# PART B: Enterprise IT Systems (with implementation examples at Tata Power Delhi Distribution Ltd)

# PART C: Call Centre Automation

**Session Content**

**B. Enterprise IT Systems (with implementation examples at Tata Power Delhi Distribution Ltd)**

- Billing and Customer Care Systems – reading and bill generation system & Customer support
- Customer Portal – Portal for customer ease for information, complaints etc.
- Enterprise Resource Planning (ERP) – Availability of different resource for monitoring & controlling the system
- Outage Management System (OMS) – integrated outage management involving smart metering
- Mobile Crew Management System – Field Force Automation (FFA), crew monitoring
- Robotic Process Automation (RPA) – Process integration and automation
- IT-OT Integration – data syncing and integration
- Asset Management System – Equipment monitoring and controlling

**C. Call Centre Automation**

- Chatbots, Voice bots – Customer interface and facilities
- Call Log Analytics – call data analysis and customer data analysis


**Speakers:**

**Subhadip Raychaudhuri,** Addl. General Manager

**Brajanath Dey,** Deputy General Manager

Tata Power Delhi Distribution Limited, India

# Billing & Customer Care System

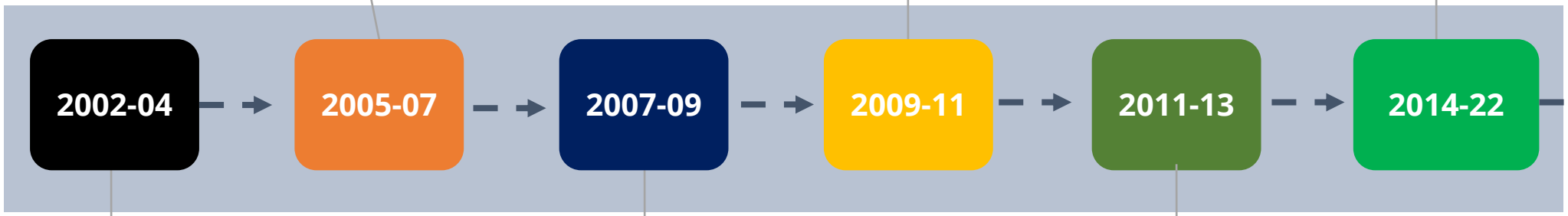
## Pioneer in Customer Experience

- Sakshat – System Front End to view Customer Details
- Commercial & Street Line Complaint Helpline Number
- ATPMs
- Website Login
- Feedback Forms
- IVRS helpline for reporting Safety, Unethical practices

Impact

***Customer Satisfaction Index ~ 96-100%***

***Getting Electricity (EODB)Rank from 137 to 22 in span of 5 years***




- Customer Care Centres
- No Power Supply Helpline Number
- Website
- Sampark – Complaint Registration Portal
- RWA / IWA Meets

- Sambandh – In-house CRM
- C Sat Survey
- Segmented Customer Meets
- SMS based complaint management
- PHF
- PUSH / PULL SMS Service
- Planned Shutdown during weekly off
- Pre-paid metering

- SAP CRM
- SAP BCM
- Single Due date billing for G&I Customers
- Payment Dropbxes
- Mobile Cash Collection Van
- OMS Roll Out

- Unified Helpline Number
- Hotline
- Instant New Connection Camp & Online Spot Billing for SCG Customers
- Packaged Sub Station
- SMRD
- Auto changeover Provision or HT Customers

- Toll Free Helpline Number
- Presence on Social Media
- Mobile App / Webchat
- SARAL
- EoDB
- Value Added Services

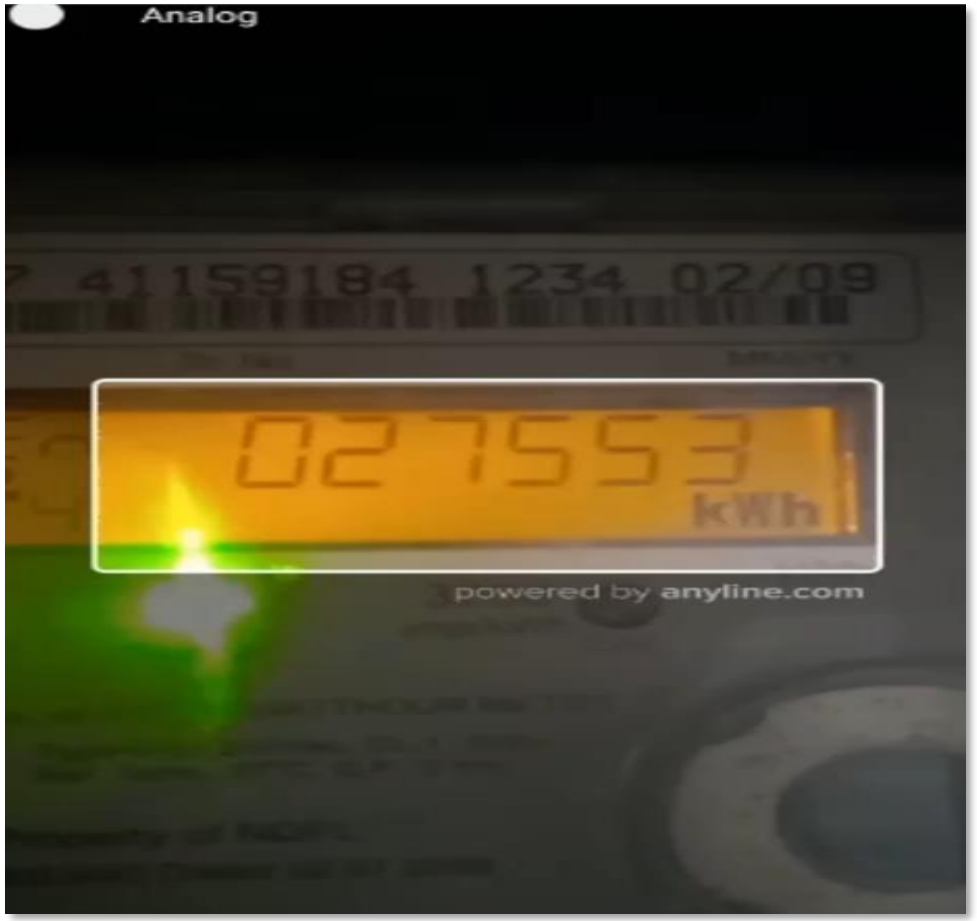
- Feedback Tab at CCC
- Omni Channel
- All Women CCC
- Value Added Services

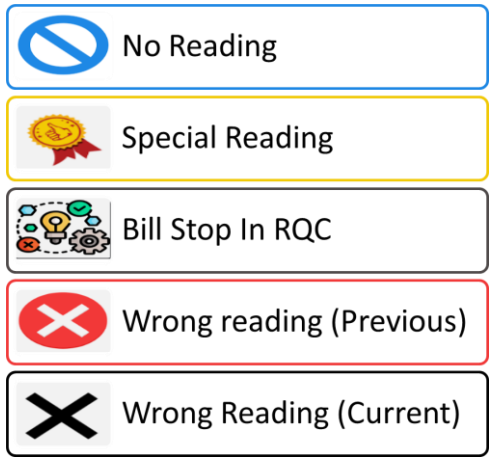
# OCR - Optical Character Recognition

Reading of meters by OCR-Software, to reduce re-punching

**Benefits:**

- **OCR Correct scan accuracy achieved is 96.8% as against the 65% initial month of implementation**
- **Reduction in Reading Complaints by 50%**
- **Reduction in re-punching**




# Customer Listening & Learning – Customer Portals

Online Listening

Website | Mobile App | Whatsapp | Email | Chatbot | Pull SMS Service | Web Chat | SARAL | Facebook | Twitter

Sampark Kendra (Toll Free)

Customer Care Centres

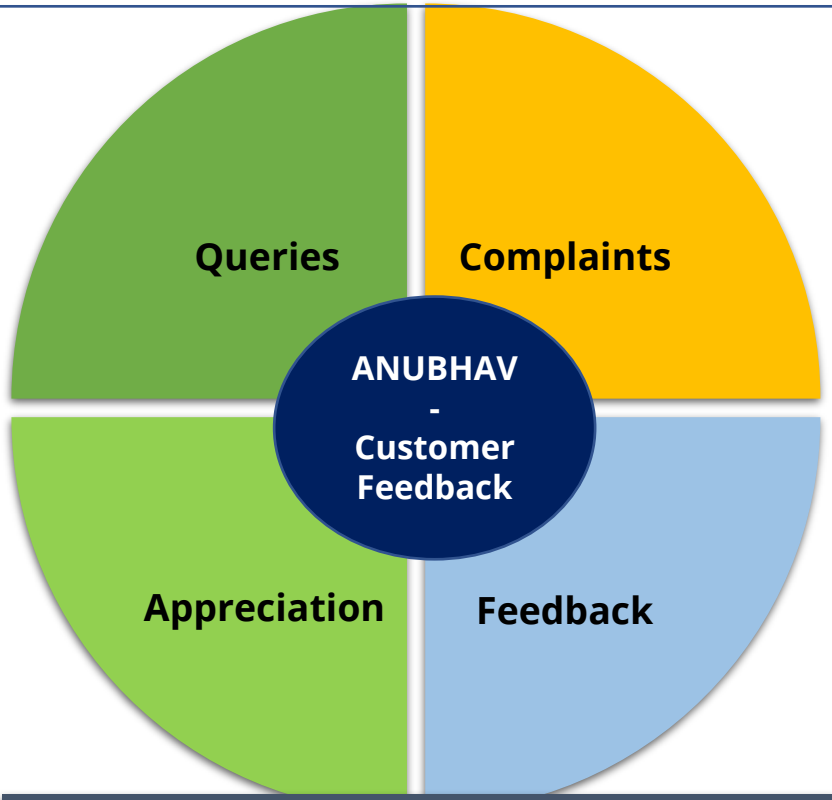
ABHA

KAM (Xpress, KCG, HRB)

Outreach/ Customer Meet

Letters

Offline Listening




Capturing Customer Experience

## Learning Engines

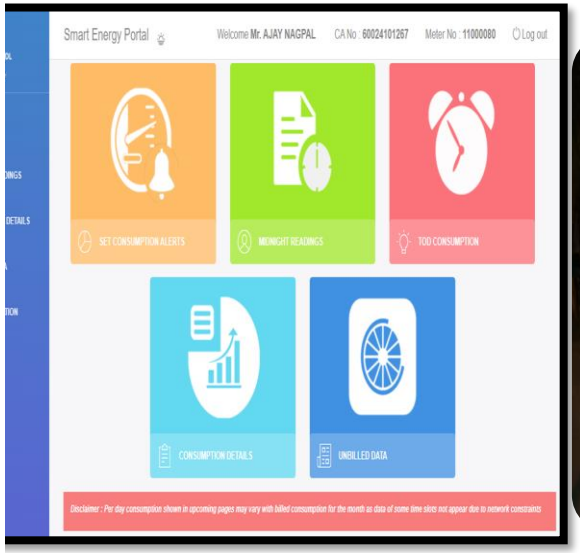
Anubhav Portal

Satisfaction Survey (All)

# Customer Benefits in App – Value Added Services (VAS)

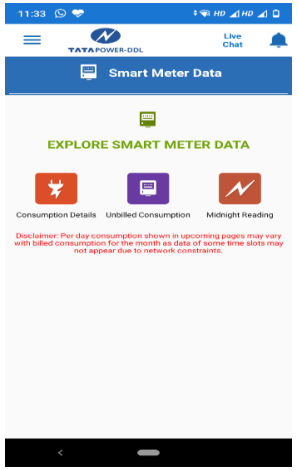
## Initiatives taken to spread awareness on Smart Meter:

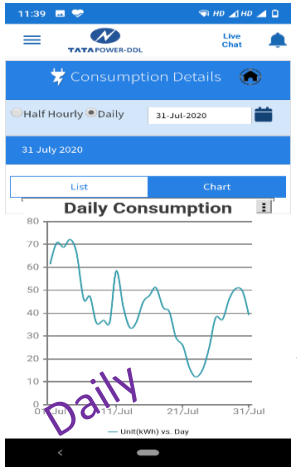
- ✓ Newsletter connect - 4 lac consumers (2 lac Installed + 2 lac to be replaced)
- ✓ RWA & EC meets awareness
- ✓ Virtual Green Zone sessions thru RWA members
- ✓ Virtual Synergy sessions with school students
- ✓ SAMMAN Events- for Senior Citizen customers
- ✓ Showcasing of consumer seniors to customers thru what's app and social media links



