TATA POWER-DDL

Towards a Greener Tomorrow

Best practices for the requalification of energy systems for the energy transition

Tuesday, September 12, 2023

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Head - Meter Management & AMI Applications

About Tata Power-DDL

Journey started 1st July'02 onwards

TATA POWER-DDL

सत्यमेव जयते
Government of
National Capital Territory of Delhi

TATA
TATA POWER

51:49

JV of The Tata Power Company Limited and Government of Delhi

25 years

License Period

510 Sq.KM

License Area of North and Northwest Delhi

19.8 Lakh

Current Customer base

TATA Power-DDL is an ISO 9001 (Quality Management Systems), ISO 14001 (Environmental Management Systems), ISO 45001 (Occupational Health and Safety), ISO 22301(Security and Resilience), ISO 27001(Information Security Management), ISO 31000 (Risk Management), ISO 50001 (Energy Management Systems), SA 8000 (Social Accountability), ISO 10002 (Customer Satisfaction - Guidelines for Complaints Handling), ISO 20400 (Sustainable Procurement) certified organization.

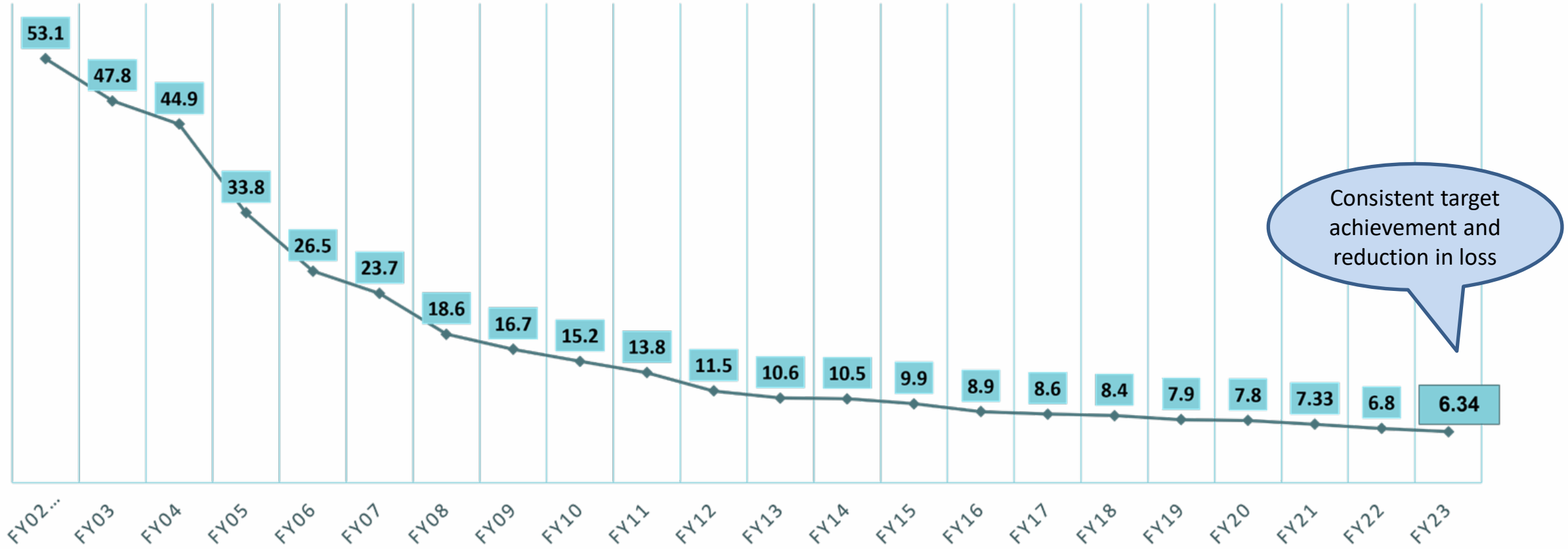
JV= Joint Venture

Performance in past 20 years

Parameter	Unit	July 2002	March 2023
OPERATIONAL PERFORMANCE			
AT&C Losses	%	53.1	6.34
System Reliability – ASAI -Availability Index	%	70	99.9
Transformer Failure Rate	%	11	0.68
Peak Load served	MW	930	2229 *(as on 28 June 2022)*
Length of Network	Ckt. km	6750	13790
Street Light Functionality	%	40	99.17
Smart Meters Installed	Lakh	0	3.5
CONSUMER RELATED PERFORMANCE			
New Connection Energisation Time	Days	51.8	3
Meter Replacement Time	Days	25	3
Mean Time to Repair Faults	Hours	11	0.67
Consumer Satisfaction Index	%	-	97

'**Roshni'** – our Brand Mascot

AT&C Loss reduction over the years



20 Years Turnaround Story of One of the Most Successful Private Power Distribution Utility

Focus Areas (Jul-2002)

TATA POWER-DDL

- **Reduction in AT&C Losses (53%)**
- **Network & Asset Management**
- **Digitization** (Record, Process, Report)
- **Operational Efficiency** (Technical/ Commercial)
- **Customer Satisfaction**
- **Employee Engagement**

BPR/Technology Adoption/Fresh Recruitments of ET/MTs and Lateral Recruits with 7-10 years experience in this sector

AT&C= Aggregate Technical & Commercial, BPR= Business Process Re-engineering

AMI- Deployment & USE Case

AMI- Deployment Monitoring

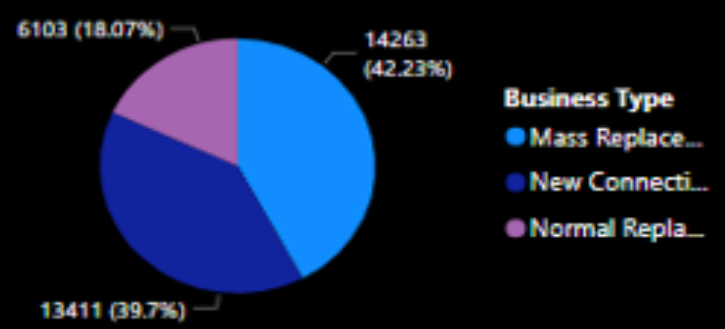
Cumulative Installation 31.08.2023
3,87,694

Active Connections 31.08.2023
3,50,554

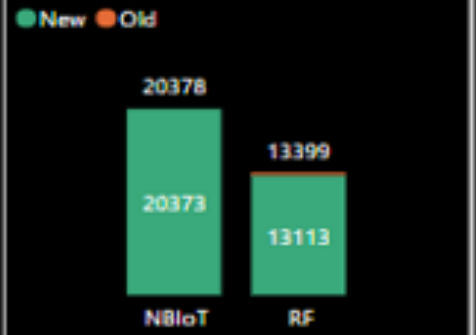
Installation (FY24)
33,777

Installation (Aug-23)
7,140

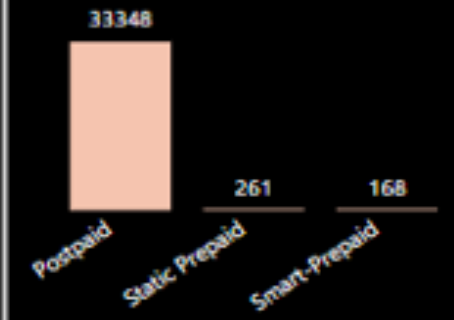
Business-Wise (FY24)



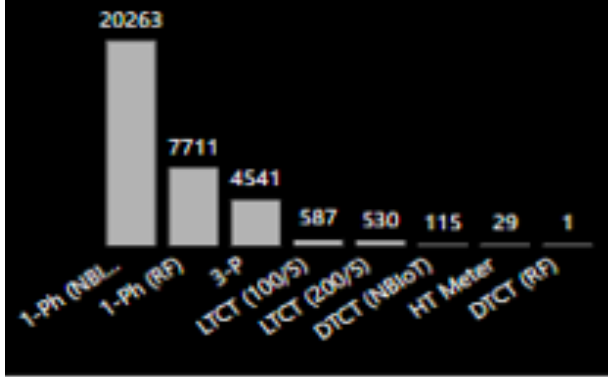
Tech-wise (FY 24)



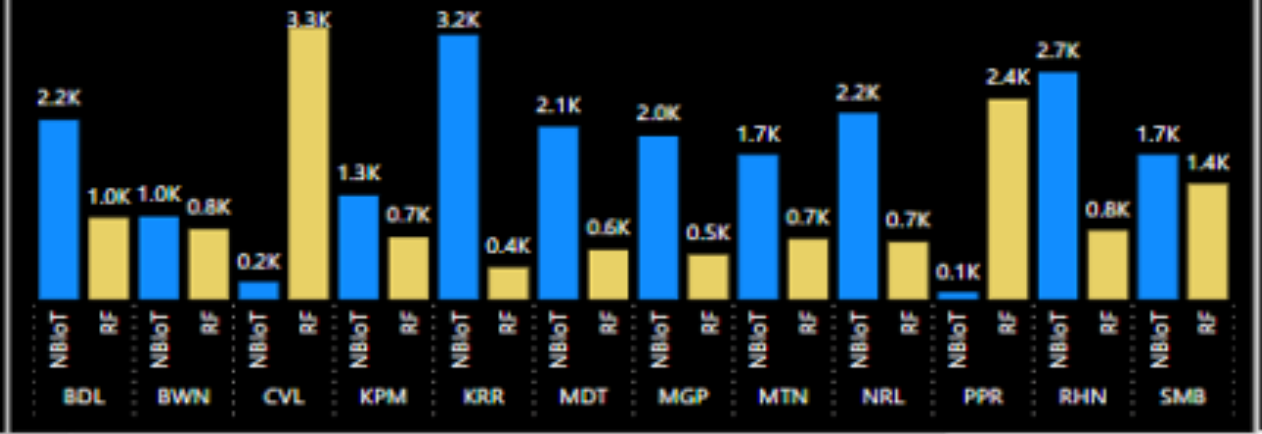
Prepaid/Postpaid



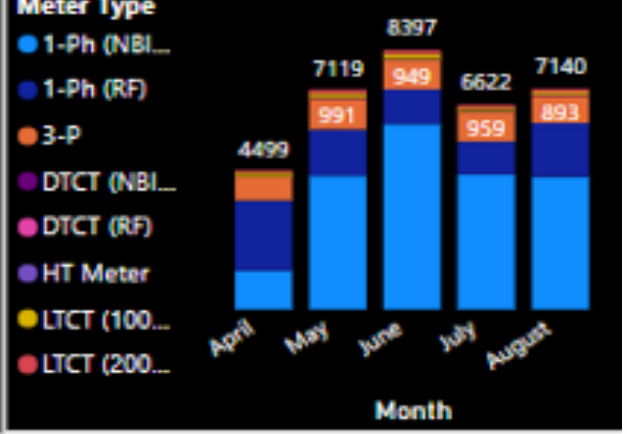
Installation by Meter Type (Cumulative FY 24)



