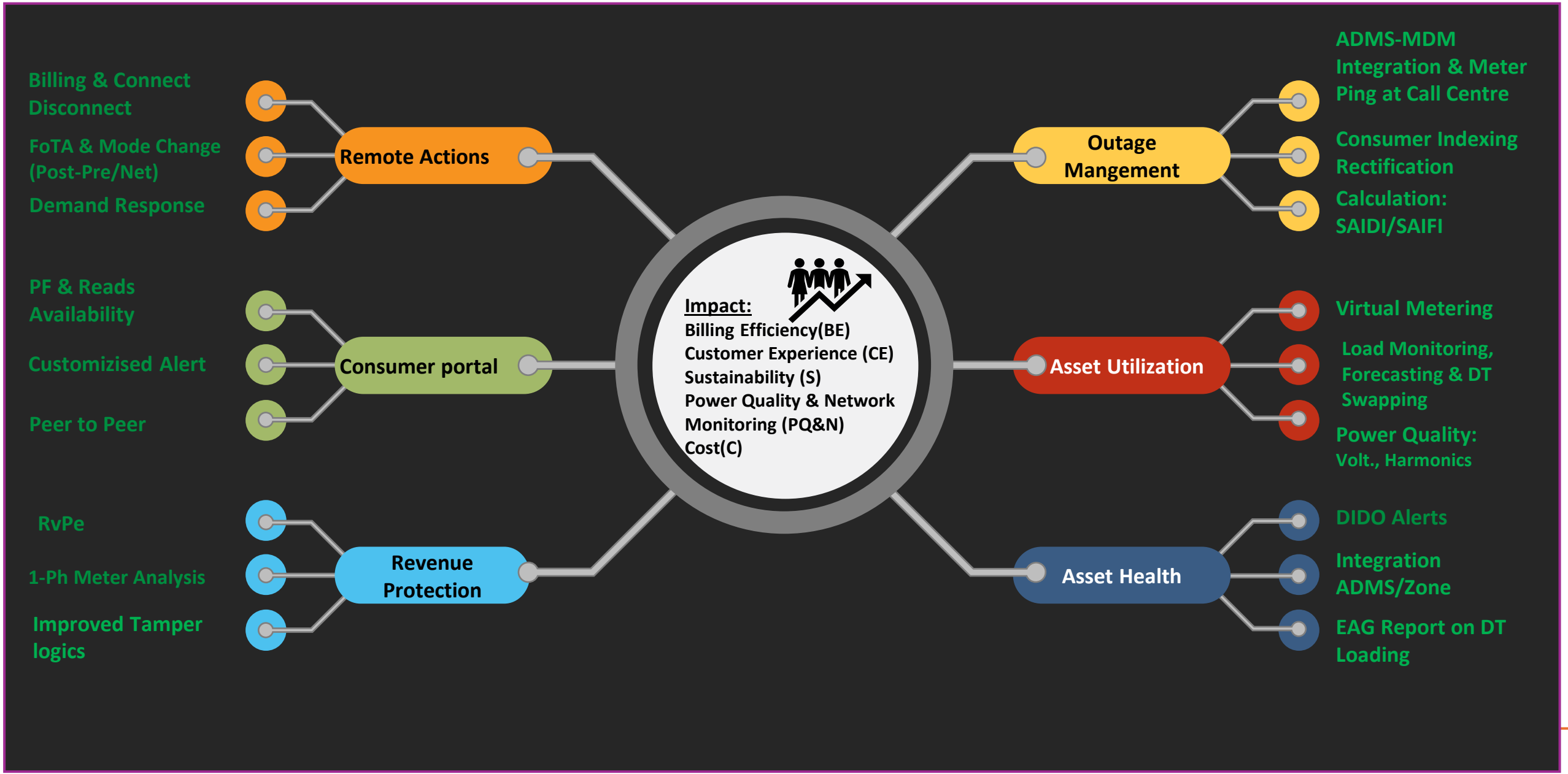
Infrastructure Development

Practice Yard at all MMG Location

In-house Test Bench- 02 Nos-15 position Single Phase& One 15 position Poly phase

Decentralised functioning – Formulation of 4 MMG hubs

AMI Application
- Smart Meters use cases

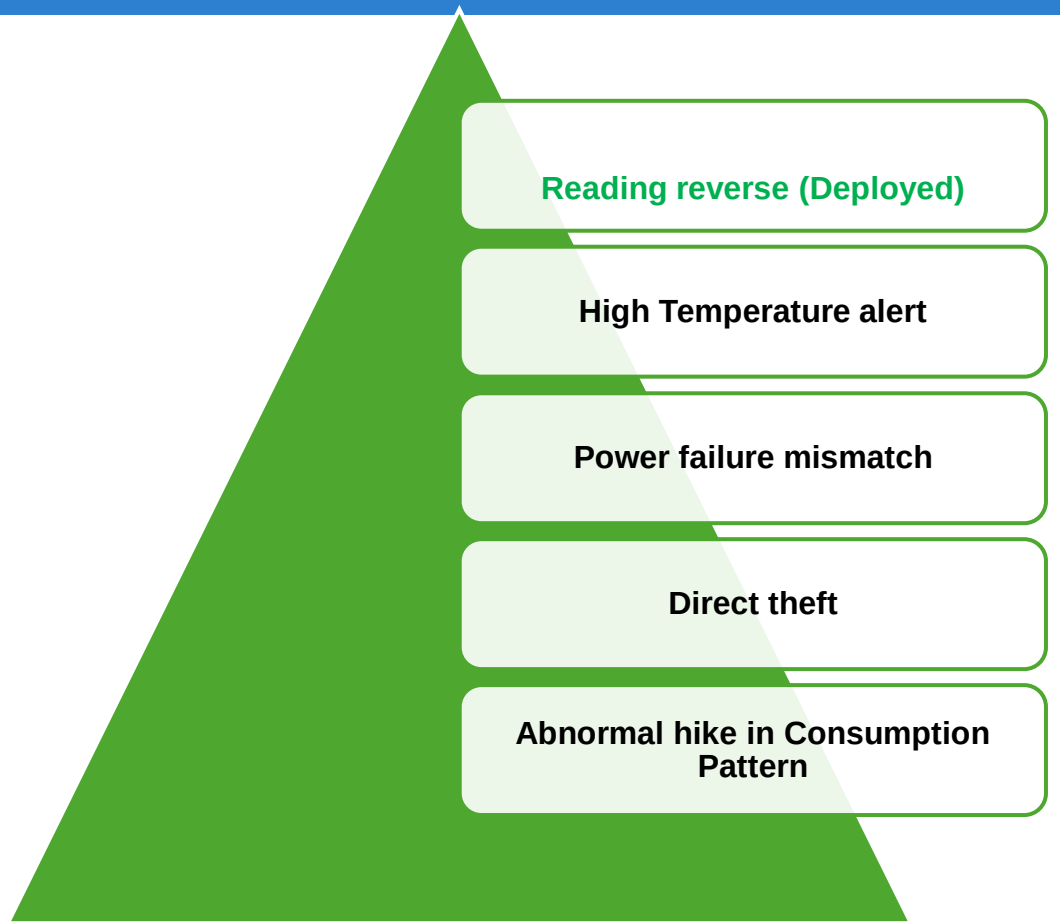


Revenue Protection System (RvPE) - Logics

Logics replicated in RvPE from AMRDA

Sr no	Logic Name
1	Assessed Consumption for Industrial and Commercial Connections
2	Assessed Consumption for Domestic Connections
3	Voltage Failure
4	Power Failure
5	CT overload
6	Data Corruption
7	Low Power factor
8	Potential missing with Load Running
9	Current Missing
10	Neutral Disturbance
11	Current Reversal (To be Modified)
12	Magnet
13	Cover Open
14	Direct theft logic through neutral current
15	High Voltage
16	Current imbalance
17	Misuse
18	Drop in consumption with constant MDI

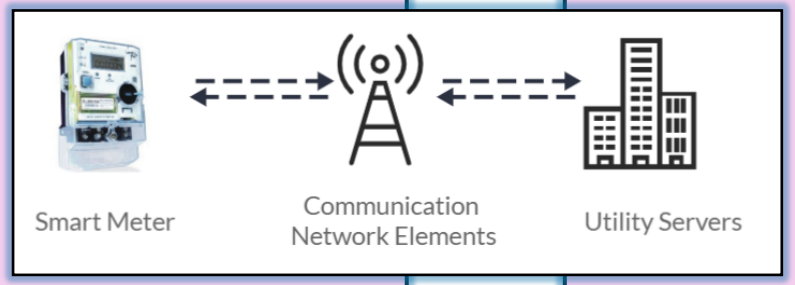
New Logics incorporated in RvPE: Delta over AMRDA



Use of Smart Meter data

Conventional Use

- Remote Billing
- Remote Connection & Disconnection
- Remote Firmware Upgrade
- Usage Update to Consumers



Smart Metering Infrastructure

Innovative Use

- Outage Management
  - Last Gasp Integration with ADMS
  - Meter Ping in consumer complaint
- Asset Utilisation
  - Virtual Metering
  - Load Monitoring & Forecasting
- Asset Health
- Power Quality Improvement
- Behavioral Demand Response
- Revenue Protection
- Thin Pre-paid Mechanism

Implementation of AMI - Challenges

OEM

- ***3rd party meters inclusion under development***
- ***Communication of Mass Scale – success rate on daily basis***
- ***OEM's Product not ready for Indian markets.*** (LT-CT & HT-CT Meters)
- ***Single party dependency:***
  - ***Meter supplier, Inventory management***
  - ***RF dependency***
  - ***Unwillingness of TSPs on NBIoT in Delhi***
  - ***Limited options for fallback on 2-G***

Utility

- ***Financial – High upfront costs of smart meters***
- ***Uncertainty due to New Technology***
  - Leading to multiple iterations before reaching the desired communication success
- ***Absence of skilled manpower and SOP for system commissioning***
  - In depth knowledge of Telecommunications, Metering and IT.
  - Evolving Technology
  - Extensive Training program required.