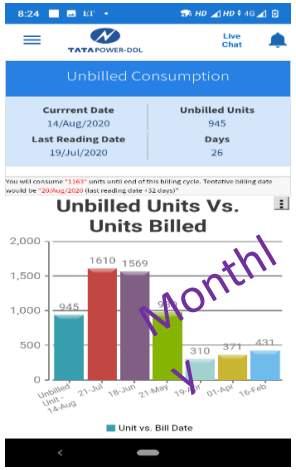






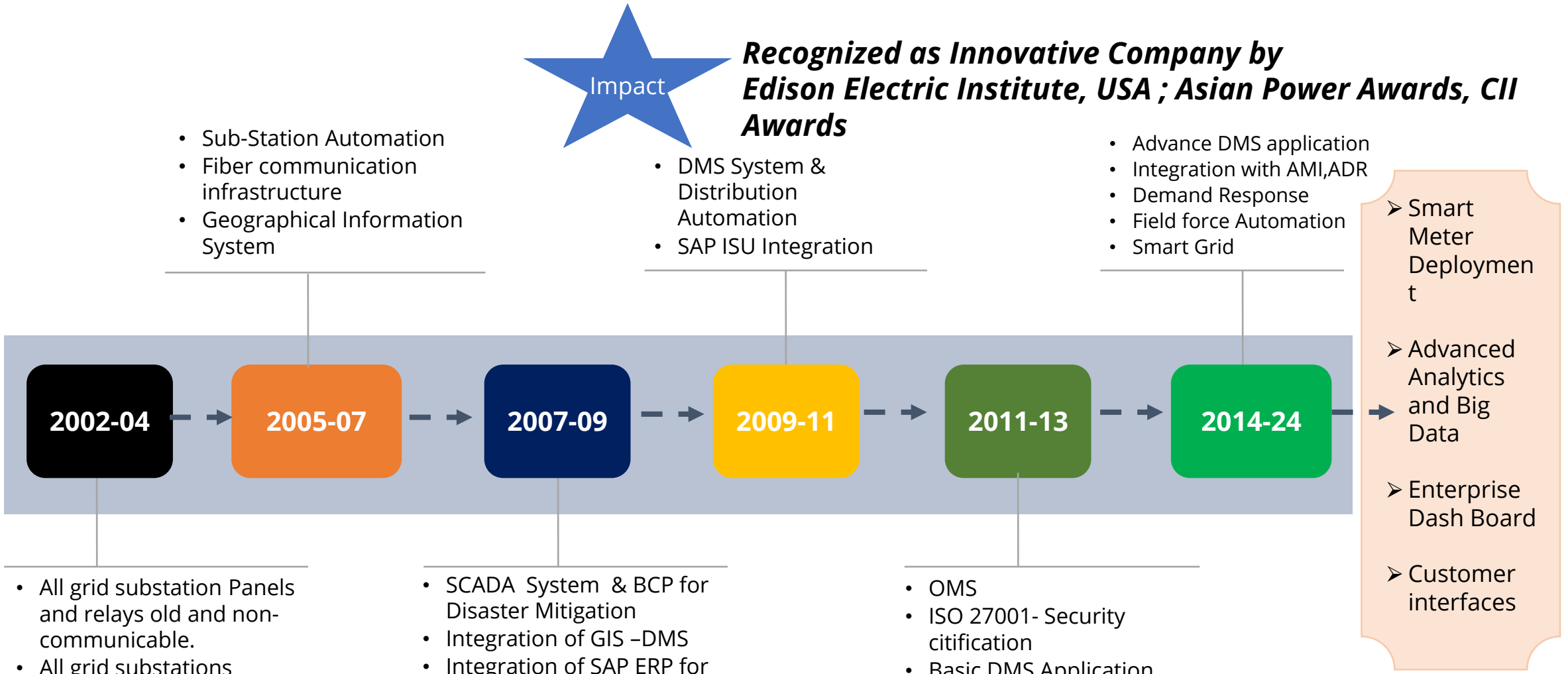








**A. Energy Usage** **B. Demand Comparison** **C. Customized Alerts** **D. Pre-Paid Balance** **E. TOD for Industrial & Comm. Users**

# Network & System Upgrade



# Tata Power-DDL Interfaces

**First** Time Use Case In Power Sector

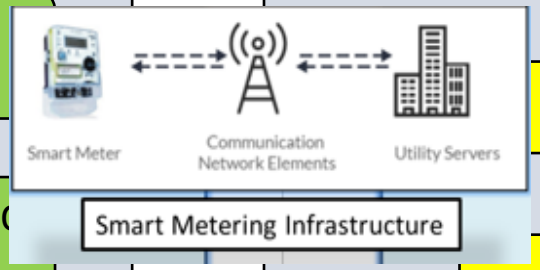
**Conventional Use**

Remote Billing

Remote Connection and Disconnection

Remote Firmware Update

User Update to Consumer




Innovative Use

Outage Management

- Last Gasp Integration with ADMS
- Meter Ping in Consumer Complaint

Asset Utilization

- Virtual Metering
- Load Monitoring & Forecasting

Asset Health

Power Quality Improvement

Behavioral Demand Response

Revenue Protection

Thin Prepaid Mechanism

**Opex reduction leading to consumer tariff coming down. Quantifiable**

**Opex reduction leading to consumer tariff coming down. Intangible**

# Implemented Technology Landscape

**Major Technology adoption**

- SCADA
- DMS
- OMS
- AMR
- Smart Metering
- GIS
- ADMS
- FFA
- Demand Response
- SAP ERP
- CRM
- Battery Storage

**Data Analytics** **CMMI & PCMM** **Cyber Security**

**Technology Enablers**

All the major technology adoption over the years along with our current drivers playing a significant role towards our aspiration of TPDDL 2.1

**IoT & ICT**

**Smart Metering & DER Technology**

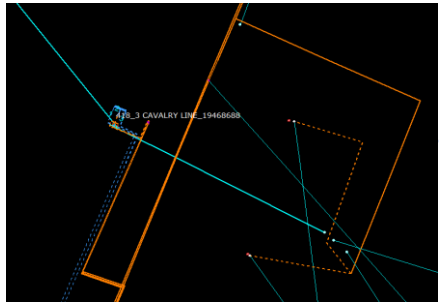
**Grid Modernization**

**Outcomes**

- Improved Reliability
- Consumer Value Creation
- Societal Value Creation
- Zero Harm Culture
- Sustainable Operations

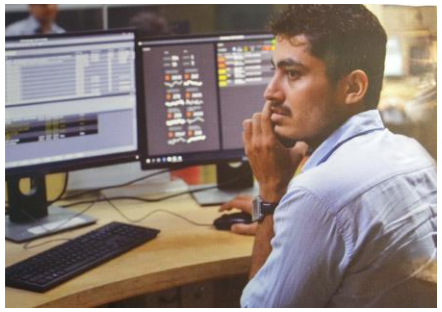
# SCADA-OMS-GIS-CRM Interfaced Process Flow

*Details transferred to field crew*



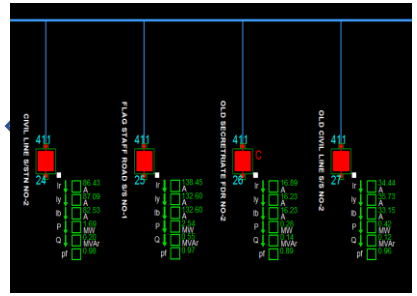
**GIS**

*Details of the customer & Customer Count*



**Outage Management**

*Information of an Outage*



**ADMS**

*Details like repair history, Crew comments, ETR are also visible at SAP-CRM*

OUT-1617293-L

| OUTAGE DETAILS | CUSTOMER DETAILS |
|---|---|
| Grid Name | DU GRID_19464749 |
| Sub Station Name | |
| Incident Description | DU GRID_19464749, 418_NEW SOCIAL SCIENCE_Feeder_Circuit Breaker_22000715 |
| ETR Left | 106 Minutes |
| Creation Time | 02-07-2021 00:02:40 |
| Zone | 418 |
| Outage Type | MV |
| Outage Status In FFA | CALL ACKNOWLEDGED |
| Outage Status In ADMS | Awaiting |

*Outage status was updated on TPDDL website with estimated time of restoration*

**SAP - CRM**

*Outage Info. Available on mobile App*

*Interactive Voice Response(IVR) system*

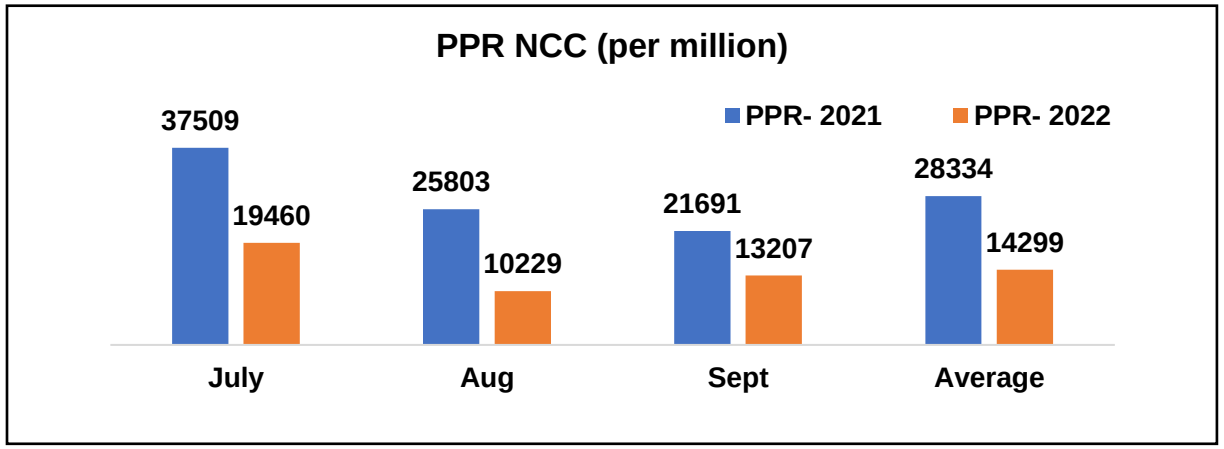
# Use of Smart Meter Data – Outage Management

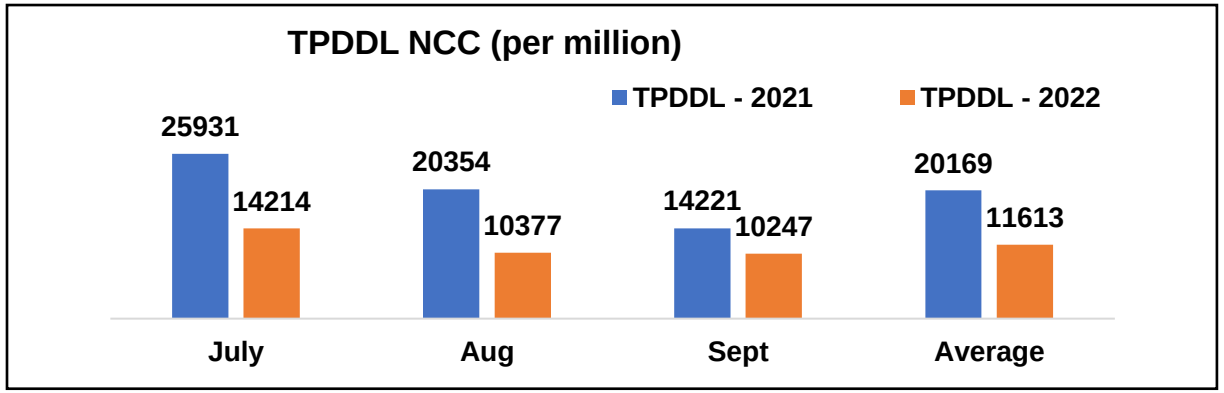
**Last Gasp integration with ADMS:**

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 of 01 district of Tata Power-DDL.




- **49.5% reduction in average NCC (per million) observed in PPR as compared to last year**
- **42.4% reduction in average NCC (per million) observed in total TPDDL.**

# Use of Smart Meter Data – Outage Management

**Meter Ping in consumer complaint**

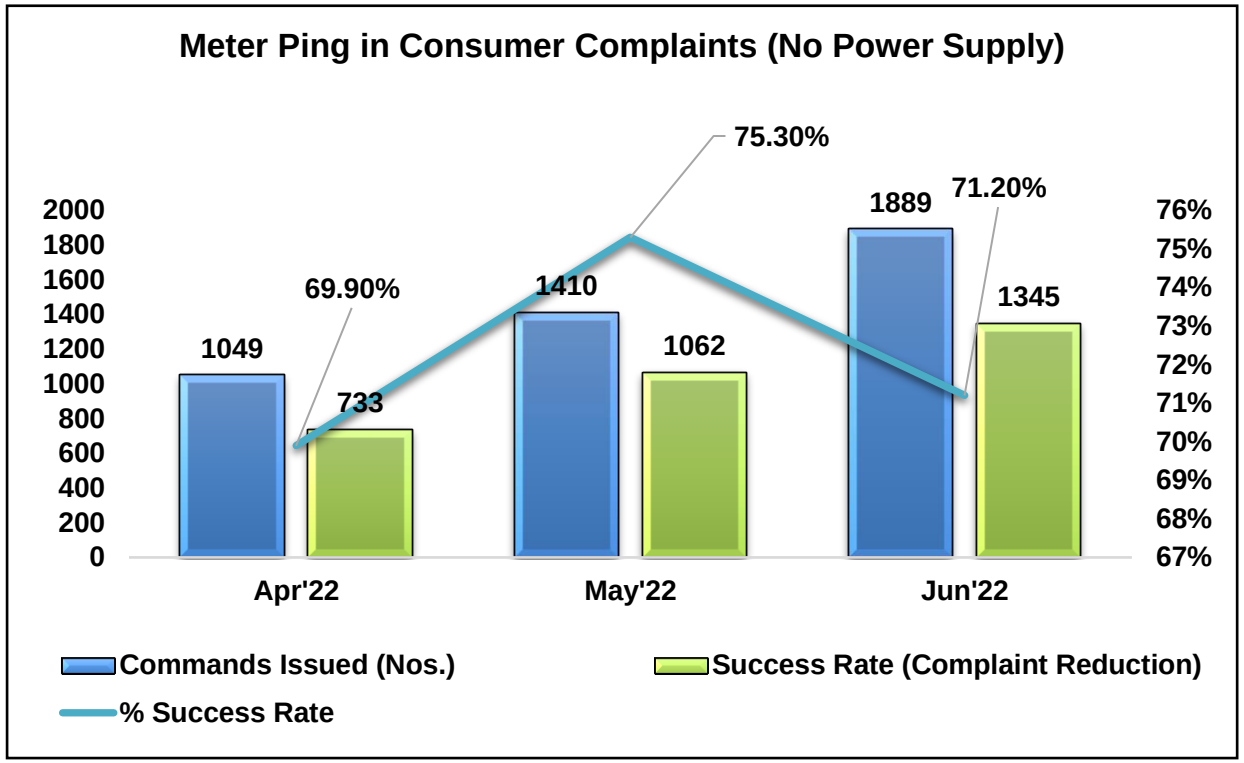
Objective: To register no-current complaints pertaining to utility only