District-wise Deployment

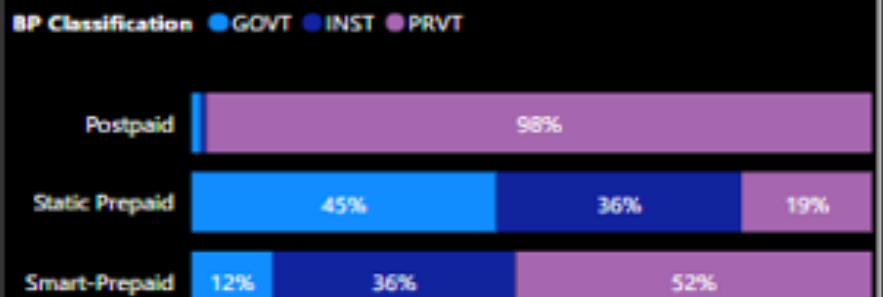


Installation by Meter Type (Monthly)

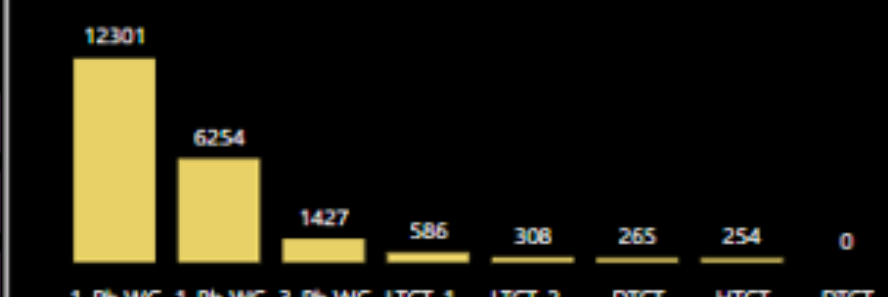


Contract Class-Wise Deployment

Prepaid/Postpaid (BP Classification-Wise)



Stock Position by Meter Type



Smart Meter Journey

2012

POC Communication roadmap finalization with L+G, Silver Spring, Trilliant

2013

2014

2016

Benchmarking

With early implementers across the globe

National Tariff Policy

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

2017

RF Canopy

Deployment(back End), Material Delivery, Planning of deployment and backhaul & Strategy

2018

Smart Meter

Meter Deployment Started With Pre-MDM solution

BIS Inclusion of Meters

2019

MDMS

MDMs Deployment

Network Stabilization & Smart District wise deployment

2021

NBIoT Smart Meter

NBIoT Meter Deployment

Use Case rollout

2023

4-G Smart Meter

POC in Process

NBIoT: HES Integration with MDM

Details of Case Studies(Selection of Technolo

Technologies Evaluated

- RF Mesh @ 865-67 MHz
- RF (P2MP)
- RF Mesh @ 2.4 GHz & 5.8 GH
- PLC (3G,Prime)
- Cellular (2G,2.5G,3G,4G,LTE)

1 PLC

- ➢ Stabilisation efforts too high
- ➢ skilled man power required.
- ➢ Network suitable for high count of meters per transformer.
- ➢ Impedance mismatch problem.
- ➢ Tariff policy not favouring.
- ➢ Multiple technology implementation not possible.

2 GPRS

- ➢ Dependency on 3rd Party Service Provider
- ➢ Very High Rental O&M cost
- ➢ Long term approach missing
- ➢ Fast migration to new technology and Signal penetration

3 RF

- ✓ **Network cost independent of count of meters per transformer.**
- ✓ **Private Network.**
- ✓ **Multiple Technologies can be supported.**
- ✓ **Cost effective in high Density Area**
- ✓ **Self healing network.**
- ✓ **Terrain and Land Cover has big role in performance.**
- ➢ Significant upfront cost.
- ➢ Dependency on one service provider leading to high risk.

4 Optical Fibre

- ✓ **Very fast and reliable data transfer.**
- ➢ Too expensive to extend up to each customer

Hybrid technology (for deployment) :

•RF-Mesh @ 865-67 MHz with Optical Fiber backhaul

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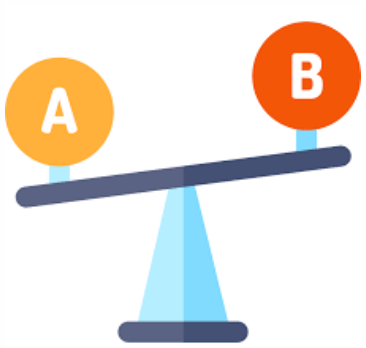
Ability to support smart grid applications

S.No.	Application	Smart Grid communication tech.		
		RF mesh	PLC	Cellular
1	Distribution Automation	Yes	No	Yes
2	Automatic Demand Response	Yes	No	Yes
3	Multi interval meter reading	Yes	Yes	Yes
4	On-Demand meter reading/ Connection / Disconnection	Yes	No	Yes
5	Remote firmware upgrade	Yes	No	No
6	Real time pricing	Yes	Yes	Yes
7	Outage Management	Yes	Yes	Yes
8	Support for pre-paid meters / Net meters	Yes	No	Yes
9	Street Light Management	Yes	No	Yes
10	GSAS Backup	Yes	No	No
11	Upfront Cost	High	Moderate	Low
12	Operational Cost	Low	Low	High



AMI Application
- Smart Meters use cases

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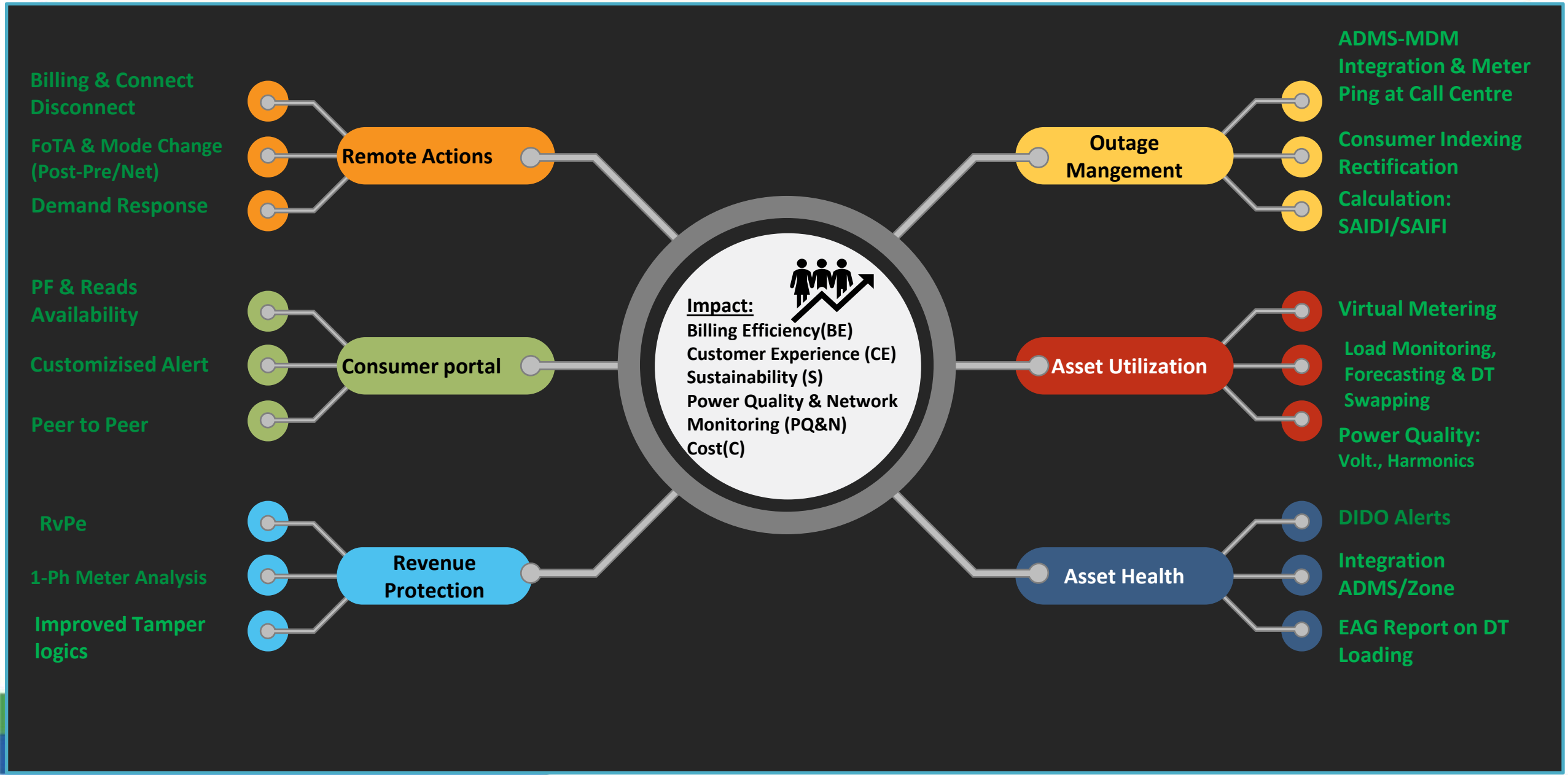
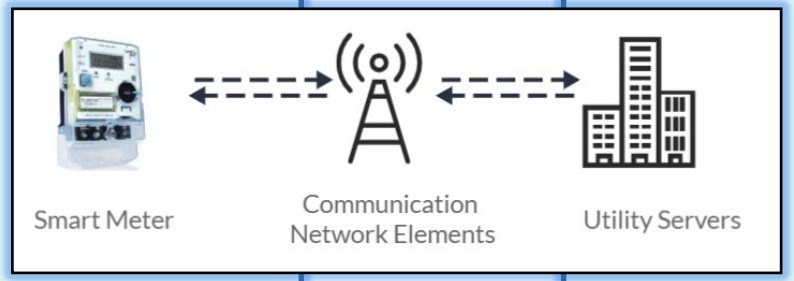