Governance

- ***Multiple models being tested*** (Opex. Vs Capex.)
- ***Billing modules tariff and IS are having Gaps***
- ***Non-Coverage of 100% population of Consumer:***
  - Scattered coverage leads to non utilization of full capabilities of AMI
  - Major resistance by consumer for deployment if Smart meters

Internal

- ***Robust implementation structure required-***
  - Separate vertical required for AMI implementation
- ***Long procurement and installation period***
- ***Cyber Security:-***
  - Applications Layer Security (Inside Data Centre), for external devices & network level security. (Proprietary security in network)
- ***Site identification*** *for* ***Router Installation***

What Smart Metering will not achieve…

While smart meter is effective in the revenue billing, collection (smart prepaid) and recovery to certain extent, it can't resolve the revenue leakage on its own. A proper information pipeline and analysis mechanism has to be established for effective results.

Smart Meter data alone can't achieve asset health monitoring. Read in conjunction with other electrical parameters, the same can be achieved.

Correct Energy accounting cannot be ensured by standalone Smart meter data.

Individual customer consumption insights can be achieved through smart meter data but for peer to peer comparison and cohort identification, additional intelligence has to be built.

PRESENTATION ON THE TOPIC (1/2 slides) (1 Mins each slide)

- Presentation on the Topic/Project

Smart Grid Index 2022 (conducted by Singapore Power)

- Benchmarks a total of 94 utilities across 39 countries / markets

TATA POWER-DDL

Utility	Country/Market	Score	+ / - (%)	Best Practices
Enedis	FRA	98.2	1.8	
TaiPower	TWN	94.6	-	
UKPN	GBR	94.6	-	
ConEd	USA	92.9	-1.8	
WPD	GBR	92.9	-	
CitiPower	AUS	91.1	-1.8	
DEWA	ARE	89.3	-	
SP Energy Networks	GBR	89.3	1.8	
SDGE	USA	87.5	-	
FPL	USA	85.7	-	
Northern Powergrid	GBR	85.7	1.8	
SCE	USA	85.7	-	
Stedin	NLD	85.7	-	
ComEd	USA	83.9	-	
PG&E	USA	83.9	-3.6	
ENWL	GBR	82.1	-3.6	
Jemena	AUS	82.1	1.8	
PEPCO	USA	82.1	5.4	
Powercor	AUS	82.1	-	
Radius	DNK	82.1	-3.6	
United Energy	AUS	82.1	-	
Chubu	JPN	80.4	8.9	
Hydro Ottawa	CAN	80.4	1.8	
LADWP	USA	80.4	-	
SSEN	GBR	80.4	-	
State Grid Beijing	CHN	80.4	-	
Tata power-DDL	IND	80.4	-	
TEPCO	JPN	80.4	-1.8	

Tata Power-DDL is the 1st Indian Utility to be positioned among Top 25 Utilities across the globe

Tatapower-DDL Analysis

SPgroup

Monitoring & Control
- SCADA available
- ADMS available

Customer Empowerment & Satisfaction
- Real-time data
- 96.8% Customer Satisfaction Index

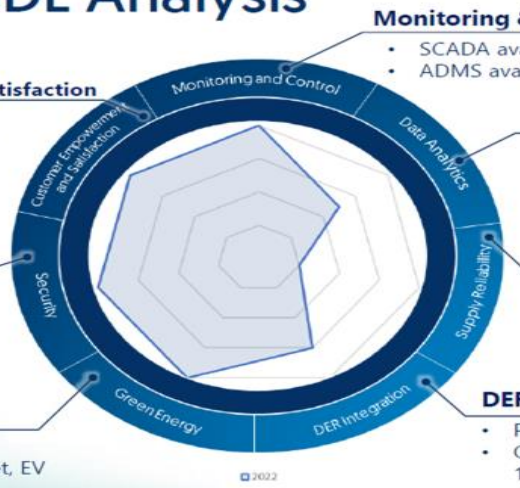
Data Analytics
- 0.2 million smart meters installed
- Advanced Data Analytics for improving reliability through Faults Prediction & Asset Optimization

Security
- ISO 27001

Supply Reliability
- 58.8 mins
- 1.75

Green Energy
- 14.13%
- EV pilot, TOU, EV service fleet, EV charging infrastructure

DER Integration
- Procedures available
- Grid integrated 10 MWh system & 150 kWh Community ESS



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Towards a Greener Tomorrow

THANK YOU

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

visit: www.isuw.in

Links/References (If any)