Adoption in Business Process:

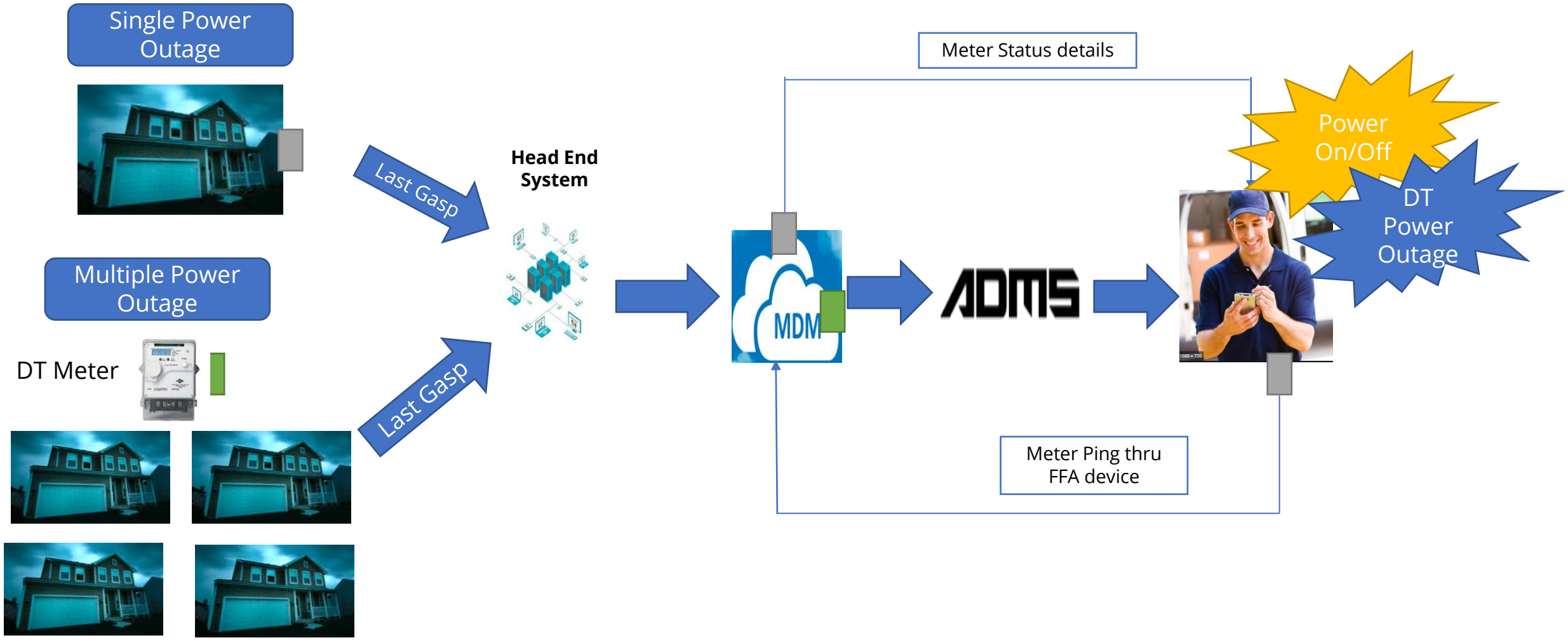
- Eliminates false no-current complaint registration
- Timely information to consumers if cause of power supply failure at his end.

Benefits:

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



# Last Gasp Integration/ Meter Ping Integration



# Meter Ping Integration with SAP - No Power Complaints

No power Complaint

Response


System Check

SAP CRM

Meter Ping

Ping Response

MDM

Customer

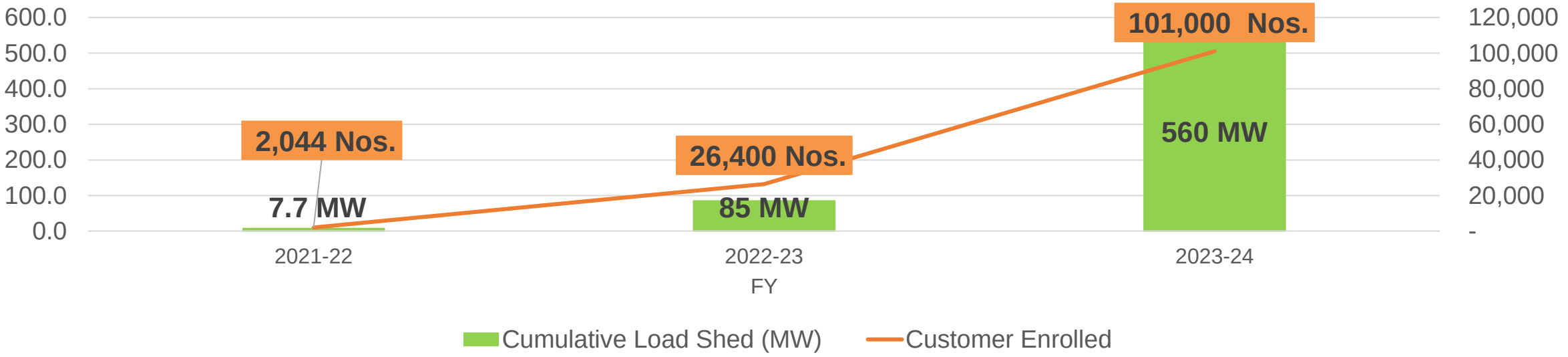
Customer Care Centre

Head End System

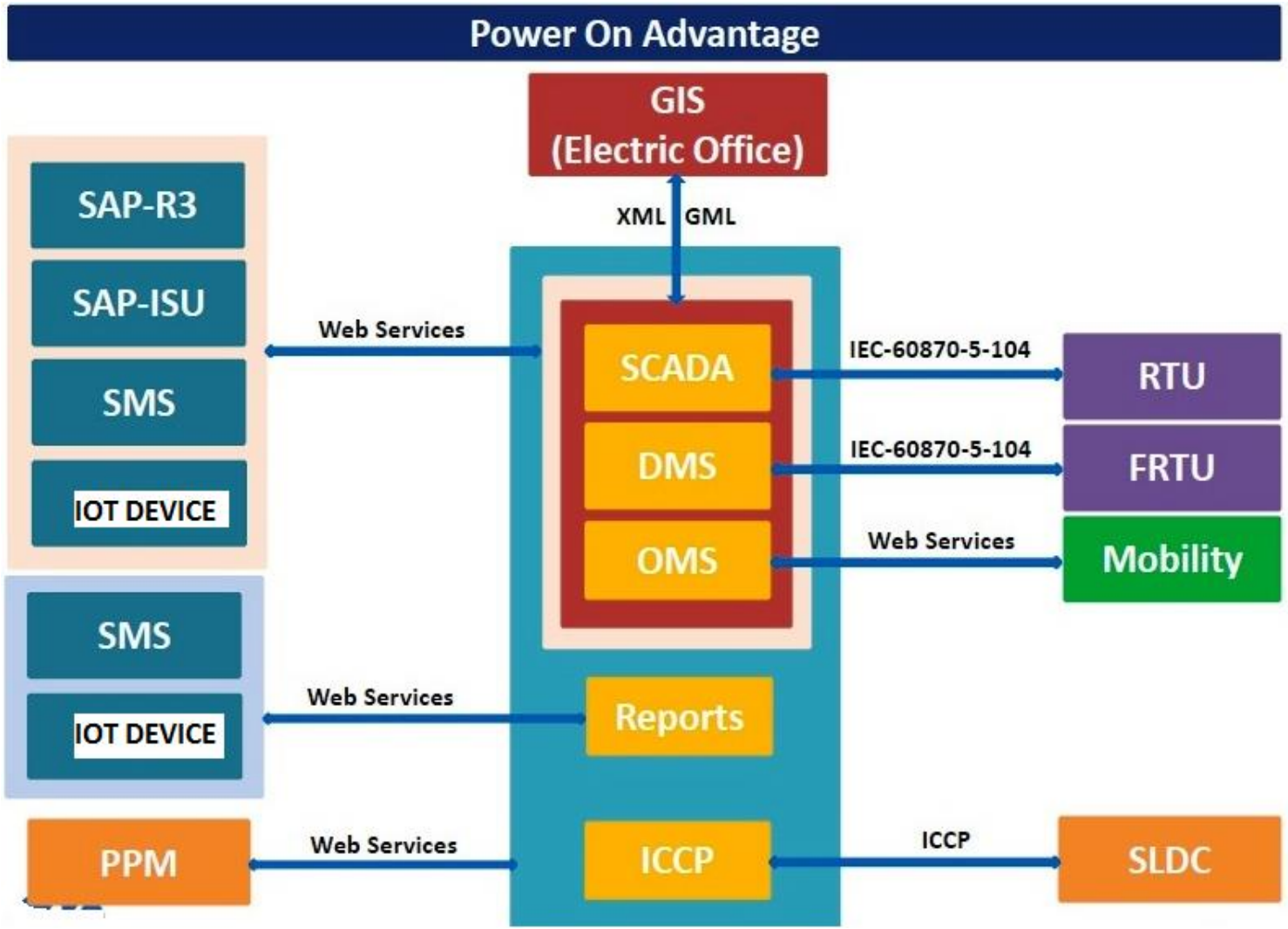
Meter

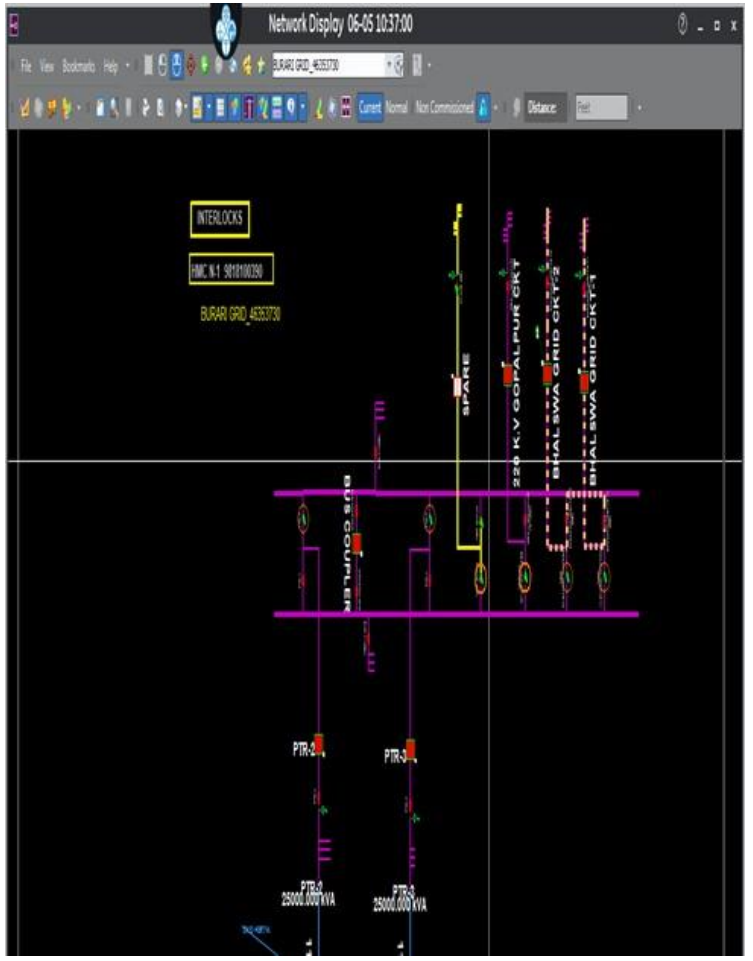
# Demand Response : Y-o-Y Performance

| Description | UoM | FY22 | FY23 | FY24 | X from FY23 |
|---|---|---|---|---|---|
| Customers Targeted | Nos | 4,417 | 64,000 | 1,33,000 | 2X |
| Customers Enrolled | Nos | 2,044 | 26,400 | 1,01,000 | 4X |
| Cumulative Load Shed | MW | 7.69 | 85.0 | 560 | 6.5X |
| Average Participation in an Event | Nos | 880 | 7,300 | 27,050 | 3.5X |
| Minimum & Maximum Participation in an Event | Nos | 630 & 1,300 | 4,600 & 11,300 | 12,250 & 44,850 | 2.5X & 4X |
| No. of Events Successfully Executed | Nos | 16 | 12 | 16 | |
| Events - Day & Night | Nos. | 11 & 5 | 8 & 4 | 16 | |
| Unique Customers Participation | Nos | 1,990 | 19,900 | 91,300 | 4.5X |
| Avg. Load Shed/Meter | kW | 0.4 Resi | 0.4 Resi; 3.5 C&I | 0.33 Resi; 4.9 C&I | |