Use of Smart Meter data

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

Outage Management- NCC

Last Gasp integration with ADMS:

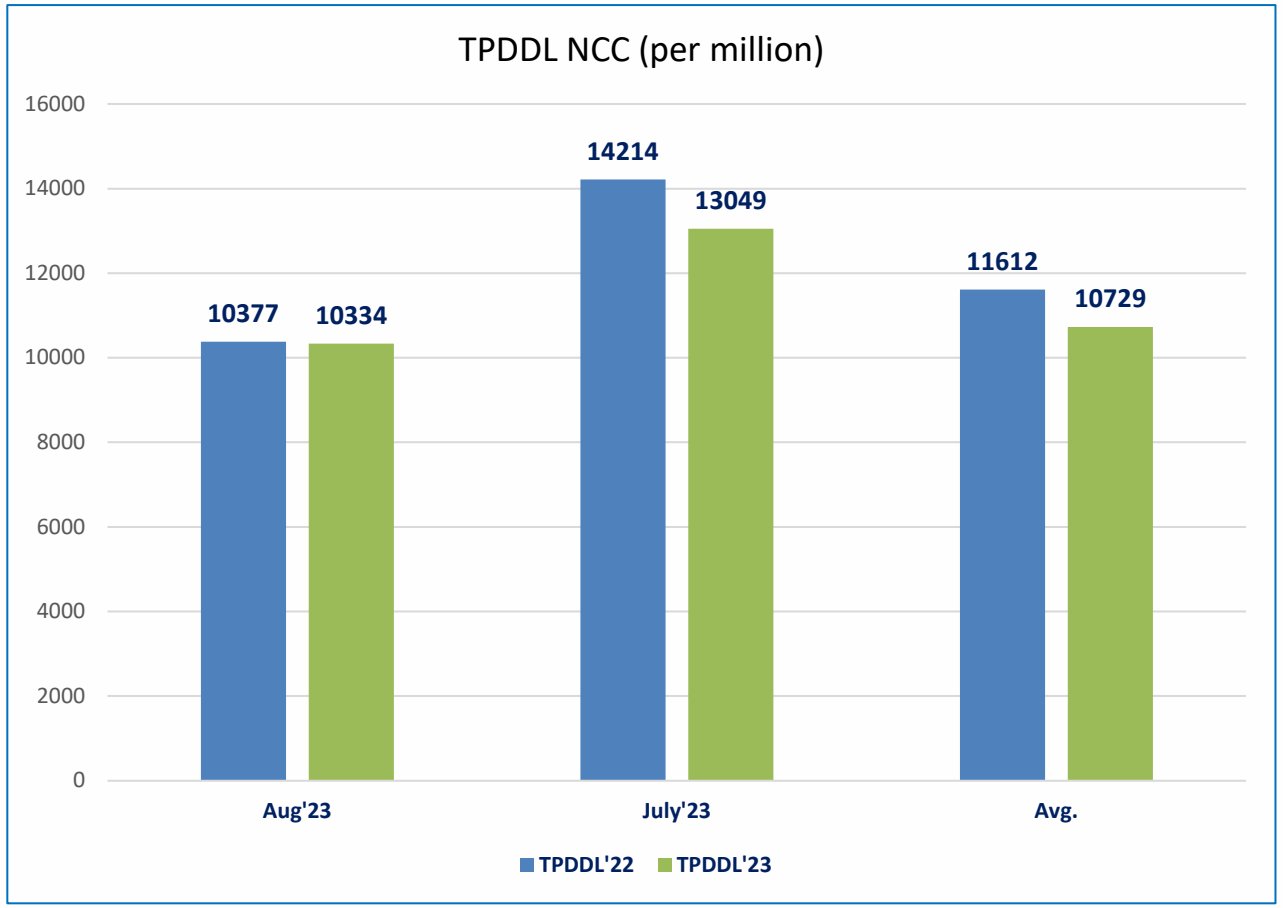
Objective: Using the Last Gasp signal to prioritize the outage response.

Adoption in Business Process:

- To benefit consumers by improving SAIDI
- Optimize utilization of field crew

Benefits:

- Early identification of power failure in the network.
- Saving in Operational Expenses by using manpower efficiently
- Reduction in registration of No Current Complaints. Ref. graph



Outage Management- Meter Ping

Meter Ping in consumer complaint:

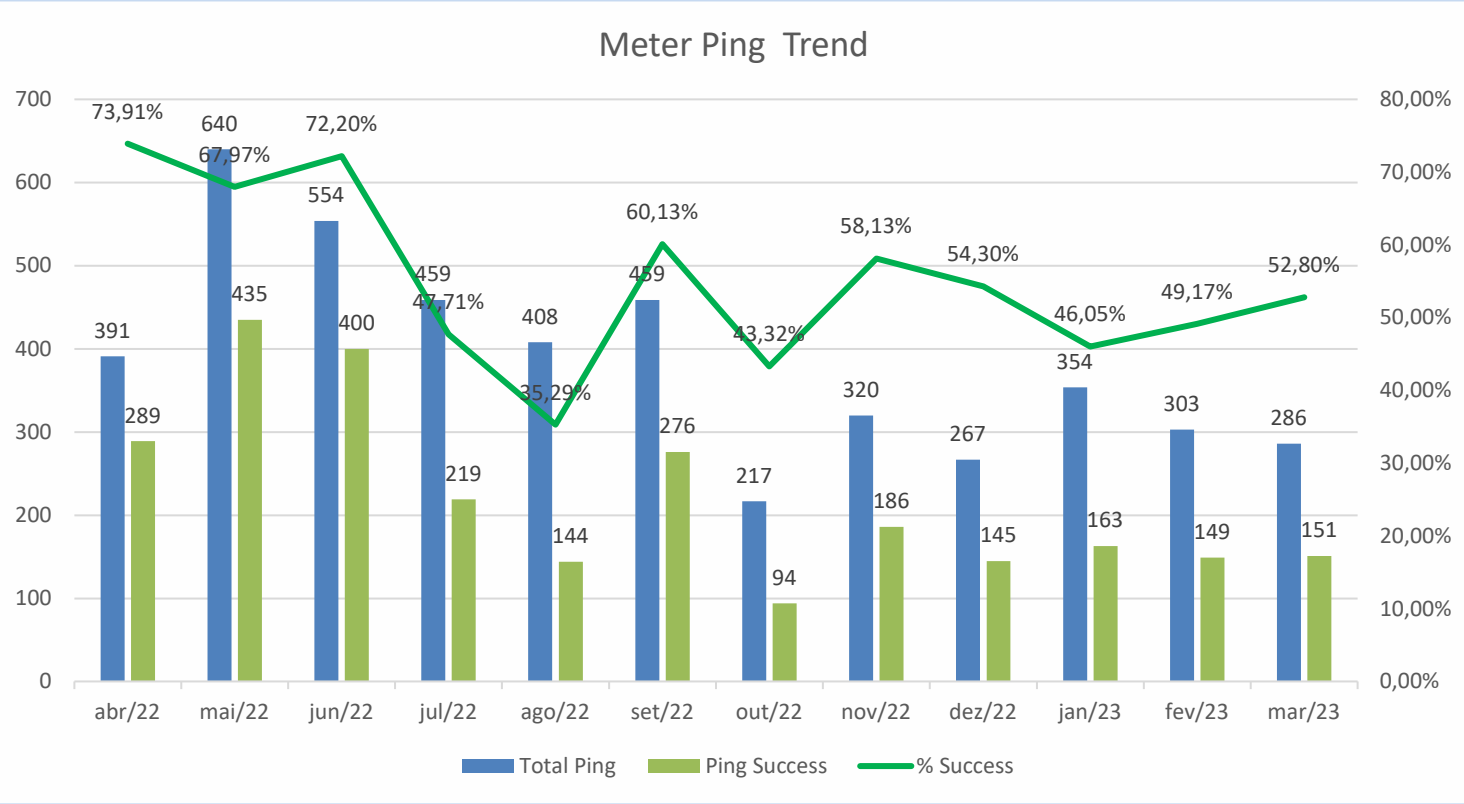
Objective: To register no-current complaints pertaining to utility only

Adoption in Business Process:

- Eliminates false no-current complaint registration
- Timely information to consumers if cause of power supply failure at his end.

Benefits:

- Optimize utilization of field crew
- Saving Operational Expenses by using manpower efficiently.