# Network Monitoring & Control, IT-OT Technology Integration With ADMS

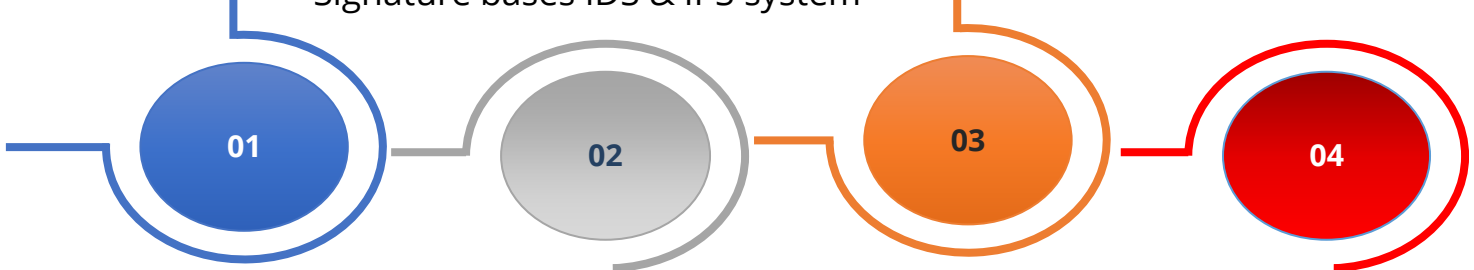



User Interface

# IT & OT Integration - Cyber Resilience

| Visibility and Granular Control of SCADA Traffic | SCADA-Aware Threat Prevention | Enhanced OT Assets Visibility | Technology Collaboration |
|---|---|---|---|




**2020-2021**

**Grid/ICS Firewall**

- Reviewing policies.
- Password management.
- Introducing IoT Blades
- Visibility & Control ICS Communication.
- Signature bases IDS & IPS system

**2021-2022**

**Enhanced Visibility**

- Implementation of Anomaly Detection Tool
- Anomalous Traffic detection in 23 Grids/ 1050 devices through claroty tool
- Vulnerable firmware, and Protocols Identification

**2022-2023**

**Risk Assessment & Mitigation**

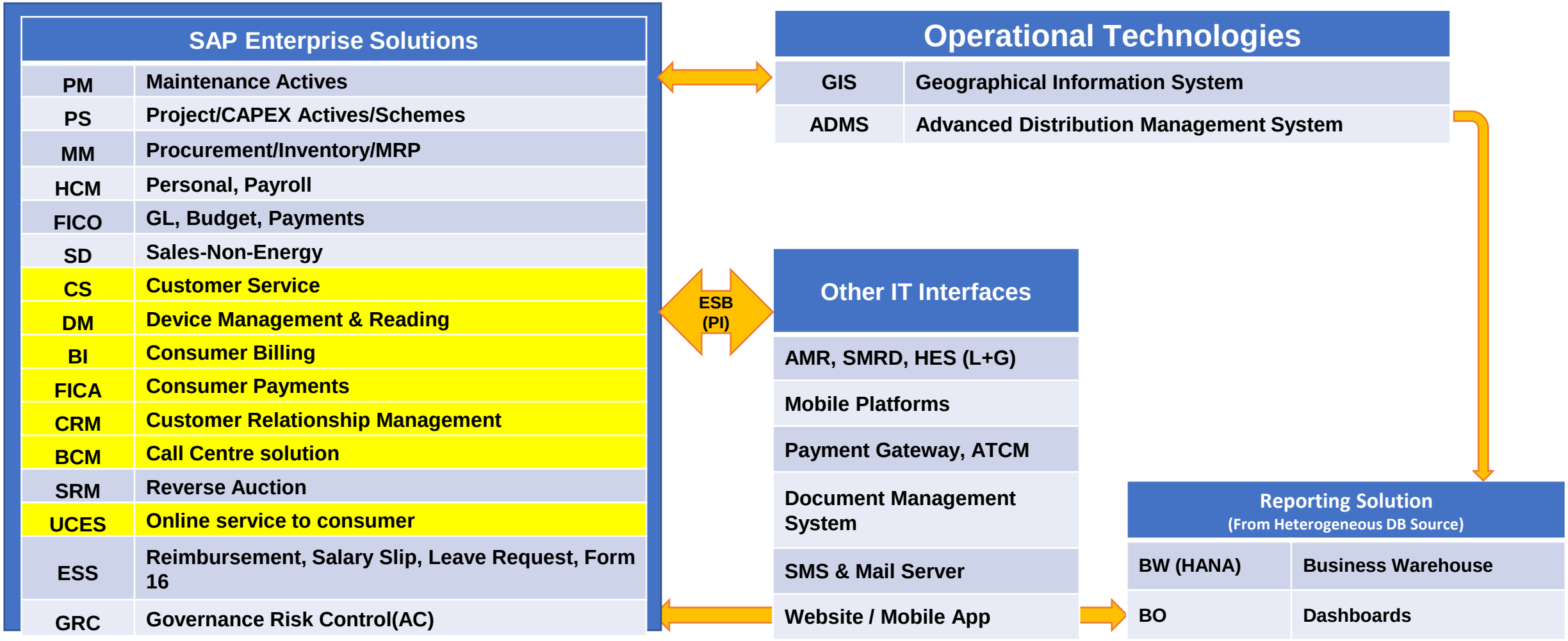
- VAPT of OT assets
- Anomalous Traffic Detection via Wireshark Dump
- Integration of RTUs with iNMS

**2023-2025**

**Resilient OT**

- Implementation of Firewalls for EV Stations in new Grids
- Transition to ISO 27001:2022 with coverage of Grids
- Integration of OT Assets with SIEM for 24X7 monitoring
- OT Maturity Assessment/Red Team through Deloitte
- Collaboration for OT Visibility application (Utiltyx/ Claroty) for anomalous detection and scale up to all OT devices.
- ADMS Risk Assessment report awaited from NCIIPC for further Actions plan.
- Cert-in Re-Empanelment

# SAP Solutions & Its Interfaces with IT/OT Applications



# Use of Smart Meter Data – Asset Management System

## 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:

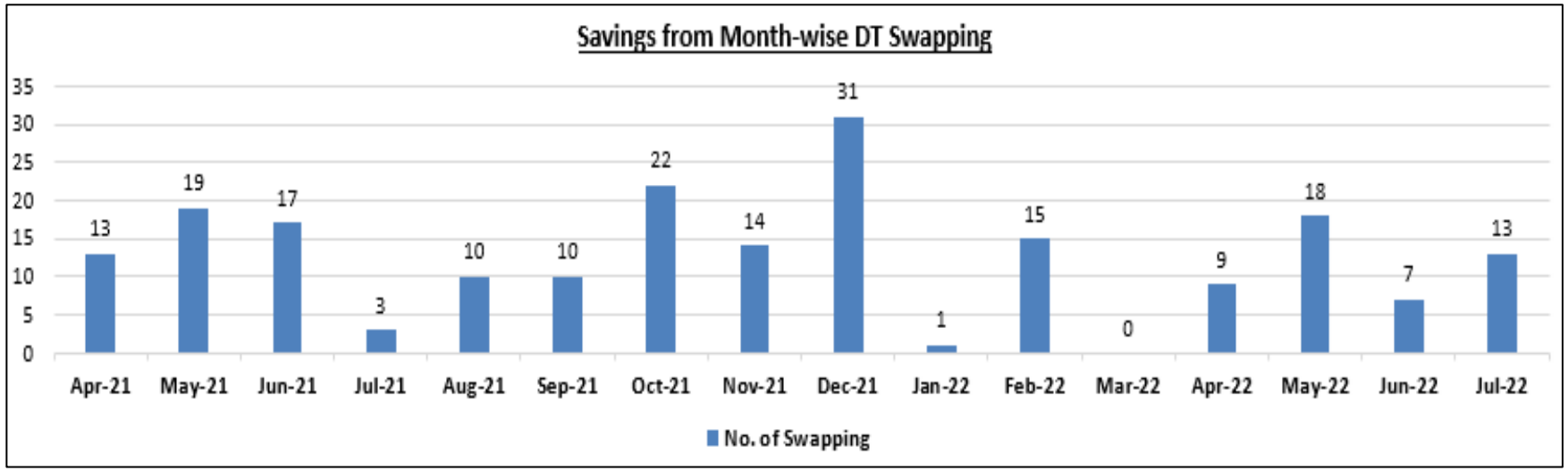
- From Apr'21 to Jul'22, 202 nos. of Distribution Transformer swapped to create the margin in the network for sanctioning load
- Fire incidents due to overloading could be ruled out.

## Virtual Metering

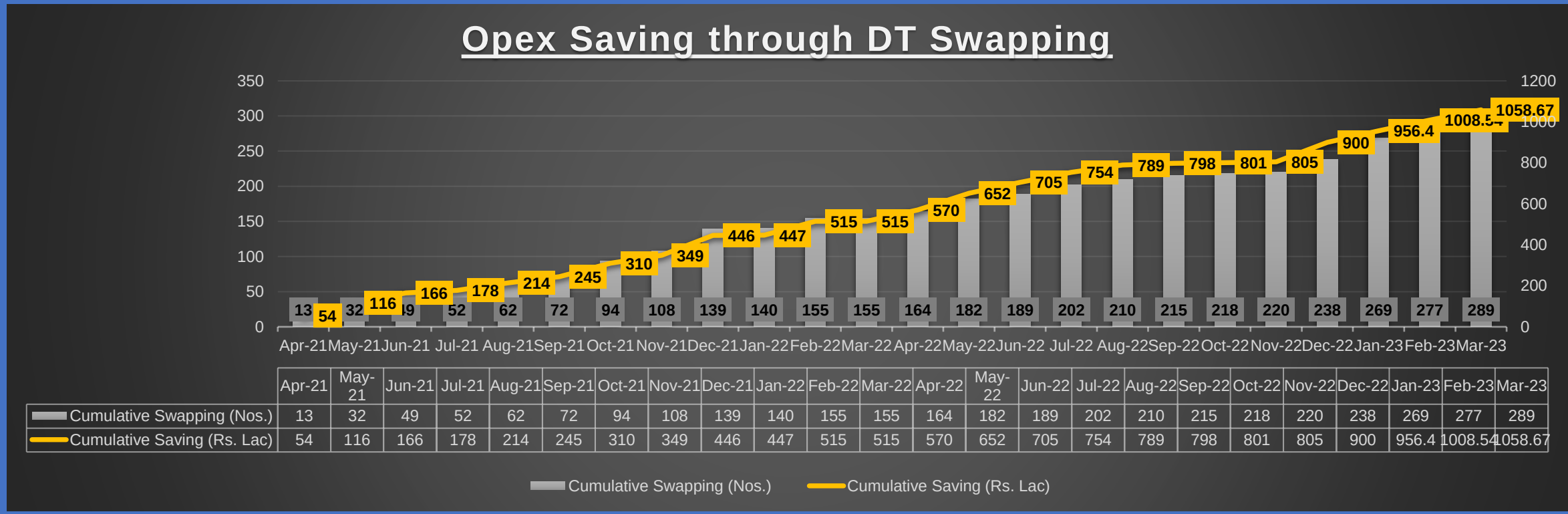
Objective: Planning Network capacity in advance by using data from Smart Meters installed under unmetered distribution transformers, feeders and Solar generation

Adoption in Business Process:

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



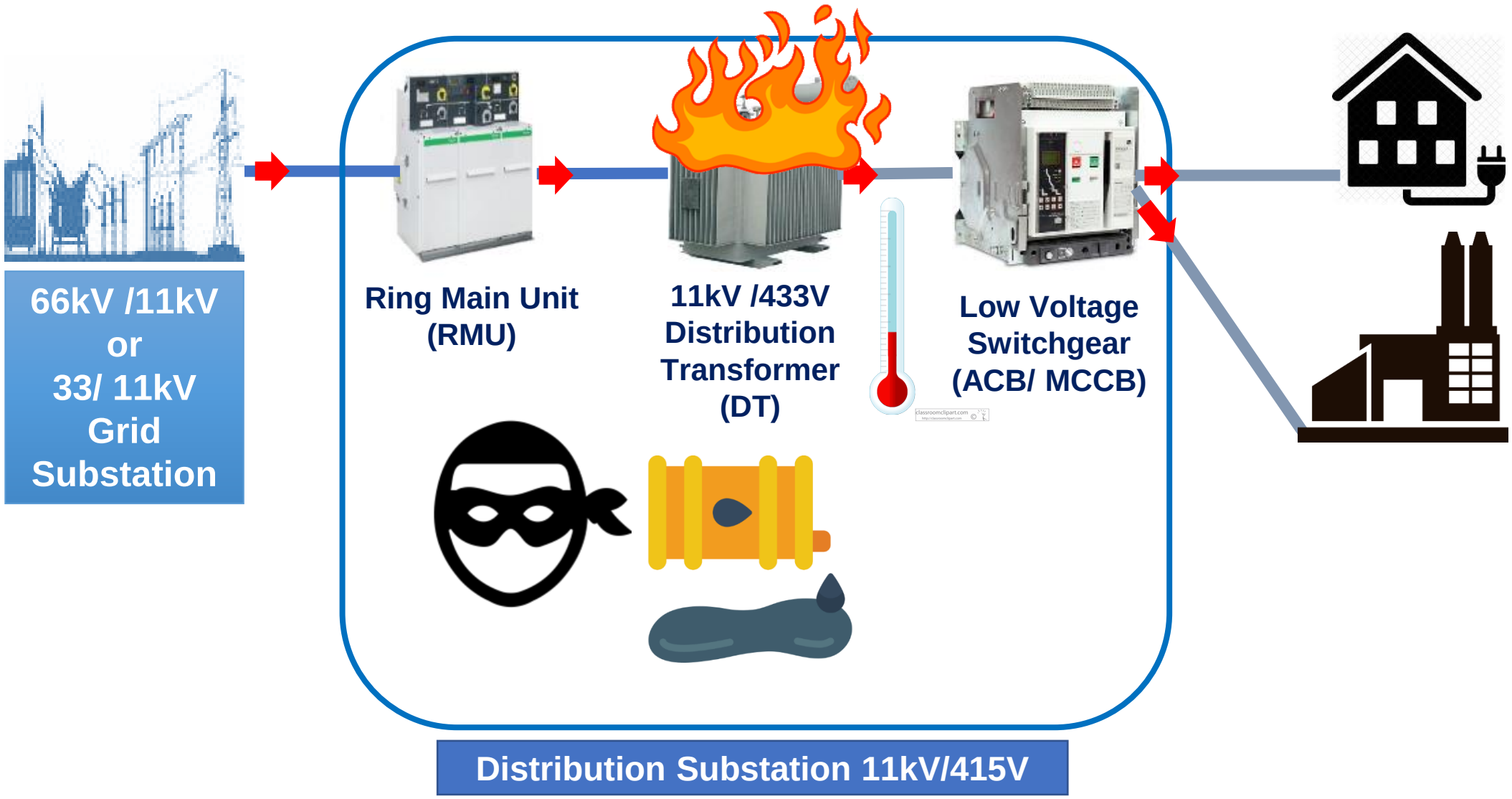
# Cost Savings - DT Swapping



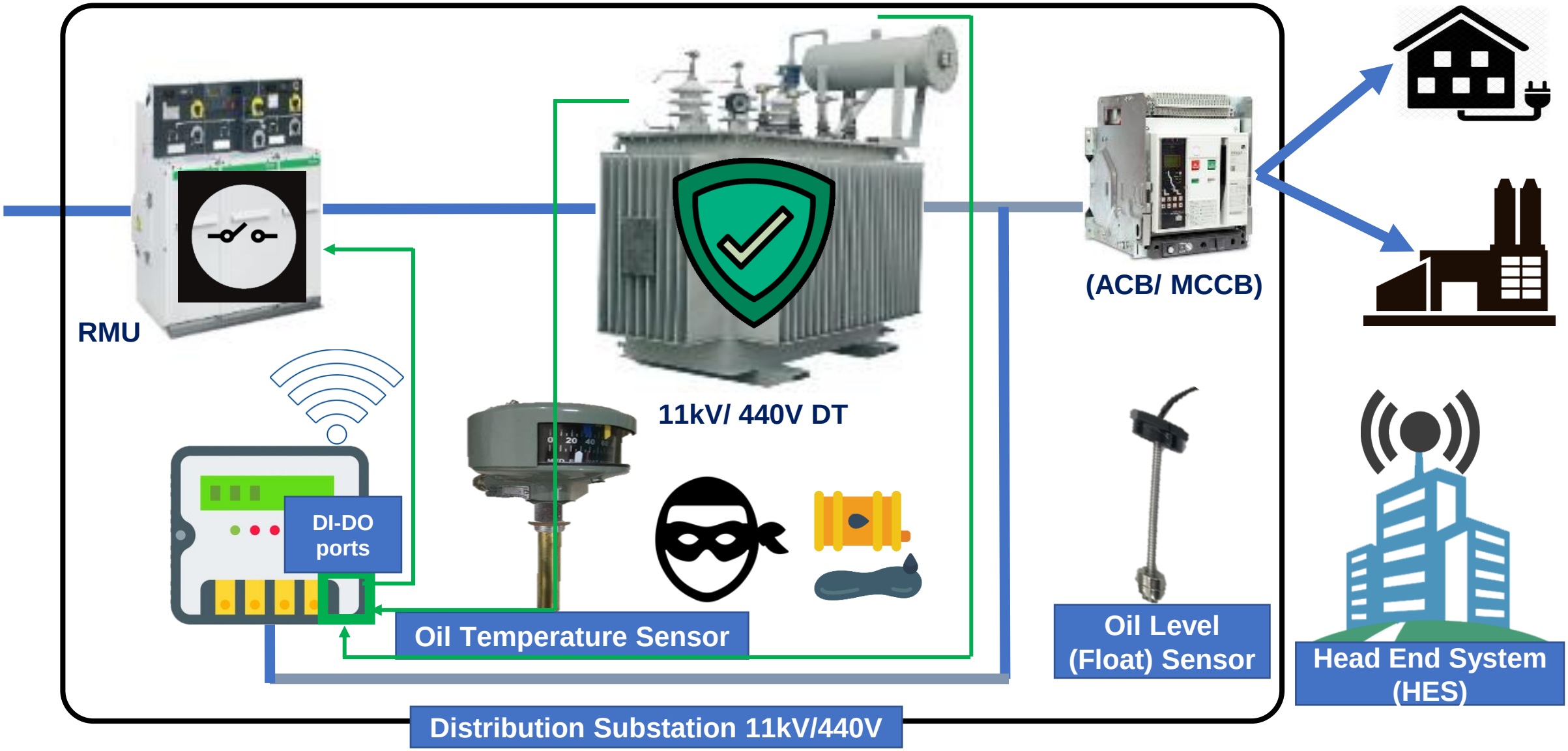

| | Apr-21 | May-21 | Jun-21 | Jul-21 | Aug-21 | Sep-21 | Oct-21 | Nov-21 | Dec-21 | Jan-22 | Feb-22 | Mar-22 | Apr-22 | May-22 | Jun-22 | Jul-22 | Aug-22 | Sep-22 | Oct-22 | Nov-22 | Dec-22 | Jan-23 | Feb-23 | Mar-23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cumulative Swapping (Nos.) | 13 | 32 | 49 | 52 | 62 | 72 | 94 | 108 | 139 | 140 | 155 | 155 | 164 | 182 | 189 | 202 | 210 | 215 | 218 | 220 | 238 | 269 | 277 | 289 |
| Cumulative Saving (Rs. Lac) | 54 | 116 | 166 | 178 | 214 | 245 | 310 | 349 | 446 | 447 | 515 | 515 | 570 | 652 | 705 | 754 | 789 | 798 | 801 | 805 | 900 | 956.4 | 1008.54 | 1058.67 |

**Rs. 5.15 Cr Saved till Mar'22 and Rs. 10.58 Cr saved till Mar'23 & 61 DT count worth 1.58 Cr till Oct 2023**

# Asset Monitoring System – Health Monitoring

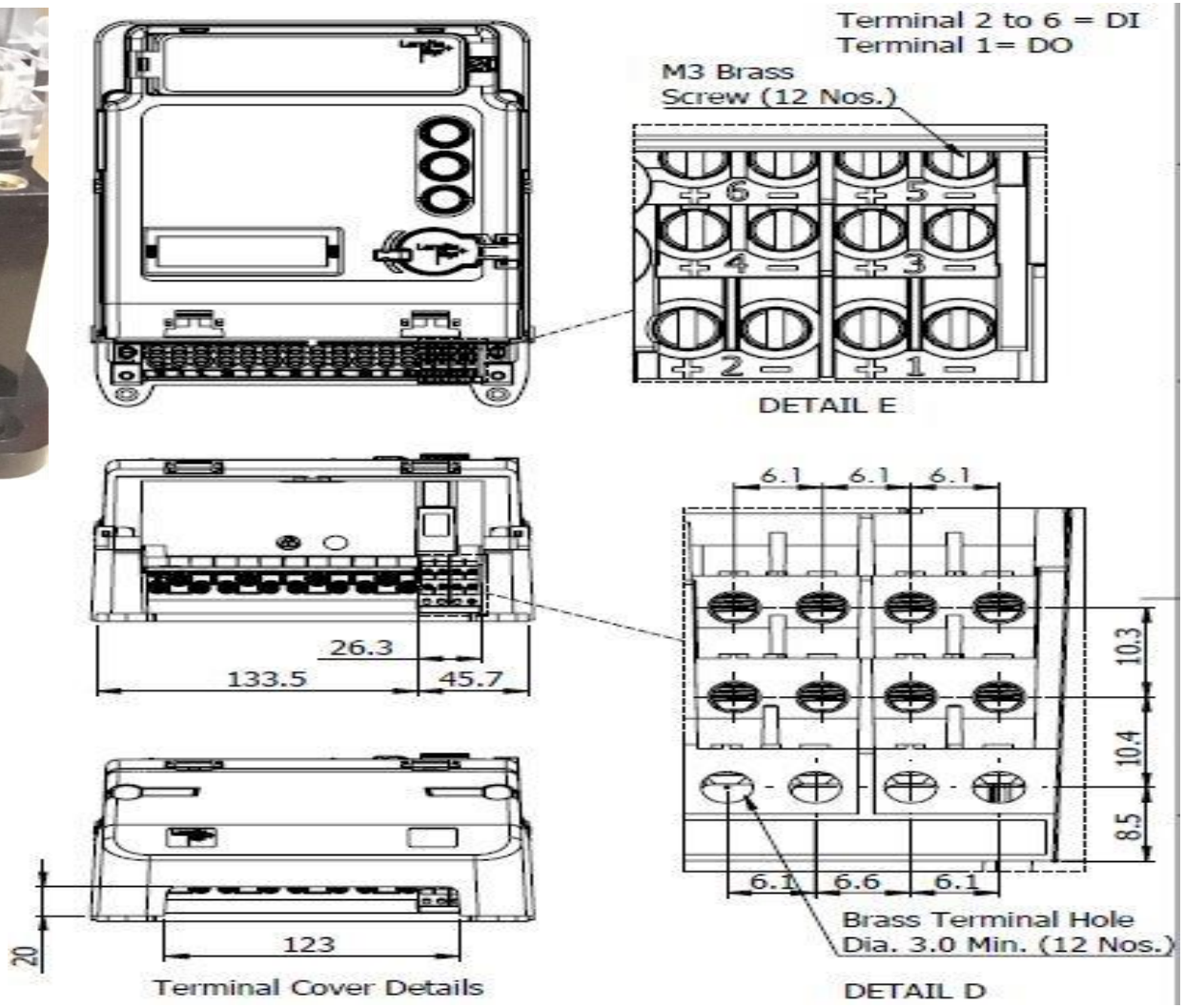


# Solution Design: DT Smart Meter with DI-DOs



# Smart Meter Design: Terminal Block with DIs and DO

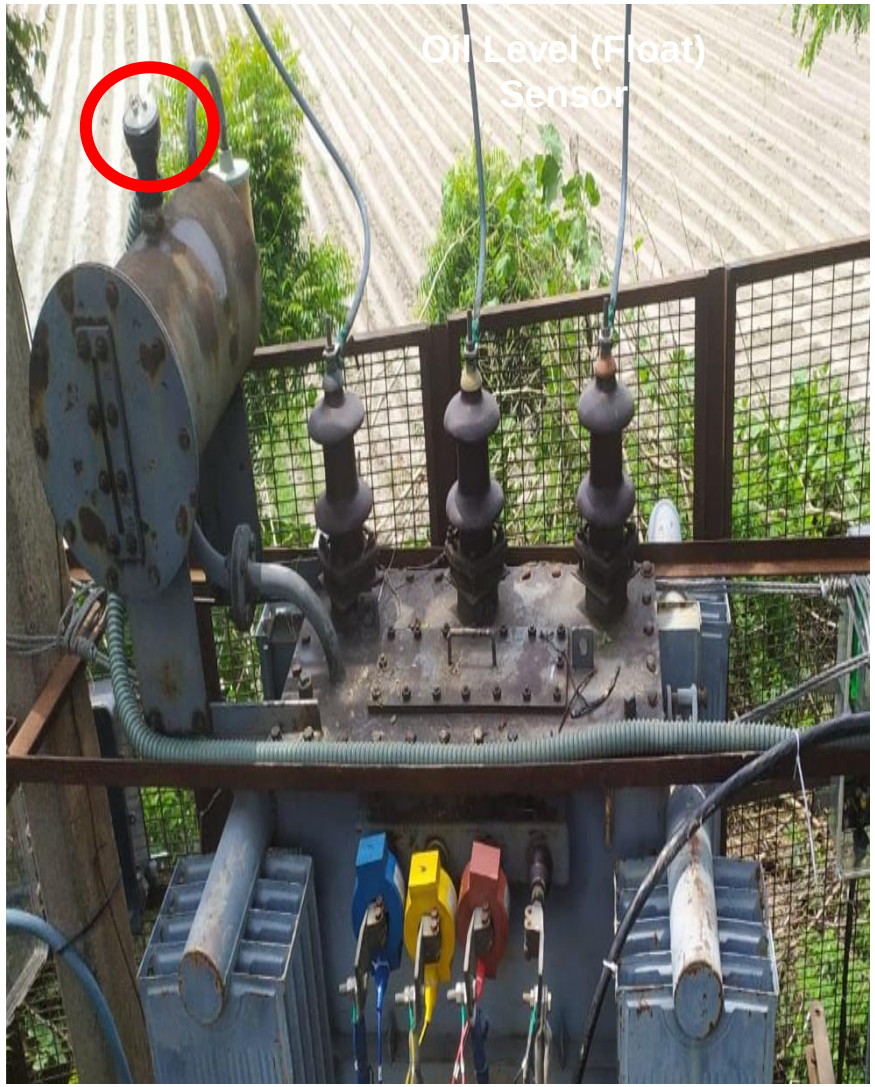
DIs and DO on the terminal block of smart meter

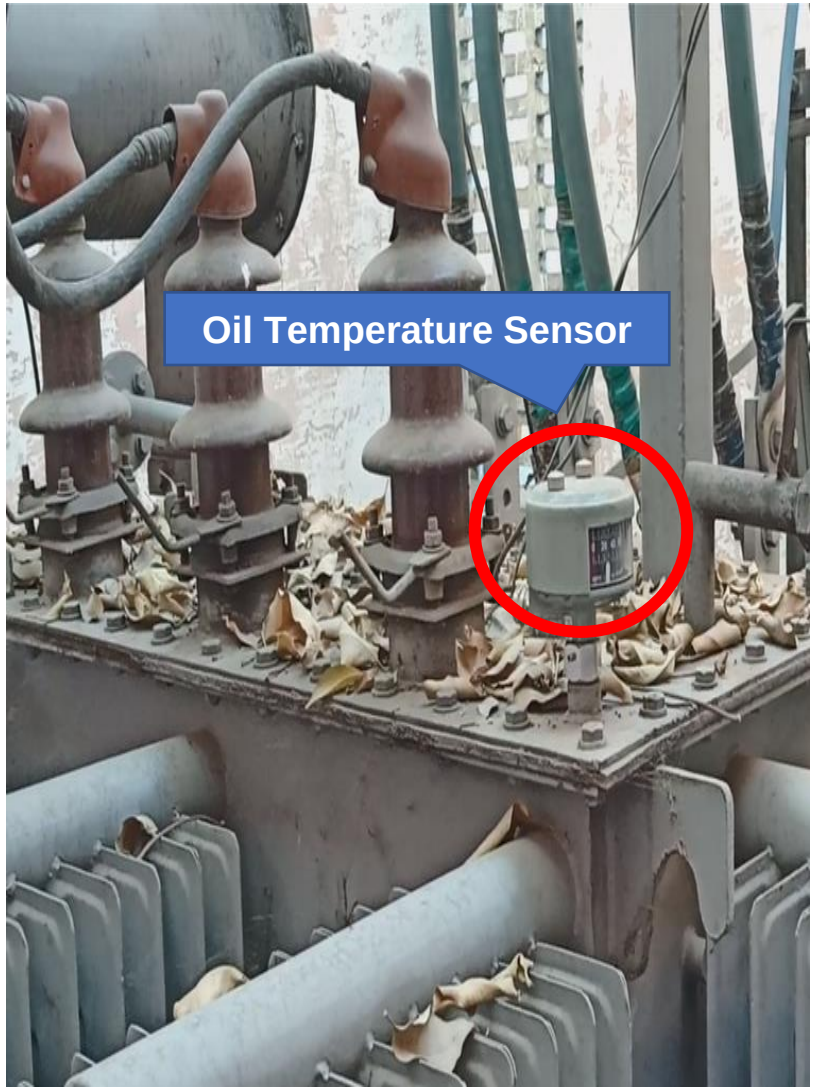



**Extendable Design:**

- **Can accommodate upto 5 Digital Input signals**
- **More diagnostic sensor inputs can be added in future, with the same design**

# Site Implementation – DT Smart Meter




# Integration with Distribution Automation & SCADA

**In field**

**Smart Meter redesigned** to capture Transformer Sensor Data

1) Meter Redesigned

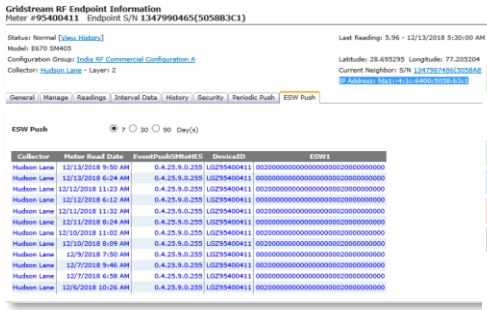
b) Closer look at 5DI and 1 DO


2) Relays activated

***Application***

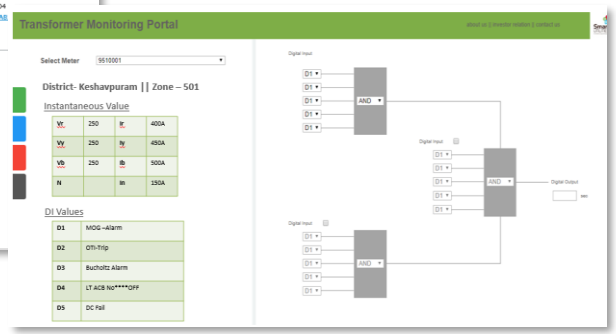
**At Backend**

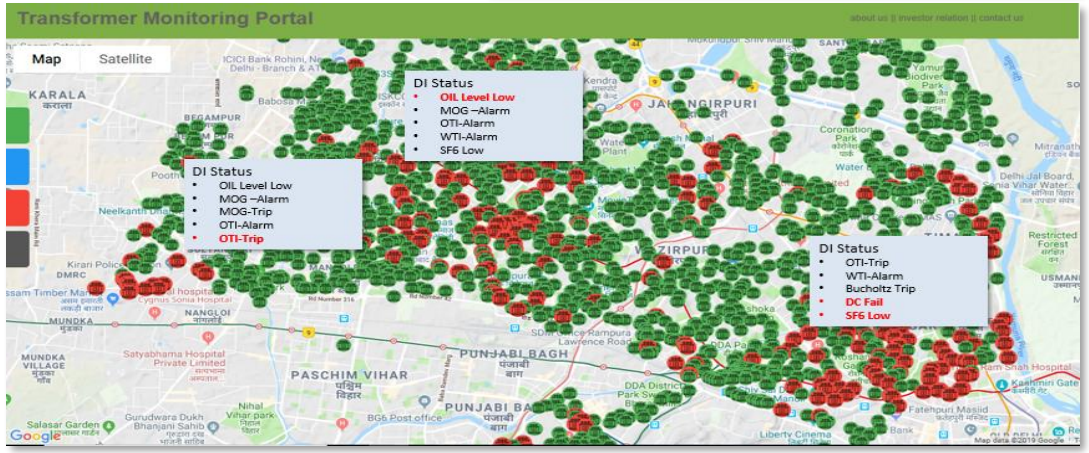
**At the Backend Servers (Network Operation Center)**




1) Digital Data

2) Algorithms




3) Runtime visual representation to the (24X7) Network Operation Team

# Use of Smart Meter Data – Risk Prediction of Distribution Transformer

Objective : To create a prediction of risk for DTs

Adoption in Business Process

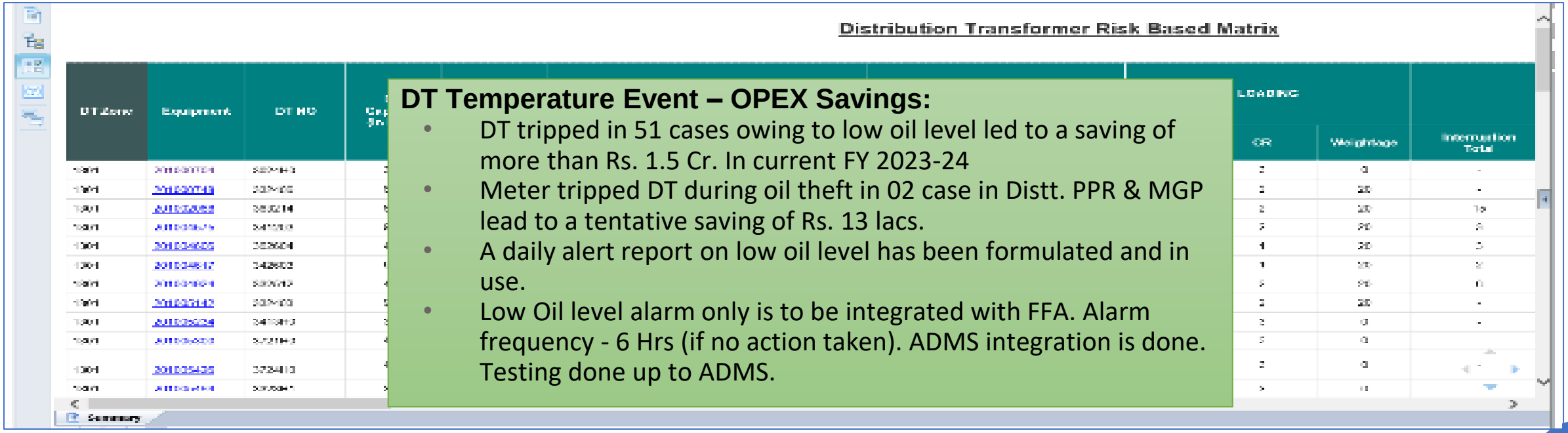
- From period based maintenance /overhaul to data based maintenance /overhaul
- Embed in workflow by linking to notification process

Benefits

- Avoid both scheduled and unscheduled interruption
- Reduce opex/ Capex and 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




**DT Temperature Event – OPEX Savings:**

- DT tripped in 51 cases owing to low oil level led to a saving of more than Rs. 1.5 Cr. In current FY 2023-24
- Meter tripped DT during oil theft in 02 case in Distt. PPR & MGP lead to a tentative saving of Rs. 13 lacs.
- A daily alert report on low oil level has been formulated and in use.
- Low Oil level alarm only is to be integrated with FFA. Alarm frequency - 6 Hrs (if no action taken). ADMS integration is done. Testing done up to ADMS.

# Automation at TPDDL Contact Centre

**Inbound Calls**
**– IVRS (handling 65% of total calls)**

**Outbound Calls**
**-Predictive Dialer**

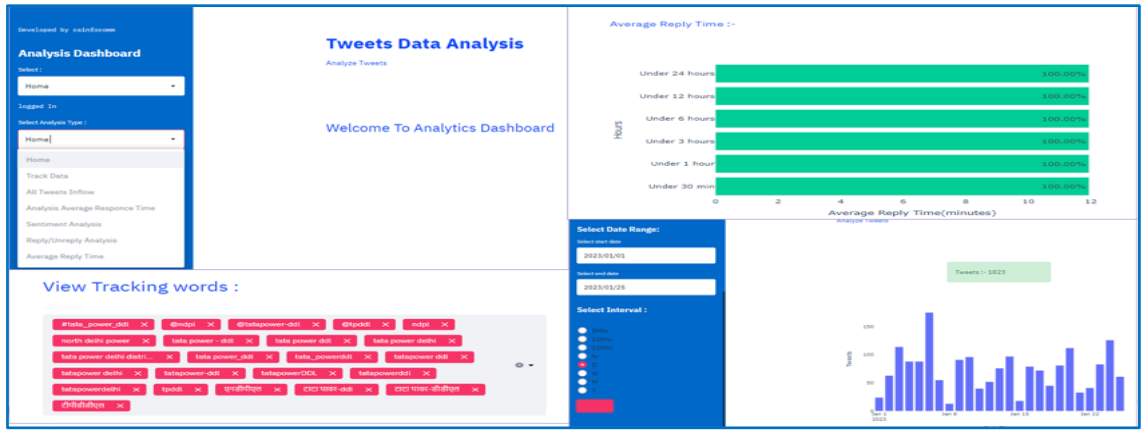
**Chat**
**- Chatbot (handling 95% queries)**