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Risk Prediction of Distribution Transformers

Objective

To create a prediction of risk for DTs

Adoption in Business Process

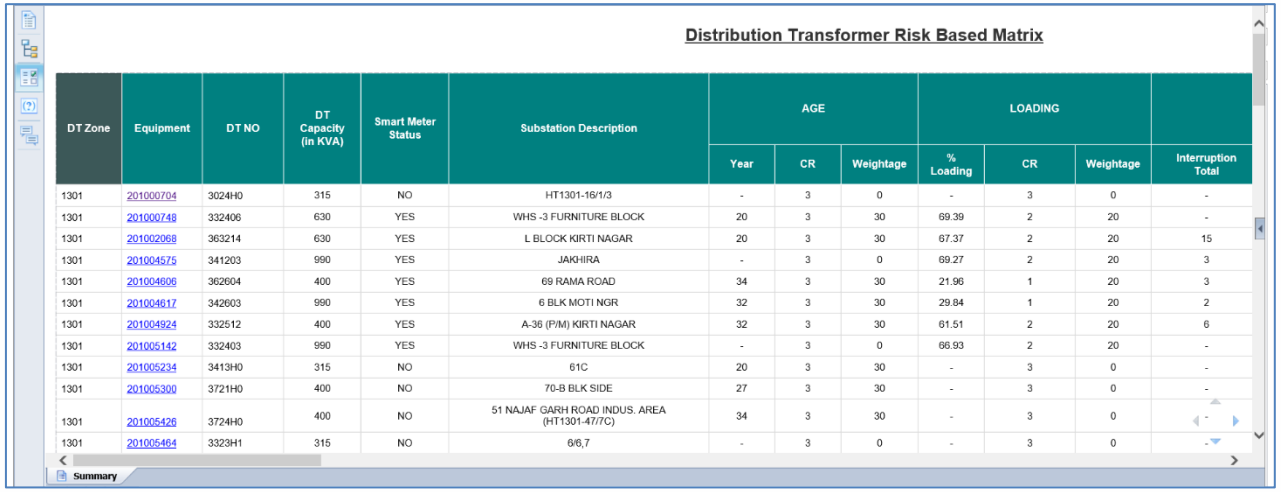
- From period based mntc/overhaul to data based mntc/overhaul
- Embed in workflow by linking to notification process

Benefits

- Avoid both scheduled and unscheduled interruption
- Reduce opex and capex
- Reduce asset failure rate

Features

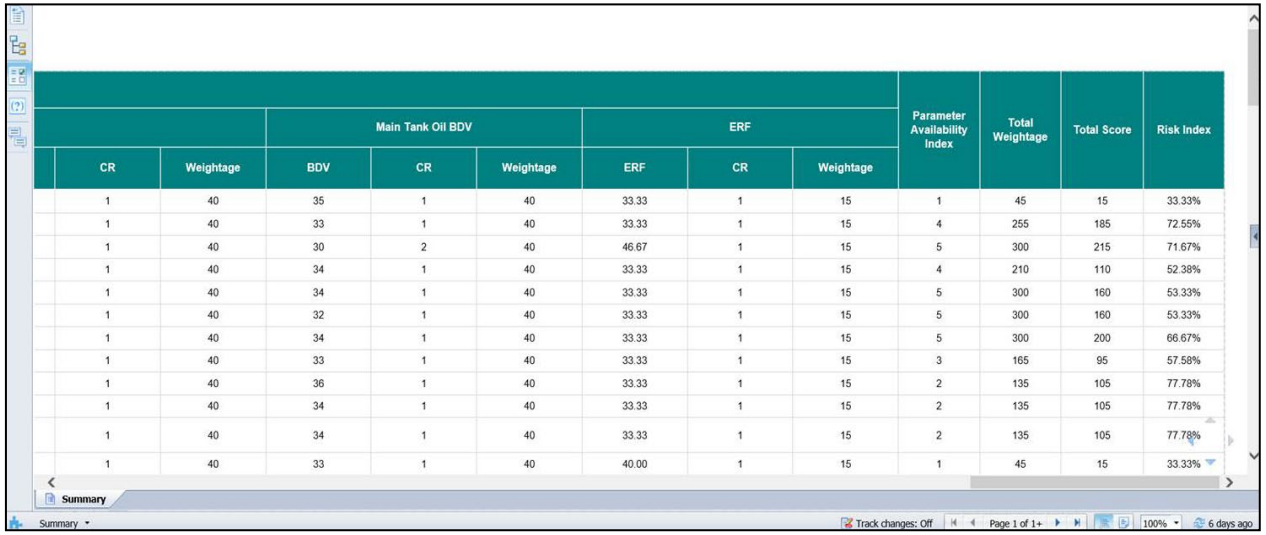
- All asset data in different systems like ERP, MDM, etc integrated to create a model.
- Threshold values validated by verifying previously failed DTs



Distribution Transformer Risk Based Matrix

DT Zone	Equipment	DT NO	DT Capacity (in KVA)	Smart Meter Status	Substation Description	AGE			LOADING			
						Year	CR	Weightage	% Loading	CR	Weightage	Interruption Total
1301	201000704	3024H0	315	NO	HT1301-16/1/3	-	3	0	-	3	0	-
1301	201000748	332406	630	YES	WHS -3 FURNITURE BLOCK	20	3	30	69.39	2	20	-
1301	201002068	363214	630	YES	L BLOCK KIRTI NAGAR	20	3	30	67.37	2	20	15
1301	201004575	341203	990	YES	JAKHIRA	-	3	0	69.27	2	20	3
1301	201004606	362604	400	YES	69 RAMA ROAD	34	3	30	21.96	1	20	3
1301	201004617	342603	990	YES	6 BLK MOTI NGR	32	3	30	29.84	1	20	2
1301	201004924	332512	400	YES	A-36 (P/M) KIRTI NAGAR	32	3	30	61.51	2	20	6
1301	201005142	332403	990	YES	WHS -3 FURNITURE BLOCK	-	3	0	66.93	2	20	-
1301	201005234	3413H0	315	NO	61C	20	3	30	-	3	0	-
1301	201005300	3721H0	400	NO	70-B BLK SIDE	27	3	30	-	3	0	-
1301	201005426	3724H0	400	NO	51 NAJAF GARH ROAD INDUS. AREA (HT1301-47/7C)	34	3	30	-	3	0	-
1301	201005464	3323H1	315	NO	6/6,7	-	3	0	-	3	0	-

Summary



		Main Tank Oil BDV			ERF			Parameter Availability Index	Total Weightage	Total Score	Risk Index
CR	Weightage	BDV	CR	Weightage	ERF	CR	Weightage				
1	40	35	1	40	33.33	1	15	1	45	15	33.33%
1	40	33	1	40	33.33	1	15	4	255	185	72.55%
1	40	30	2	40	46.67	1	15	5	300	215	71.67%
1	40	34	1	40	33.33	1	15	4	210	110	52.38%
1	40	34	1	40	33.33	1	15	5	300	160	53.33%
1	40	32	1	40	33.33	1	15	5	300	160	53.33%
1	40	34	1	40	33.33	1	15	5	300	200	66.67%
1	40	33	1	40	33.33	1	15	3	165	95	57.58%
1	40	36	1	40	33.33	1	15	2	135	105	77.78%
1	40	34	1	40	33.33	1	15	2	135	105	77.78%
1	40	34	1	40	33.33	1	15	2	135	105	77.78%
1	40	33	1	40	40.00	1	15	1	45	15	33.33%

Summary

Summary | Track changes: Off | Page 1 of 1+ | 100% | 6 days ago

Auto Consumer Mapping Correction

Objective

Use consumer and DT smart meter outage stampings and GIS information to detect anomaly and predict correct mapping

Adoption in Business Process

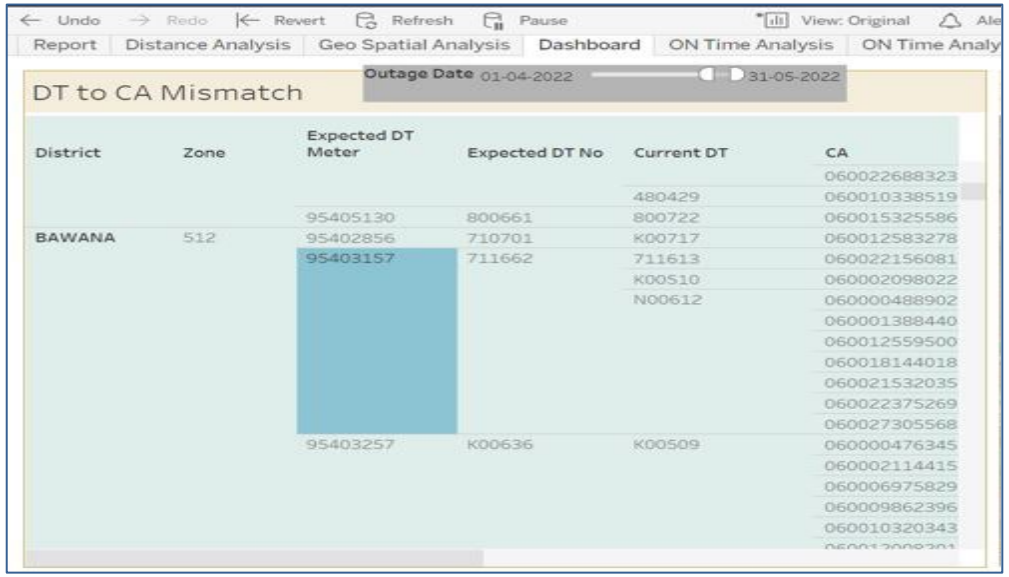
- Sustainable process to correct indexing
- Integrated to ADMS for equipment outage prediction

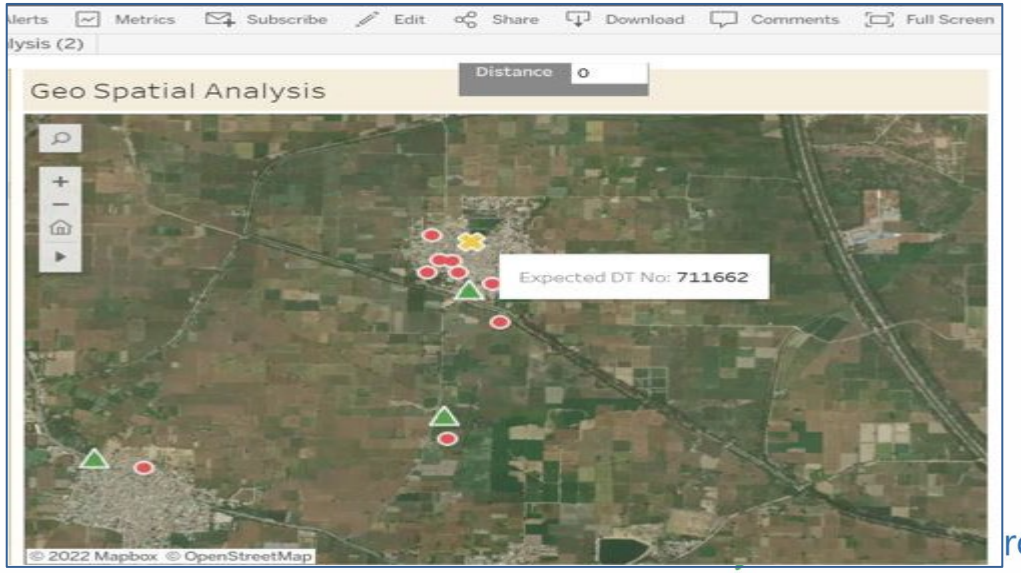
Benefits

- Correct Indexing leading to correct loss calculation, device prediction
- Reduced effort and time over conventional ways of checking indexing