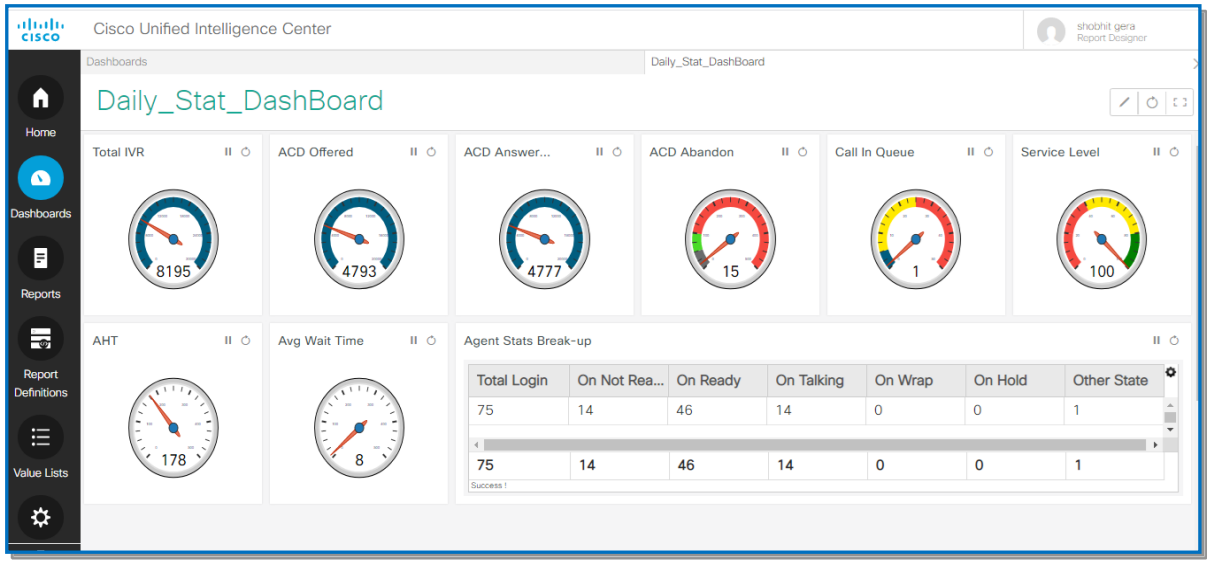

**Social Media**
**-Integrated with Omni channel**

**Emails**
**- Email Bot (46% use cases covered)**

**WhatsApp Service**
**-Integrated with bot (handling 26% of total chats)**


**Missed Call Service (96196 19124)**
**-For Power Supply related complaints**



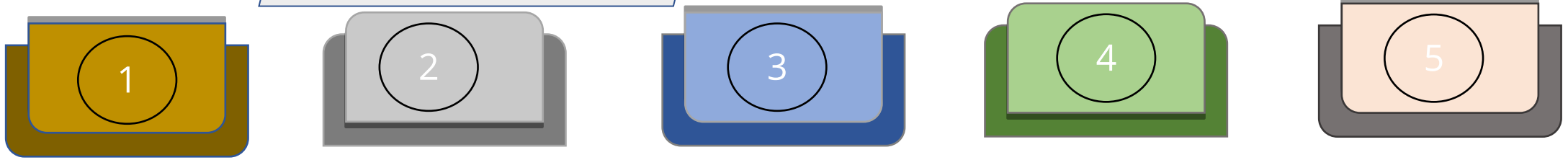
# Omni Channel Solution for Integrated Contact Centre

**E-mail Response Management System :**

- Auto-routing of emails
- Single ticket Number
- Integration with email bot

**AI based chat bot :**

- AI based automated text and voice assistance service
- Integrated with CRM
- Monitoring Dashboard and Analytics




**Call Management:**

- Calling Line Identification (CLI)
- Computer Telephonic Integration (CTI)
- Flexible IVRS
- Reporting tools
- Predictive Dialer
- IVRS blasters

**Social Media Management:**

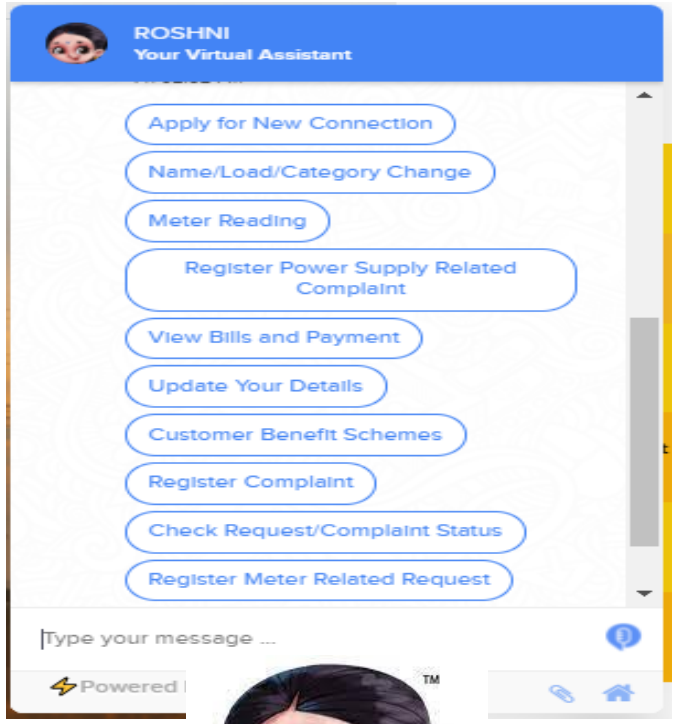
- Routing social media interactions to the agent and response to the customer's post
- Reflection of posts based on keywords across channels
- Reporting dashboard and Analytics

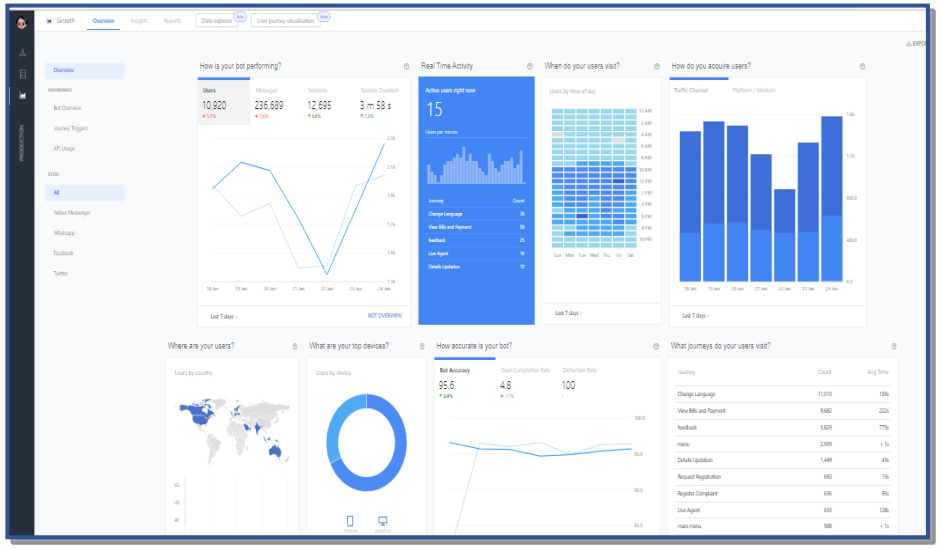
**Holistic reporting and dashboards :**

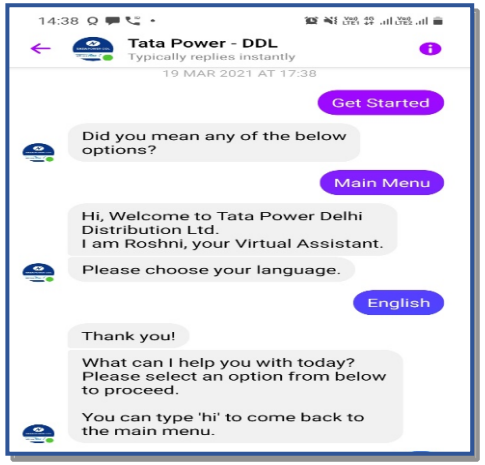
- Effective performance monitoring across touch points
- Faster and effective customer service delivery

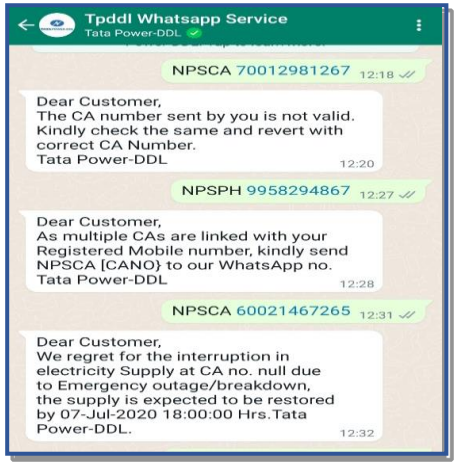
# Chatbot

- Tata Power-DDL Website
- Tata Power-DDL Mobile App
- Facebook Messenger
- Twitter DM
- WhatsApp @ 7303482071





# Email Bot

**Faster services**

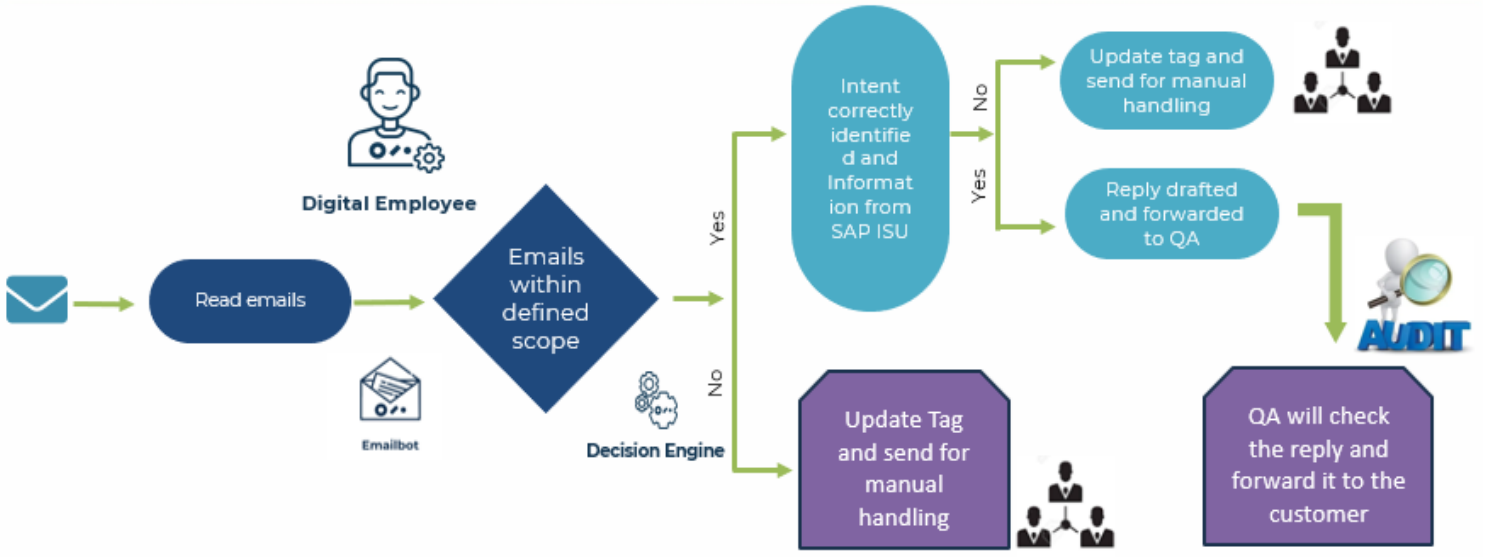
- Email bot minimizes the gaps of time required to respond to the emails. Email bot takes care of this response gap and perform the process end-to-end which leads to reduction in average response time.

**Smart Task Management**

- Email bot can handle simple queries that fall into the FAQs category so that team can concentrate on the complex queries.

**Structured Responses**

- An email bot analyzes the unstructured Email and lists out the queries that the customer needs assistance with. It will then respond to all the queries in a structured fashion.

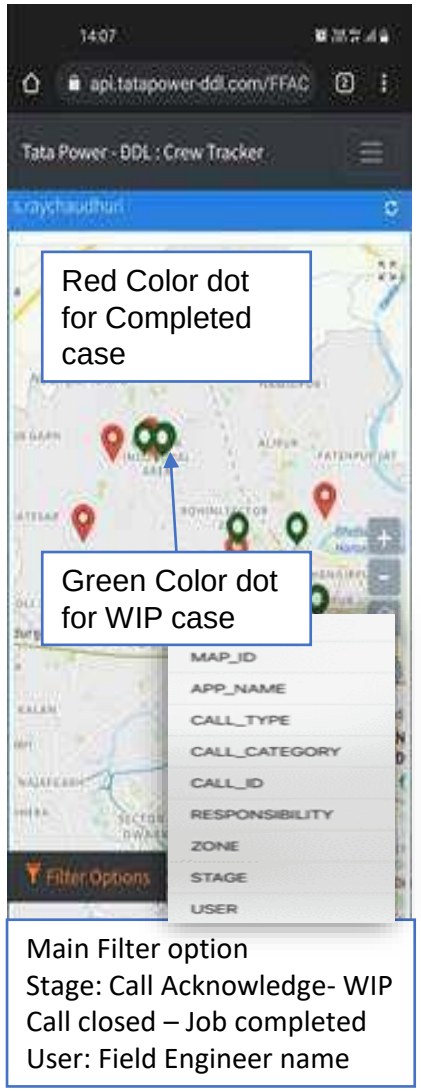



Target- 50% of total email inflow

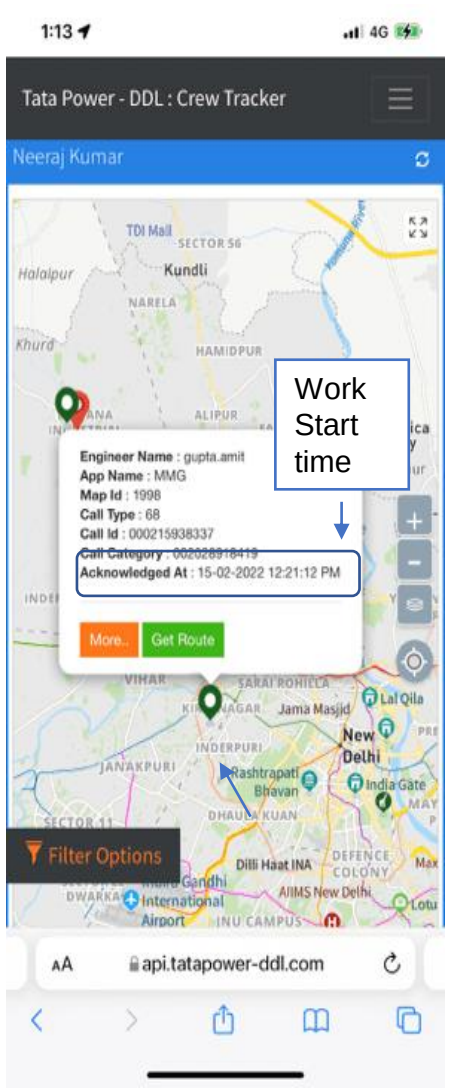
POC – 10% of total email inflow

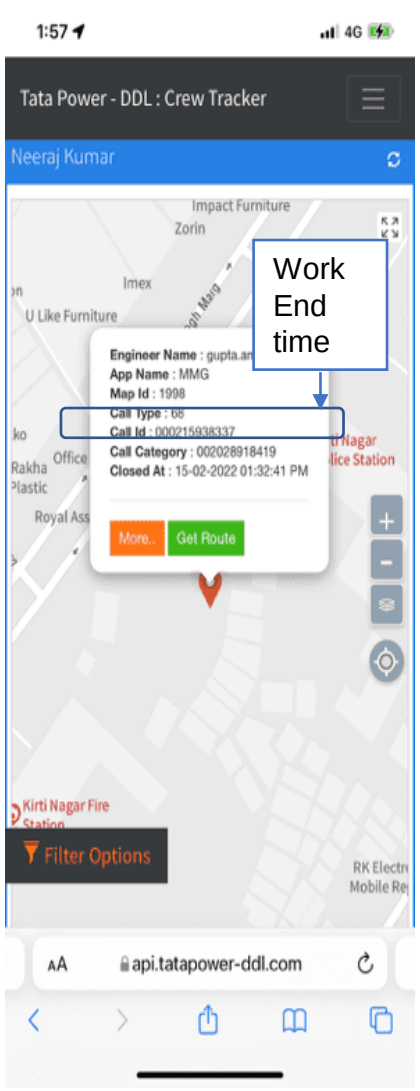
46% use cases covered and made live (with 80% accuracy)