Features

- Takes geographical co ordinates to validate predicted DT
- Rechecked with LT network availability of predicted DT's network in the vicinity





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Asset Utilization

Asset Swapping

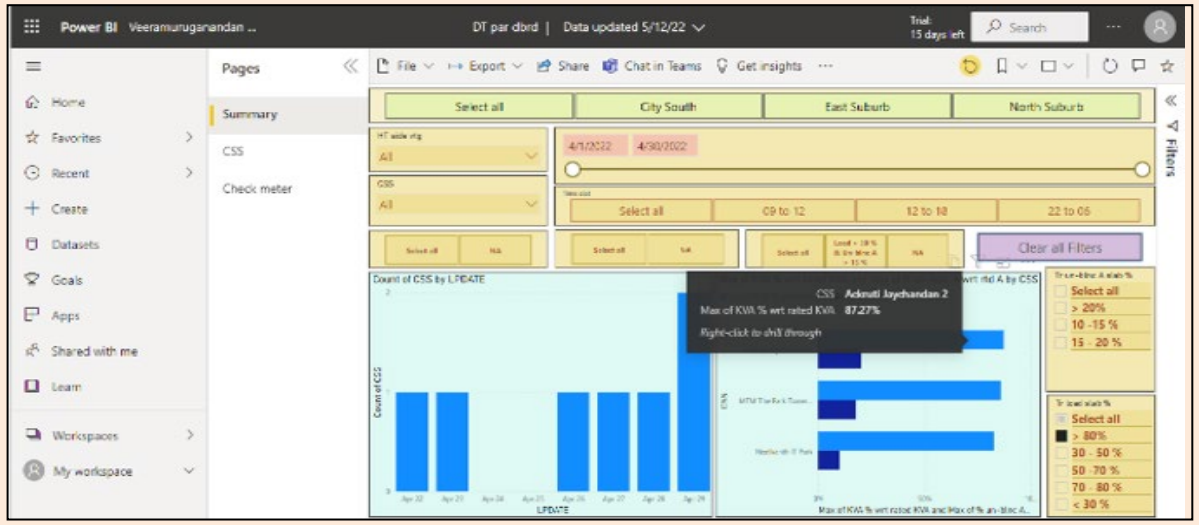
Objective: Adding efficiency to the system by swapping under-loaded assets with overloaded assets

Adoption in Business Process:

- Deferral of Capital Investment
- Optimum utilization of Network

Benefits:

- From Apr'21 to Jul'22, 202 nos. of Distribution Transformer swapped to create the margin in the network for sanctioning load
- Fire incidents due to overloading could be ruled out.

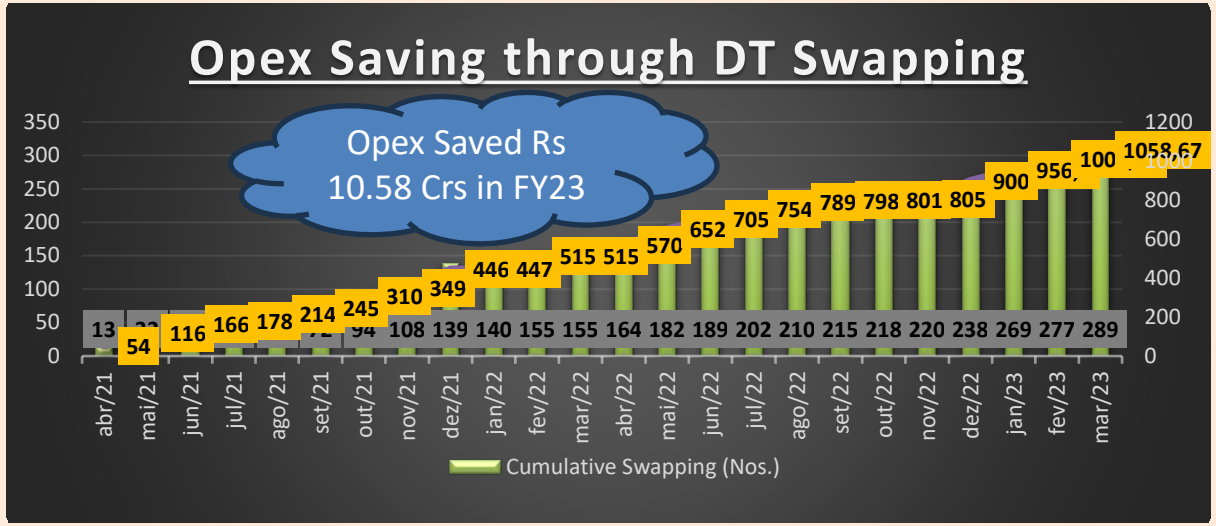


Virtual Metering

Objective: Planning Network capacity in advance by using data from Smart Meters installed under unmetered distribution transformers, feeders and Solar generation

Adoption in Business Process:

- Proper Planning of network helps in sanctioning load timely.
- Optimum utilization of Network



Asset Health

Objective: To protect the health of transformers and other assets by getting digital input and digital output signals through smart meters.

Adoption in Business Process:
- Daily alert report on low oil level
- Prevents assets from fire hazards and theft
- Prevents theft of internal components of transformers (oil etc.)

Benefits:
- Prevented DT oil theft in 02 cases
- Prevented breakdown in 12 cases owing to low oil level

Temperature Event Smart Meter | DI/DO | Status

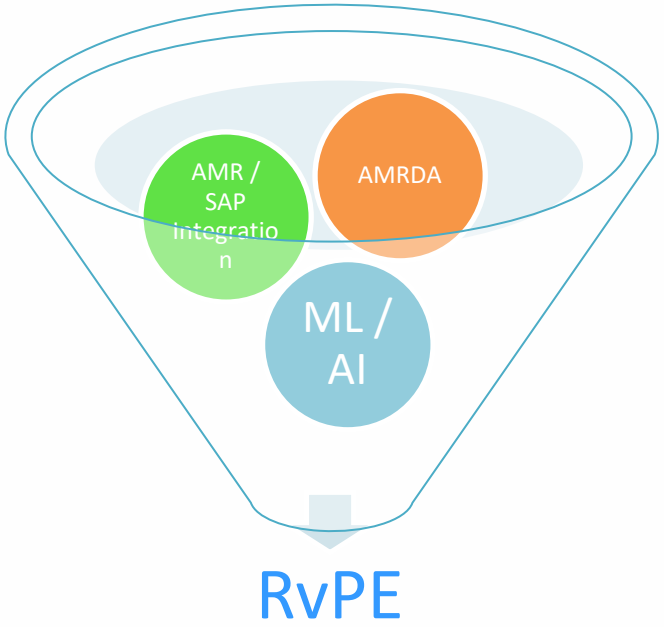
Months	Total No. DT Oil Refilled	Total Cost Savings(Lacs)
Jan'23	5	20.56
Feb'23	7	31.97
Mar'23	1	7.13
Apr'23	3	12.84

Savings from DI/DO (Low Oil Level Tripping):

Greener Tomorrow

AT&C Reduction

Revenue Protection Module



Logics Implemented → Exceptional Report Generation → Dedicated team cases allocation → Detailed Analysis → Site inspection for theft etc

RvPE additional features in comparison to AMRDA

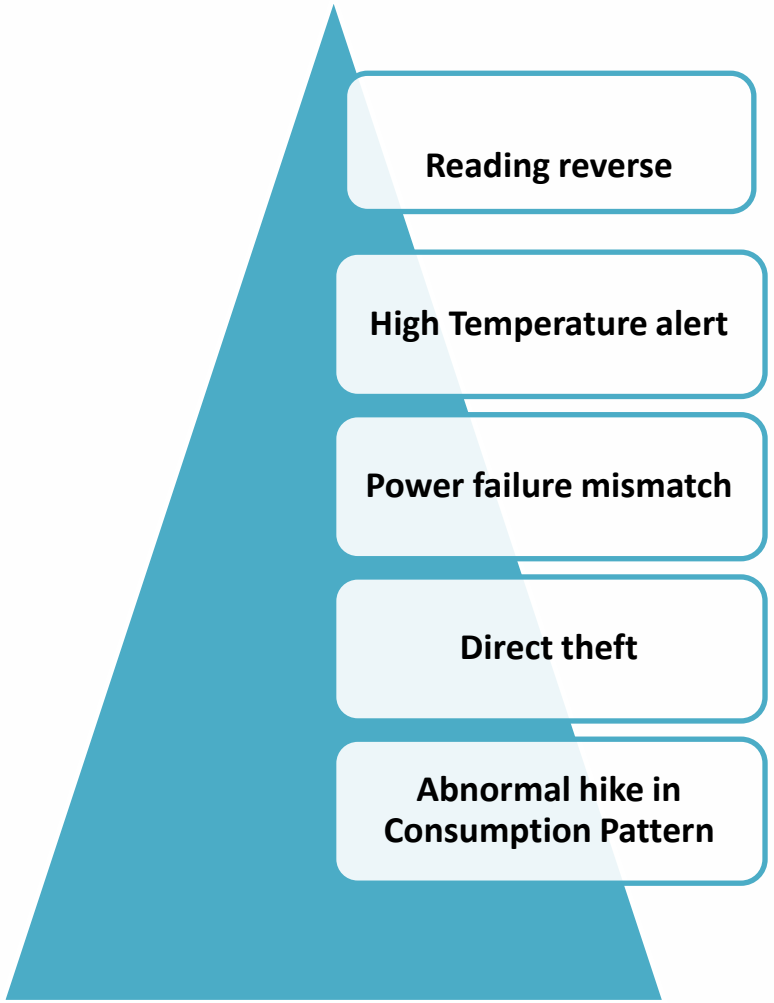
- **AMR / SAP Integration, Industry Profiling, CA based Analysis based on multiple attributes**
- **AI / ML Integration subjected to development of first point**
- **System based Logic efficiency can be monitored**
- **Instant Adhoc Analysis of any case**
- **Threshold values can be changed at user level**
- **System based processing of cases and reports availability**
- **Auto generation of notification number of referred cases**

Description- Revenue Protection Module for identification of potential electricity theft/pilferage using smart/AMR enabled meter data through predefined system based logics as well as machine learning.

Logics replicated in RvPE from AMRDA

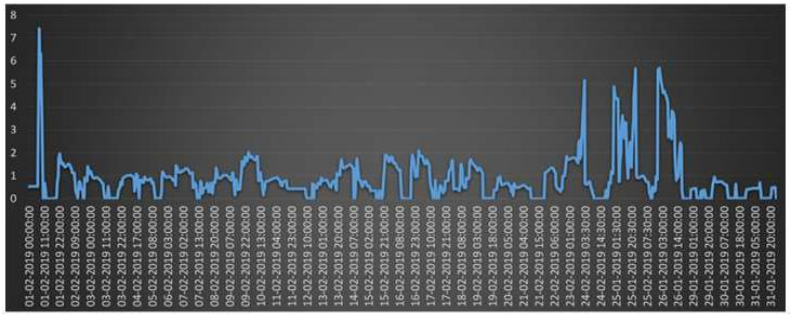
Sr no	Logic Name
1	Assessed Consumption for Industrial and Commercial Connections
2	Assessed Consumption for Domestic Connections
3	Voltage Failure
4	Power Failure
5	CT overload
6	Data Corruption
7	Low Power factor
8	Potential missing with Load Running
9	Current Missing
10	Neutral Disturbance
11	Current Reversal
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



Theft control and AT&C improvements

Case 1: Abnormal Hike in CP



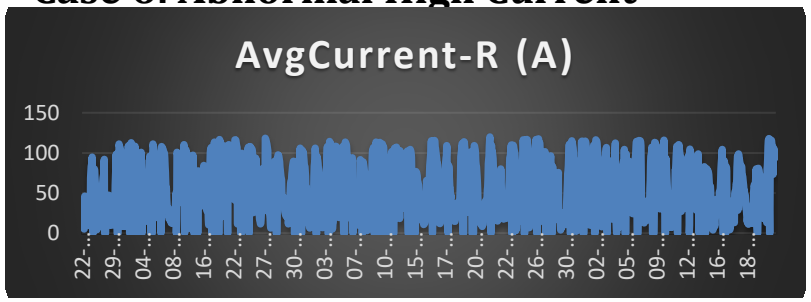
Case 2 : Zero/Low consumption

Case 3 : Non-comm after Abnormal data

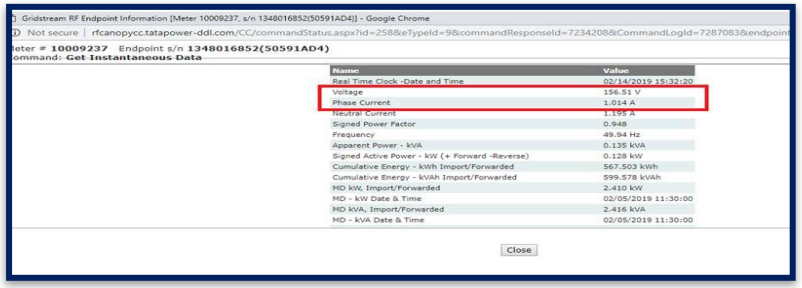
Case 4: Cover Open with High Neutral Current

Case 5: Reading Reversal

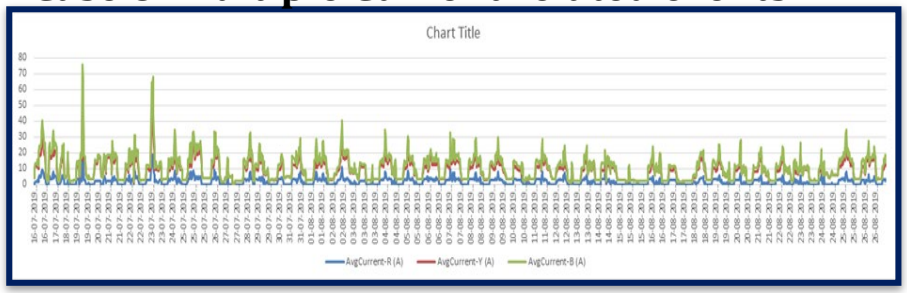
Case 6: Abnormal High Current



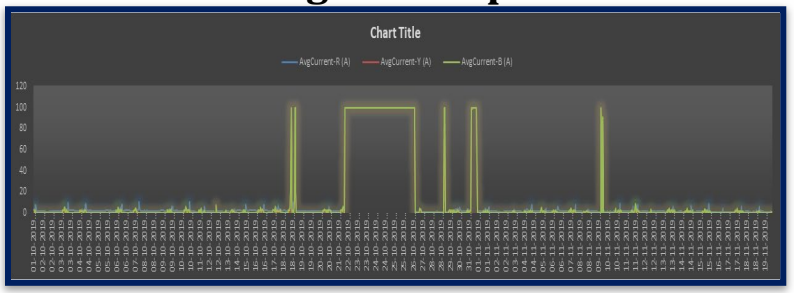
Case 7: Load Without Potential



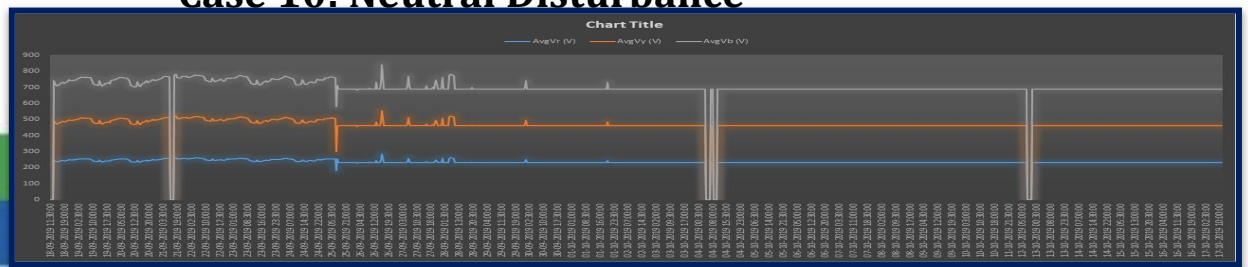
Case 8: Multiple Current related events



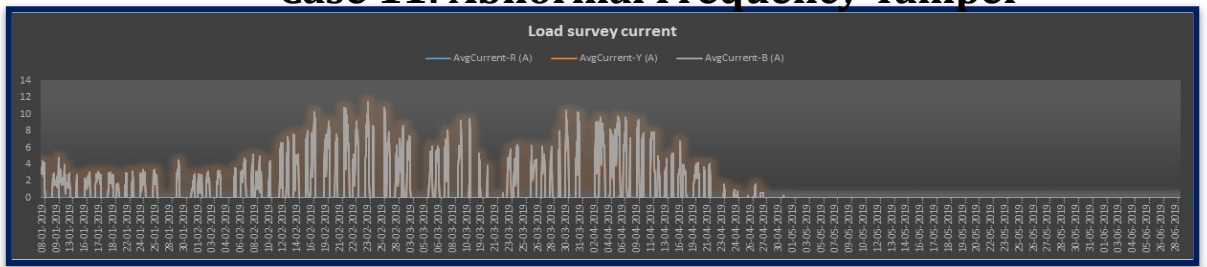
Case 9: Magnet Tamper



Case 10: Neutral Disturbance



Case 11: Abnormal Frequency Tamper



Smart Meter: Cumulative Benefits

FY 20-21 & FY 21-22: ₹ 29.55 Cr

01 Revenue Enhanced:₹ 4.76 Cr

- 14K Meters C&I upgraded to 4 registers.
  - ✓ Enhaced unit sell amount:: ₹ 4.76 Cr

214 K Consumers= Smart 14K + Non Smart 200K

02 Asset Utilization: ₹ 6.48 Cr

- DT Swapping
- **Switching to Smart Prepaid Meters**
  - **Conventional Paid Meter Cost > Smart Prepaid**
  - Conventional Prepaid meter having transactional charges to meter OEM
- DIDO events attended :: 8no's with low oil level

03 Opex Saved: ₹ 18.31 Cr

- Saved opex on different activities:
  - ✓ Reading
  - ✓ AMR
  - ✓ Connect Disconnect
  - ✓ Call Centre Follow-up calls reduction
  - ✓ Billing Complaint Reduction
  - ✓ OTA Firmware upgrade

FY 23-24 (YTM): ₹ 19 Cr

Meters replaced for KVAh Billing

- Cumulative benefits is Rs 7 Cr for New meters deployed and Rs. 6 Cr. For previously deployed (having registers updated)

Asset Utilization: ₹ 7.03 Cr

- DT Swapping
- **Switching to Smart Prepaid Meters**
  - **Conventional Paid Meter Cost > Smart Prepaid**
  - Conventional Prepaid meter having transactional charges to meter OEM
- DIDO events attended :: 6 nos. with low oil level

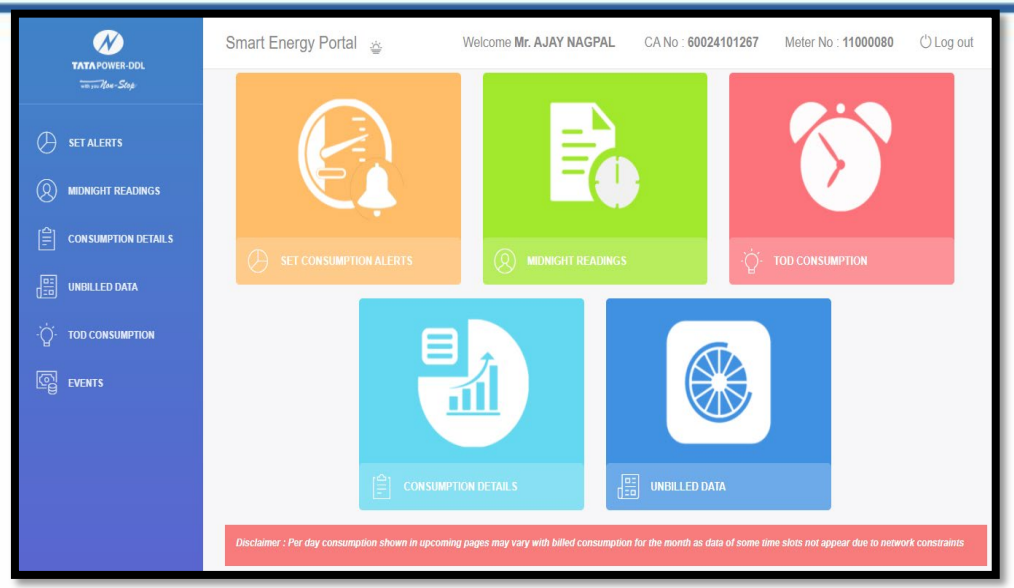
Opex Saved: ₹ 8 Cr

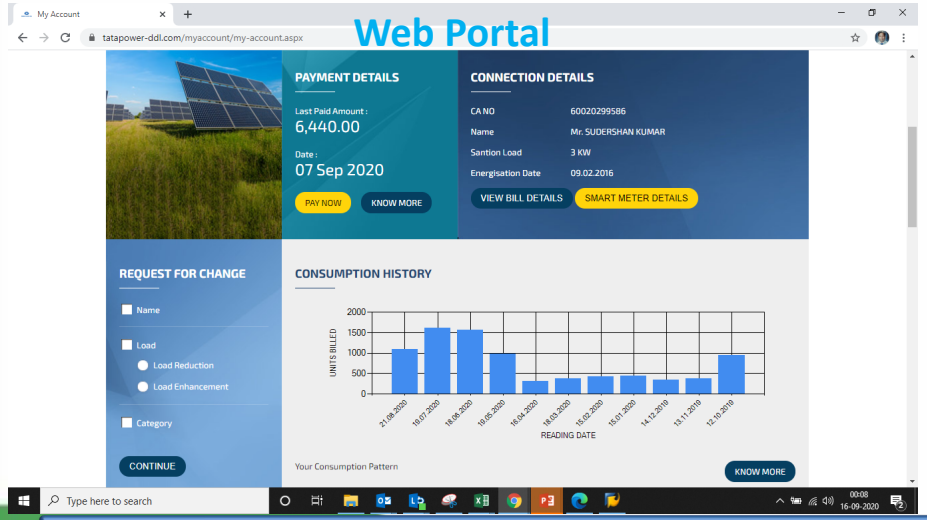
- Saved opex on different activities:
  - ✓ Reading
  - ✓ AMR
  - ✓ Connect Disconnect
  - ✓ Call Centre Follow-up calls reduction
  - ✓ Billing Complaint Reduction
  - ✓ OTA Firmware upgrade

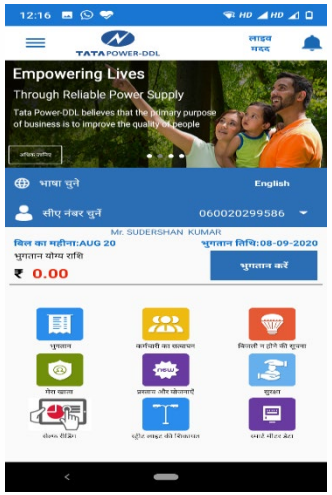
TATA POWER-DDL

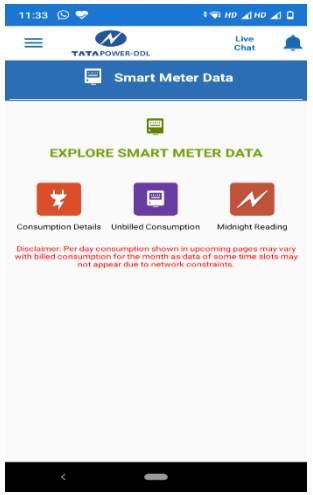
orrow

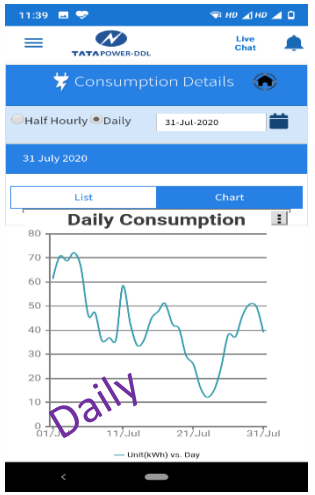
Consumer benefits in App, VAS

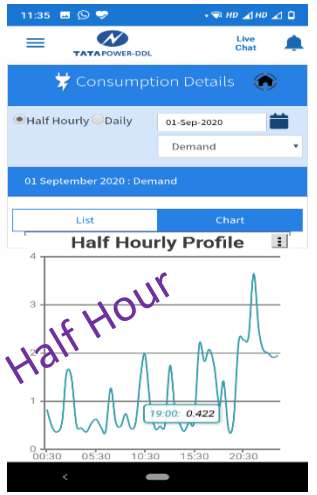


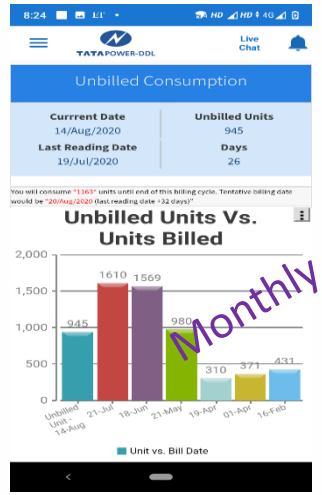












A. Energy Usage **B. Demand Comparison** **C. Customized Alerts** **D. Pre Paid Balance** **E. TOD for Industrial & Comm. Users**

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

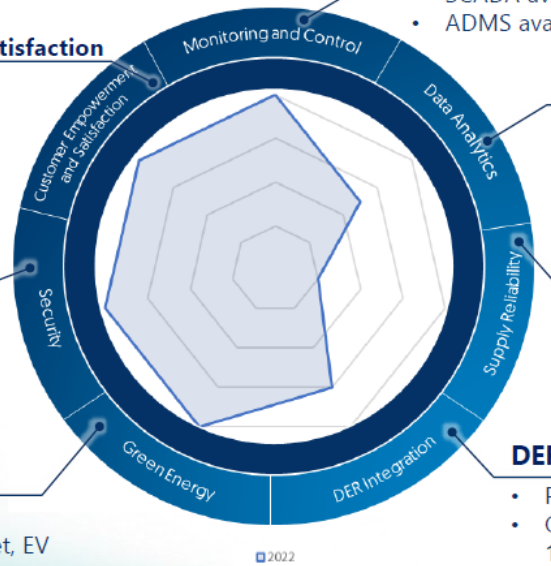
Data Analytics
- 0.2 million smart meters installed
- Advanced Data Analytics for improving reliability through Faults Prediction & Asset Optimization

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



Towards a Greener Tomorrow

TATA POWER-DDL

Energy Storage System

Energy Storage Systems

BATTERY ENERGY STORAGE SYSTEM

TATA Power-DDL has installed South Asia's First 10 MW Battery Energy Storage System (BESS) at Rohini Grid-24 to provide better peak load management, system flexibility and reliability to more than 2 million consumers.

It was a pilot project with cost of Rs 62 Cr having timeline of 1.25 Years.

This was done in collaboration with AES and Mitsubishi Corporation.

COMMUNITY ENERGY STORAGE SYSTEM

Tata Power Delhi Distribution collaborates with Nexcharge to power up India's First Grid Connected Community Energy Storage System

Storage Initiatives

TATA POWER-DDL

10 MWh energy storage system at Tata Power Delhi Distribution's Rohini Substation (in partnership with AES, Mitsubishi)

Community storage: 15-20% of the Distribution Transformer Capacity. 630kVA DT – 150 kW/528KWh Storage (in partnership with Exide & Leclanche)

First of a kind pilot project on Pole Mounted Battery Energy Storage (Under Development 20KW/20KWh)

Grid Storage

Community

Pole Mounted

Better load management and system flexibility

Prevent overloading and backup during exigency condition

Tomorrow

Urja Arpan Framework

TATA POWER-DDL

Urja Arpan" an initiative of Tata Power-Delhi Distribution Ltd aims to encourage responsible and optimal electricity consumption through use of energy efficient products and services among individuals and organizations and persuade citizens for practicing sustainable lifestyle for a greener tomorrow

URJA ARPAN

Do the Earth a Favour, Be a Power Saver

- Solar
- ESCO*, Smart Energy Management
- EV
- Home Automation
- AC, BLDC* Fans Air Purifier, Geyser
- EE* Lighting Products
- Demand Response

PLATINUM MEMBER

DIAMOND MEMBER

GOLD MEMBER

Vision

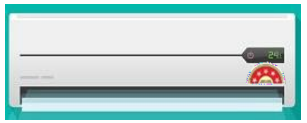
Enablers

Recognition

*ESCO- Energy Service Company; BLDC- Brush Less Direct Current; EE- Energy Efficient

Towards a Greener Tomorrow

Urja Arpan Contribution(FY23)



Offerings	Numbers	MUs	CO2 (Tons)	Trees (Million)
Solar	477	9.36	7399	0.28
AC	2349	1.48	1169	0.05
LED Lighting + BLDC Fan	23080	0.98	773	0.04
EV Cars*	2000	1.52	1200	0.05
LED Street Light Project*	176801	105	82950	3.15
Demand Response Program	74892	0.54	424.58	0.01
Grand Total	**278599**	**119 MUs**	**93916 Tons**	**4 Million**

Total

119 MUs

93916 Tons

4 Million

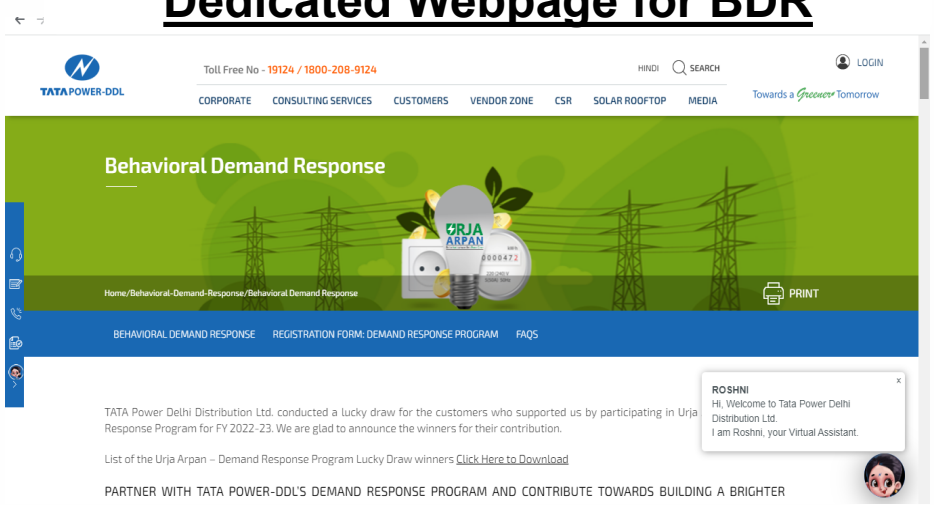
Towards a Greener Tomorrow

Behavioral Demand Response Program

Demand Response :-

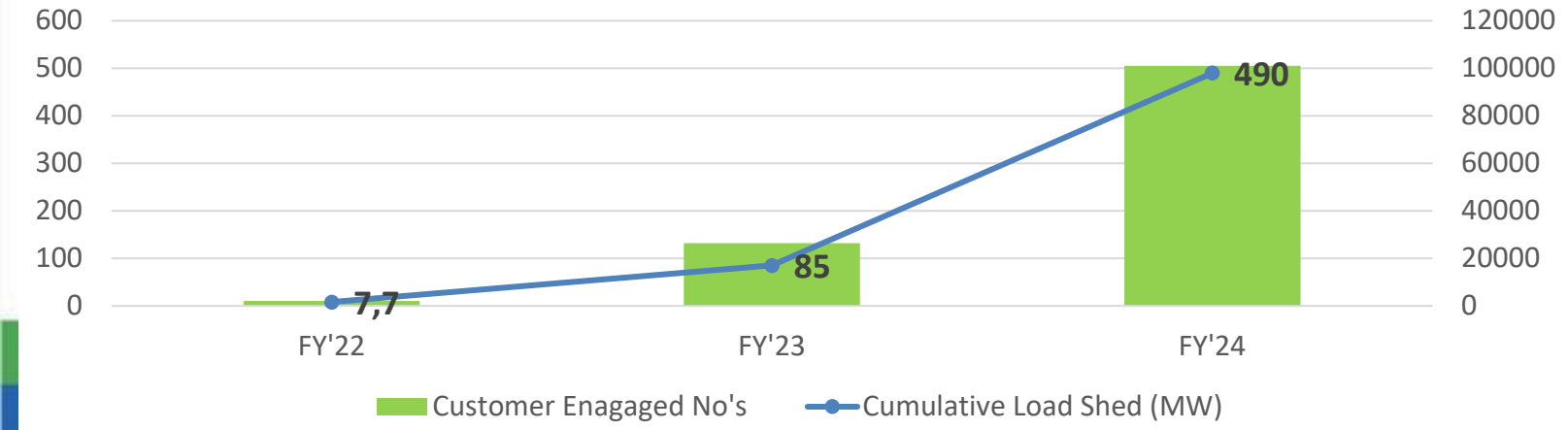
It is an **electric load management program** which seeks to manage electricity demand at consumer end by encouraging them to increase or decrease their consumption **using incentives (Critical Peak Rebate) or penalties (Critical Peak Pricing)**.Helps to bring in Demand side flexibility and Optimization of power procurement

Dedicated Webpage for BDR



YoY Results of BDR:- (Target- 500 MW load shed)

A. No. of Events B. Per Meter Load Shed Residential and C&I	A. 16 B. 0.40 kw	A. 12 B. 0.40 kw and 3.6 kw	A. 14 B. 0.32 kw and 4.9 kw



Recognition of Participating Customers

a Greener Tomorrow

The Changing Paradigm: Energy-A Service

Decentralization, Decarbonization & Digitalization are reshaping power sector, requiring the shift in business models from traditional utility centric to consumer centric.

DISTRIBUTED GENERATION

- Increased Renewable generation (Solar/ wind/Rooftop/Micro-Grids)
- Energy Storage
- Local Energy Markets
- Distributed Energy Resource Management

GRID INTEGRATION

- Demand Management
- Peaking Power; Ancillary Market
- Cybersecurity

COMPETITION DRIVEN

- Lower Margins
- From Regulated to Competition Driven

E-MOBILITY

- Increased Power Demand
- Reshaping Load-Curve
- System Balancing; Energy Storage Solutions
- Time of the day Tariffs

CONNECTED SYSTEMS

- Access to data
- Sensors & Control
- Two-way Communication
- Advanced Analytics

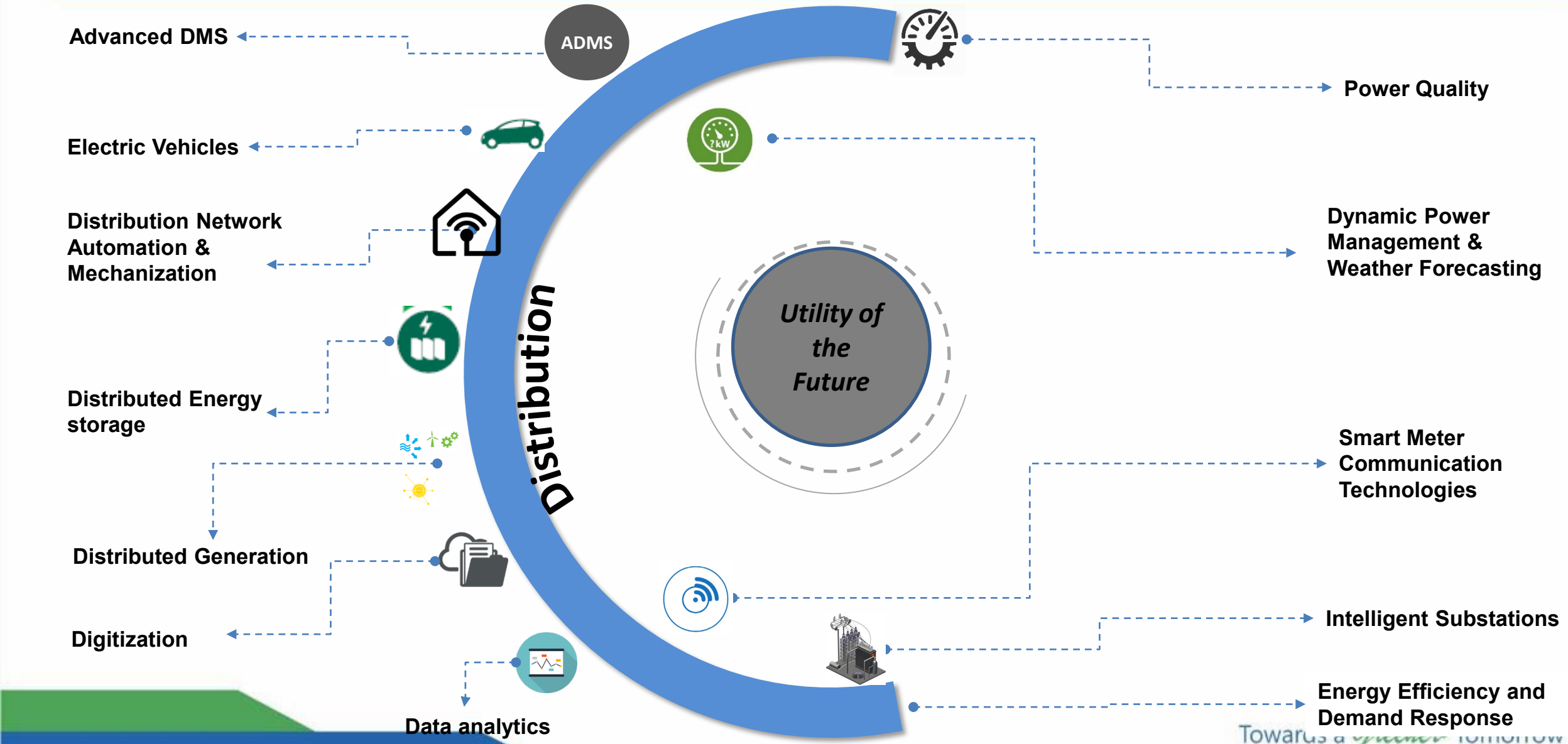
SUSTAINABILITY

- Circular Economy
- Energy Efficiency
- Coal Tax
- Stringent Emission Standards

EMPOWERED CONSUMER

- *Prosumers;* Peer to Peer Transaction
- On- Demand Services
- Personalised data-driven customer experience
- Other utility services

Tata Power-DDL: Utility of the Future



Brief Profile

Subhadip Raychaudhuri
Head (Meter Management & AMI Applications)
Tata Power Delhi Distribution Limited, India

Mr. Subhadip Raychaudhuri is an accomplished Indian professional with over 24 years of experience in power distribution utilities. He holds a Bachelor of Technology degree in Electrical Engineering and an MBA in Finance. Mr. Raychaudhuri has been an active member of ET:13 and the Bureau of Indian Standards, contributing significantly to the development of standards and policies for the power sector in India.

Currently, Mr. Raychaudhuri works as the Head (MMG and AMI Applications) at Tata Power Delhi Distribution Limited (TPDDL), where he oversees the implementation of smart metering solutions to improve power distribution efficiency and reliability in the region.

His broad range of expertise includes metering, protection, testing, and specification design of distribution systems and substations. Mr. Raychaudhuri's involvement in designing and implementing various projects, from conceptualization to commissioning, has been instrumental in their success.

Thank You