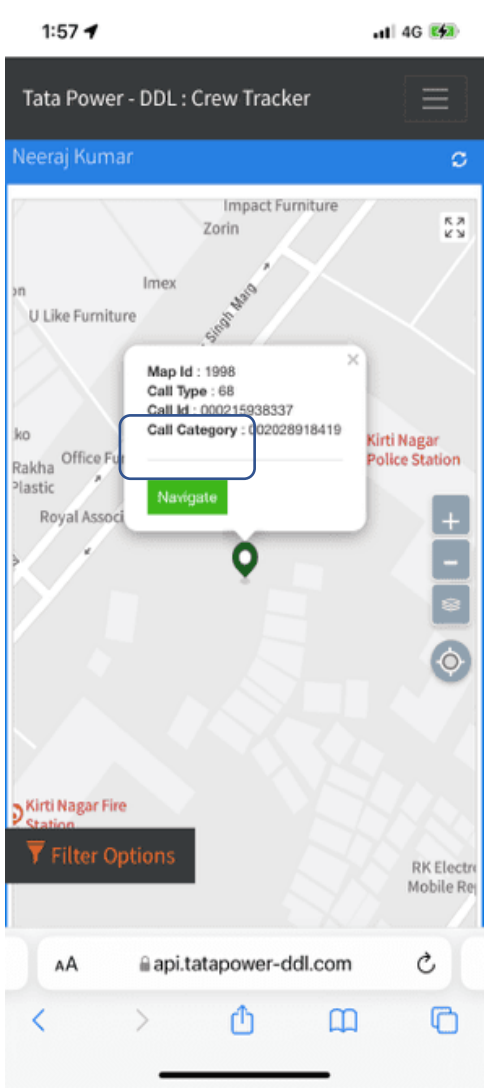
# Field Crew Tracker

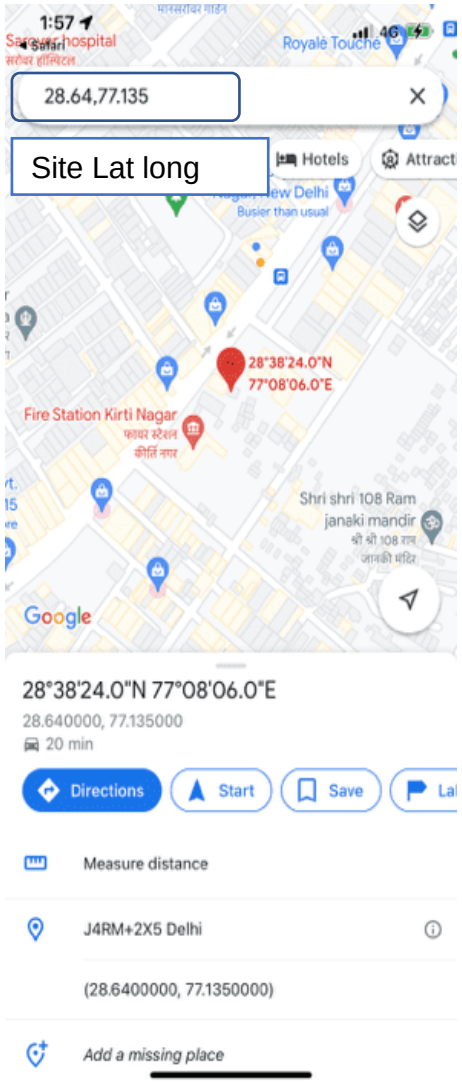



Main Filter option
Stage: Call Acknowledge- WIP
Call closed – Job completed
User: Field Engineer name



# Thank You

Any questions?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**Brajanath Dey**

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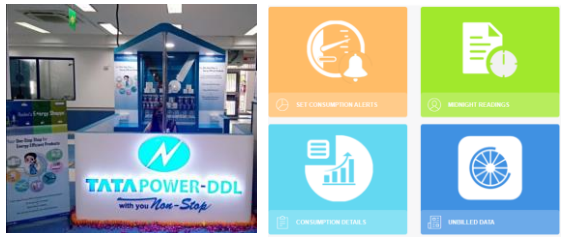
# Annexes

# Initiatives for Customer Delight






Smart Energy Portal

- Missed Call Service – No Power Supply, SPB
- Whatsapp Services,
- Self Meter Reading, Interactive Bill


Dedicated Webpage for C&I Customer

Roshni Chatbot, Social Media @ FB, Insta, Twitter, Youtube

Subsidy Eligibility Calculator

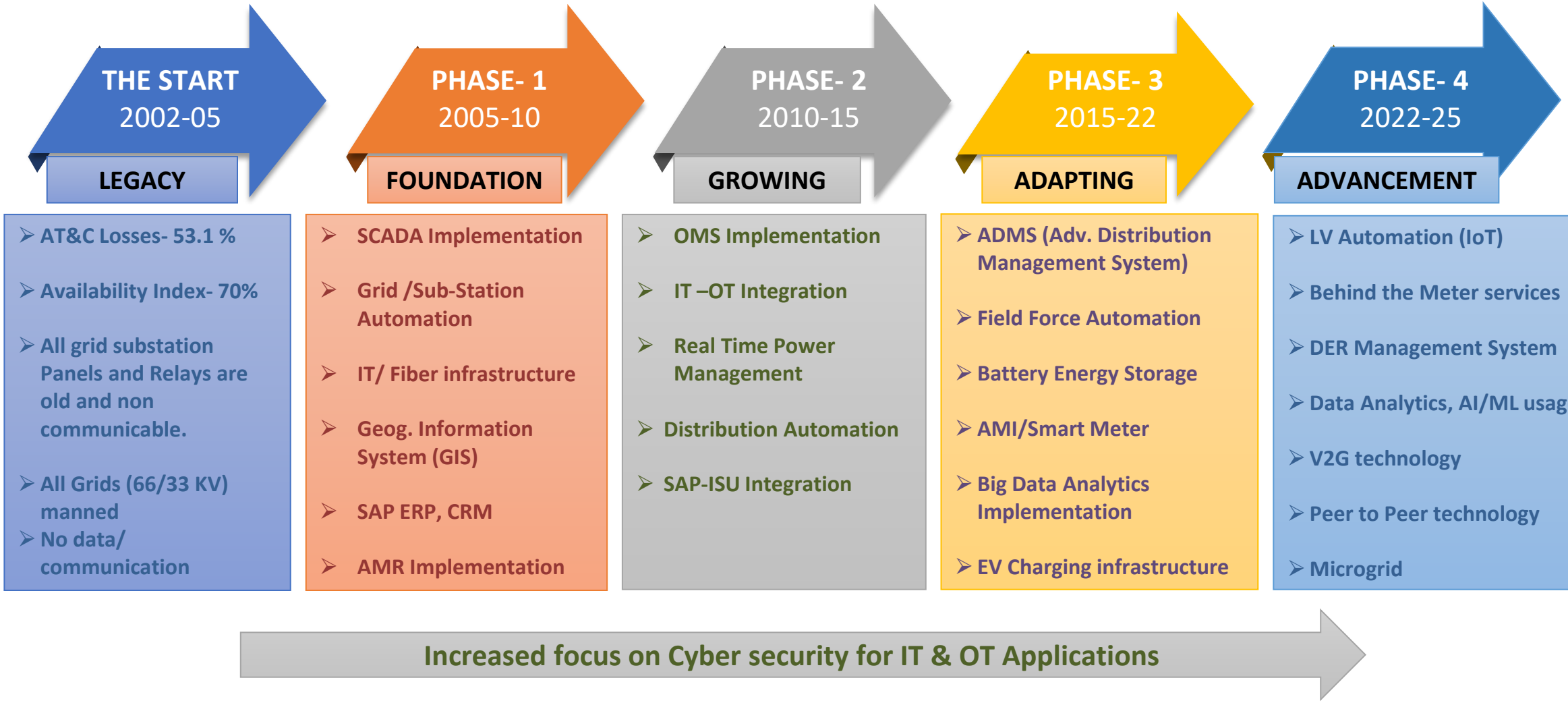

Customer Care Centre, Key Account Manager, Abha Sampark Kendra (Toll Free)

SANLAAP (Virtual New Connection Hearing)


TPDDL Connect Mobile App, SAMVAAD

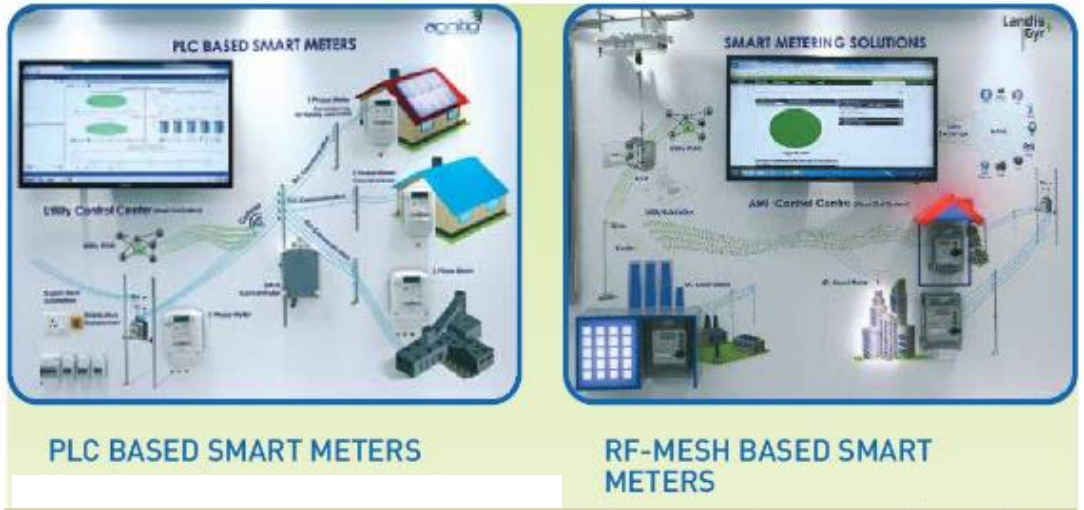

Website, Online Services

# Technology Upgrade……The Journey……..



# The Smart Grid Lab - Glimpse of Technology

## Smart Meter Communication Technologies




## 10 MW Battery Energy Storage


## GIS

**Edison Award 2008 for GIS Implementation**

## Distribution Network Management


## Automated Demand Response


## Certification

TATA Power-DDL recognized as **In-house R&D unit** by Dept. of Science & Industrial Research **(DSIR)**

TATA POWER-DDL

with you Non-Stop

# Tata Power-DDL Journey towards Smart Grid

## Metering

- EM to Static
- AMR
- Smart Metering

## Load Management

- Demand Side Management
- Energy As Service
- Dynamic Demand Awareness

## Communication

- PowerLine
- Point2Point (cellular)
- RF-Mesh
- NBioT
- Cellular 4G LTE

## Monitoring

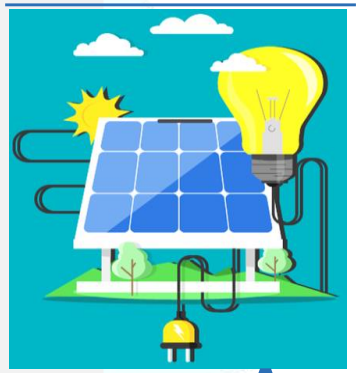
- SCADA
- DMS
- OMS
- ADMS

## Fleet Management

- Decentralized Dedicated
- Decentralized Operation
- Centralized Metering & Fault Location teams
- Field Force Automation

## Battery Storage

## Renewables



## EVs

## Analytics

# Process Automation

## Roadmap

To achieve the functional objectives, the long-term future technology adoption roadmap is as follows: