



Distribution Utilities of Future: Advance Technologies for Business Transformation

Speaker Details

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FOUNDING PARTNERS



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Sustainable Transformation of Utilities

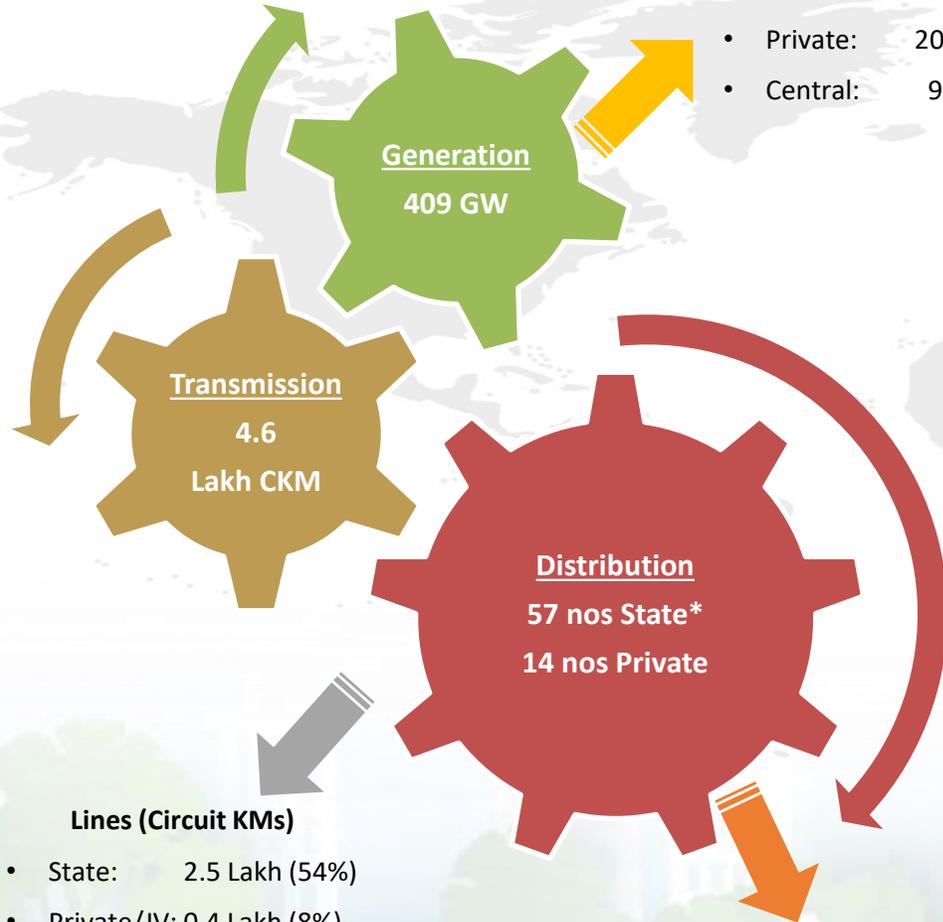
Content

-  Power Sector Overview
-  New Dynamics in Power System
-  About BSES Rajdhani Power Limited
-  Technology Journey of BSES
-  Utility Transition Philosophy
-  Way Forward

Power Sector Overview

Installed Capacity (GW)

- State: 105 (26%)
- Private: 205 (50%)
- Central: 99 (24%)



Lines (Circuit KMs)

- State: 2.5 Lakh (54%)
- Private/JV: 0.4 Lakh (8%)
- Central: 1.8 Lakh (38%)

Substations (MVA)

- State: 6,40,924 (56%)
- Private: 48,807 (4%)
- Central: 4,55,556 (40%)

- India's current installed capacity: **409 GW**
- Peak load requirement (Apr-Oct 2022): **216 GW**
- Variability of power prices and **availability in Power Exchange**
- In the entire value chain of Power Sector, Distribution is now in the stage of transition and transformation majorly due to the following:
 - Renewable integration
 - Digital transformation
 - New demand sectors: EV
 - Customer engagement
- Further, India has set itself the target of becoming **net-zero by 2070** with the following intermediary targets by 2030:
 - 50% from renewable energy
 - 500 GW from non fossil fuels
 - Reduce Carbon emissions by 1 bn Tons CO2

Source: Oct 2022 report CEA, MoP

* Including State Power Departments

New Dynamics in Power System

1. Influx of Power from New Renewable Energy Sources
2. Increased Demand of Electric Vehicles (EVs)
3. Shift in Consumer Behaviors and Contributions to Grid
4. Increased Threat of Cyberattacks
5. Changes in Fuel Prices / Availability
6. Unpredictable Weather / Natural Disasters

About BSES Rajdhani Power Limited (BRPL)

Distribution Area	691 sq. Km
No. of customers	28.7 Lacs
Max Demand Met (Till Date)	3389 MW
Sales	11,486 MU
Revenue – Sale of Power	Rs. 9,669 Cr
AT&C Loss*	7.67%



BRPL Key Stats

Year 2002

Year 2022

Peak Demand

1265 MW



3389 MW

AT&C Loss

51.5 %

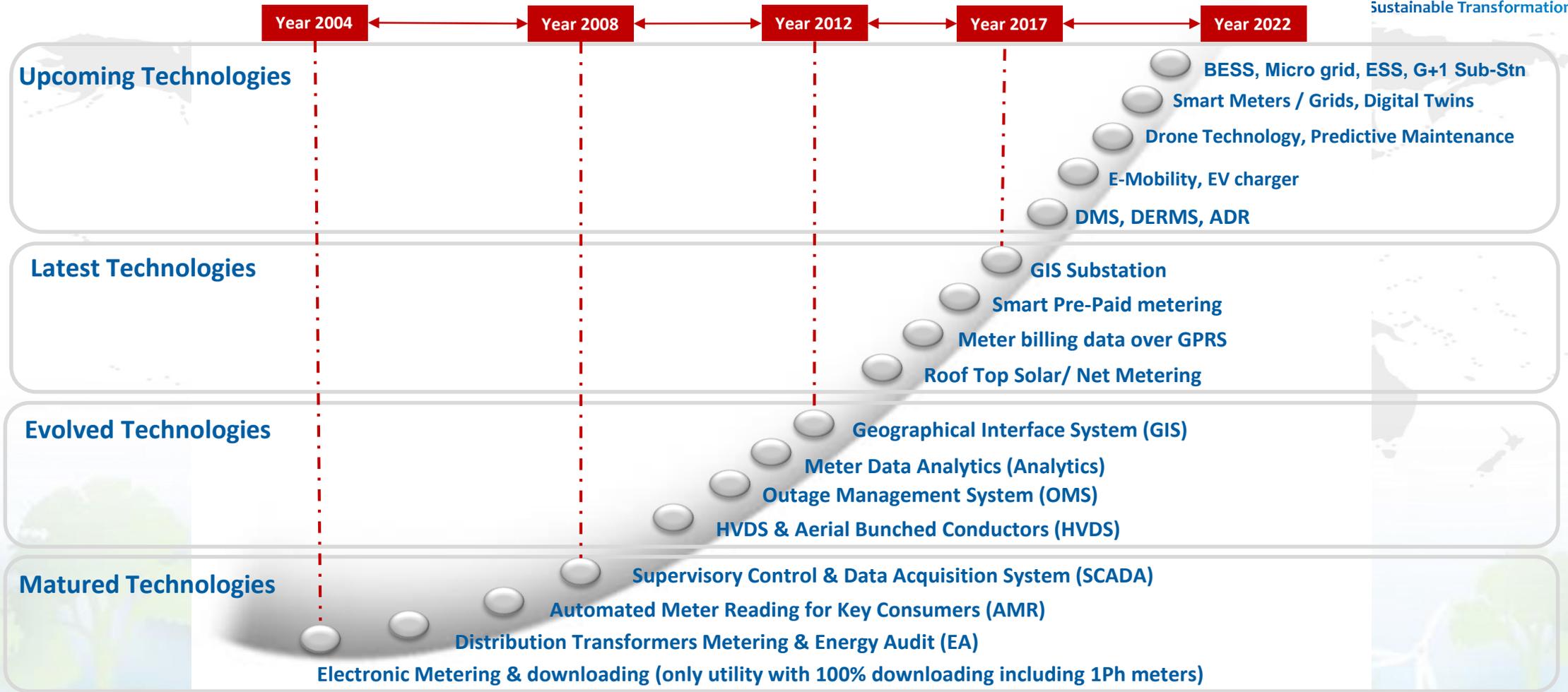


7.7 %

Peak Load of BRPL grown to ~ 2.5 times of 2002 demand

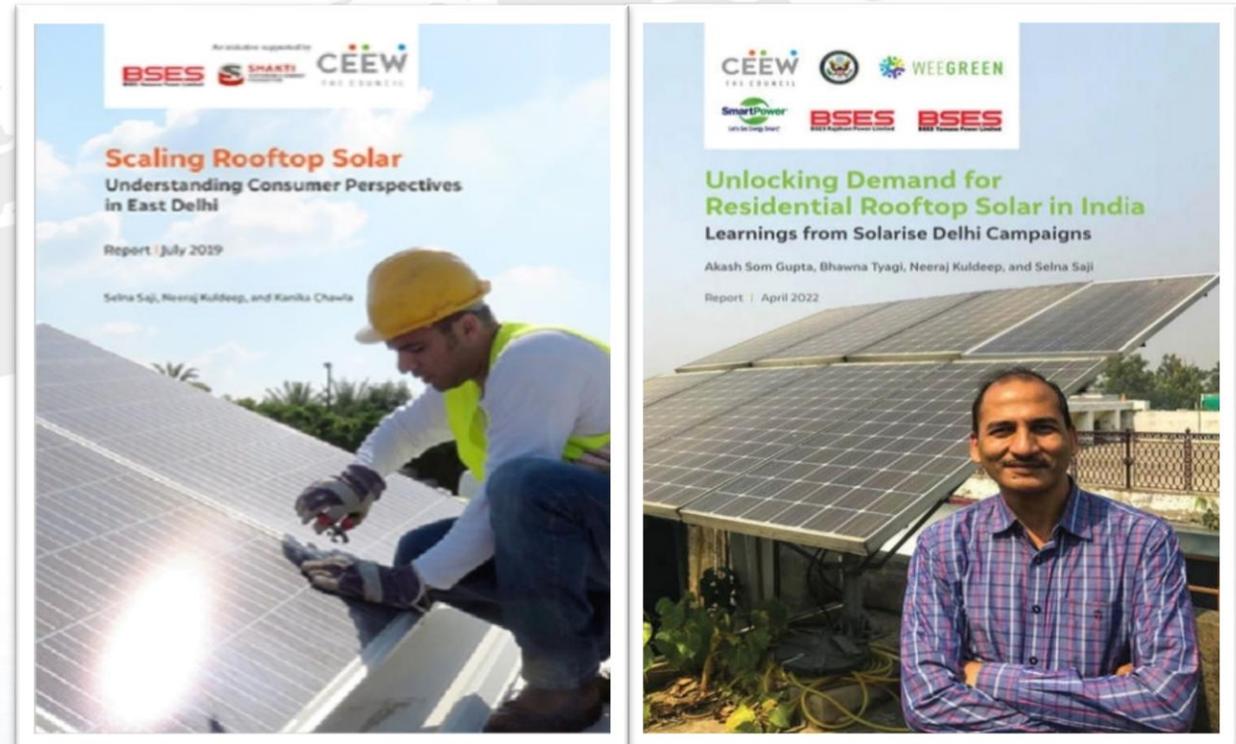
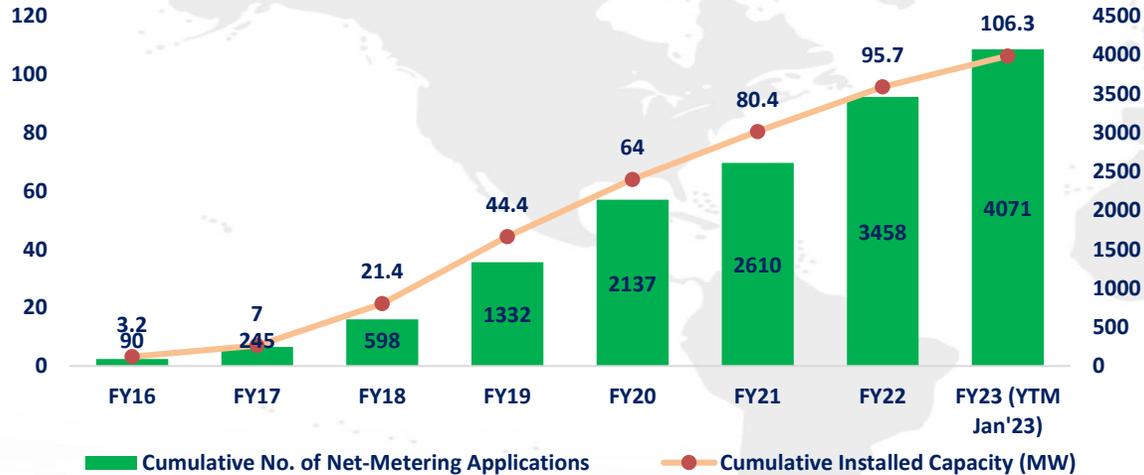
BRPL secured A+ grade in "Consumer Service rating of Discoms" for the Year 20-21 by REC

Technology Journey of BSES



Various Initiatives Taken by BSES

1. Scaling Solar Rooftop in BRPL



Solar Roof-top capacity: 106.3 MW as on Jan'23

- Apart from Net-metering, BRPL is the first utility to implement projects under Group and Virtual Net-metering.
- BRPL is promoting recently launched National Portal for Solar and became the 1st utility pan-India for getting the subsidy disbursed by MNRE to consumer.

Various Initiatives Taken by BSES

1. Other Solarise initiatives



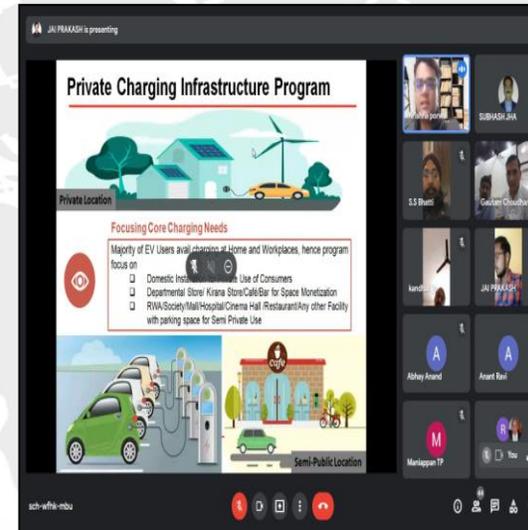
BRPL Solar City

- BRPL had launched Solar city initiatives like “Solarise Dwarka, Solarise Shakur Basti, Solarise Safdarjung”
- Promote roof top solar system in residential sector
- Carried out technical studies with organisations of repute such as Energynautics, TERI, NREL, etc. to assess the impact of rooftop solar



Urban Micro-Grid Project at 33kV Shivalik Grid

- Reliable clean power back up for upto 2 hours for about 150 consumers connected to the Shivalik C Block DT
- Other benefits include Energy Arbitrage, Peak Shaving and increased reliability and resiliency in the network



Virtual Outreach Programs Conducted with RWA's

- Breaking Myths associated with EV and Charging Infrastructure
- EV Private Charging Program for consumers as per Delhi EV Policy
- Supporting consumers in making an informed choice

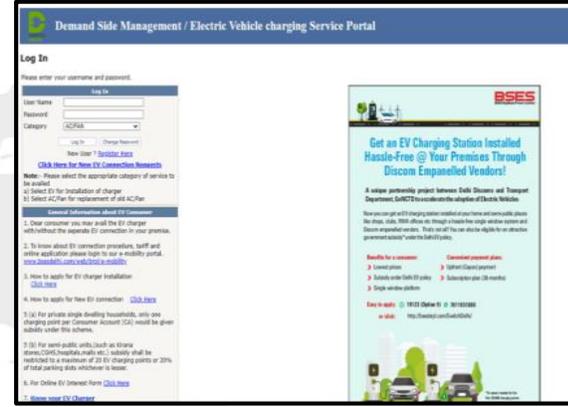
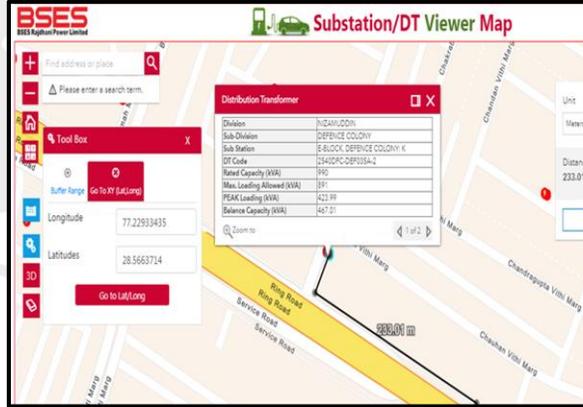
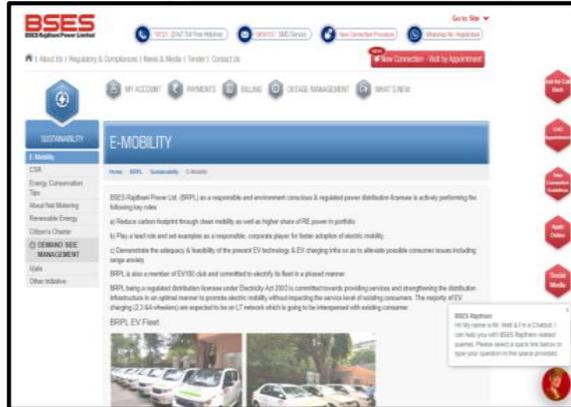


Solar Agriculture Pump

- Under the PMKUSUM component-C scheme individual farmers having grid connected agriculture pump can install Solar PV capacity up to two times of pump capacity in kW
- **Pilot Project was implemented under CSR program with zero investment from the farmers**

Various Initiatives Taken by BSES

2. E-Mobility



E-Mobility Portal

- Availability of all EV Information on Single Webpage
- Reducing human intervention in Consumer interactions

Easing EV Connection

- Pre-Technical Feasibility for Consumers
- Load Feasibility Checks through **SANKET** Portal

Private Charging Portal

- Single Window Portal for EV Charger Application
- Complete online application & Processing of Charger Inst.

Electrification of BRPL Fleet

- 30 EV deployed in BRPL offices & divisions
- EV Ready Offices : 171 Charging Points Commissioned across 115 BRPL offices

Various Initiatives Taken by BSES

3. Energy Efficiency Programs



Energy Efficient LED Lighting

- BRPL collaborated with various agencies like EESL and LED bulb OEMs to **promote Energy Efficient LED Bulbs and LED tube lights** among consumers at discounted price
- Under **Street Lighting National Programme (SLNP)**, BRPL replaced 3,63,529 conventional streetlights with LED streetlights



Energy Wise Energy Rise

- BSES introduced the programme **Energy Wise Energy Rise** in collaboration with **The Energy and Resources Institute(TERI)**
- **Community level awareness campaign:** Primary focus is sensitizing children, teachers and the Society on Energy conservation and Energy efficiency

BSES
BSES Rajdhani Power Limited

Replace your electricity guzzling AC with a new energy-efficient 5-star 1.5 T AC @ upto 60% discount

- Attractive buy-back schemes from leading brands like Voltas, Godrej, LG, Daikin and Lloyd
- Window/Split ACs available under the scheme
- Replace upto 3 ACs against each CA number

BIG SAVINGS ON SPLIT AND WINDOW ACs

- Save upto ₹6871 (895 units) annually per on each Split AC
- Save upto ₹6221 (810 units) annually on each Window AC
- Offer available for existing BRPL consumers only

For details of rates, vendors and for booking, please log-on
<https://www.bsesdelhi.com/web/brpl-ac-replacement-scheme>
WhatsApp 7827119060 or call 19123

BRPL AC Replacement Scheme

- BRPL introduced “AC Replacement Scheme” with 5-star 1.5 Ton AC
- Annual saving ~ Rs 6871 (895 units) for split AC & ~ Rs 6221 (810 units) for window AC
- **~9000 AC replaced** during scheme
- Energy saved: **6.8MUs**
- CO2 reduction: **5,965 ton of CO2**

BSES
BSES Rajdhani Power Limited

Replace your electricity guzzling ceiling fan with a new 5-star rated super energy-efficient BLDC fan @ upto 64% discount

- Attractive buy-back schemes from leading brands like Atomberg Technologies Pvt. Ltd, Halonix Technologies Pvt. Ltd. and R R Kabel Ltd.
- Replace upto 3 BLDC fans under the buy-back scheme* or
- Buy upto 2 BLDC fans without the buy-back offer*

Hurry! Register now for the limited period offer

- Save upto ₹ 1000 (142 units) annually on each BLDC fan
- Rebate period of under 2 year's
- Offer available for existing BRPL consumers only

BIG SAVINGS ON BLDC FANS

For details of rates, vendors and for booking, please log-on
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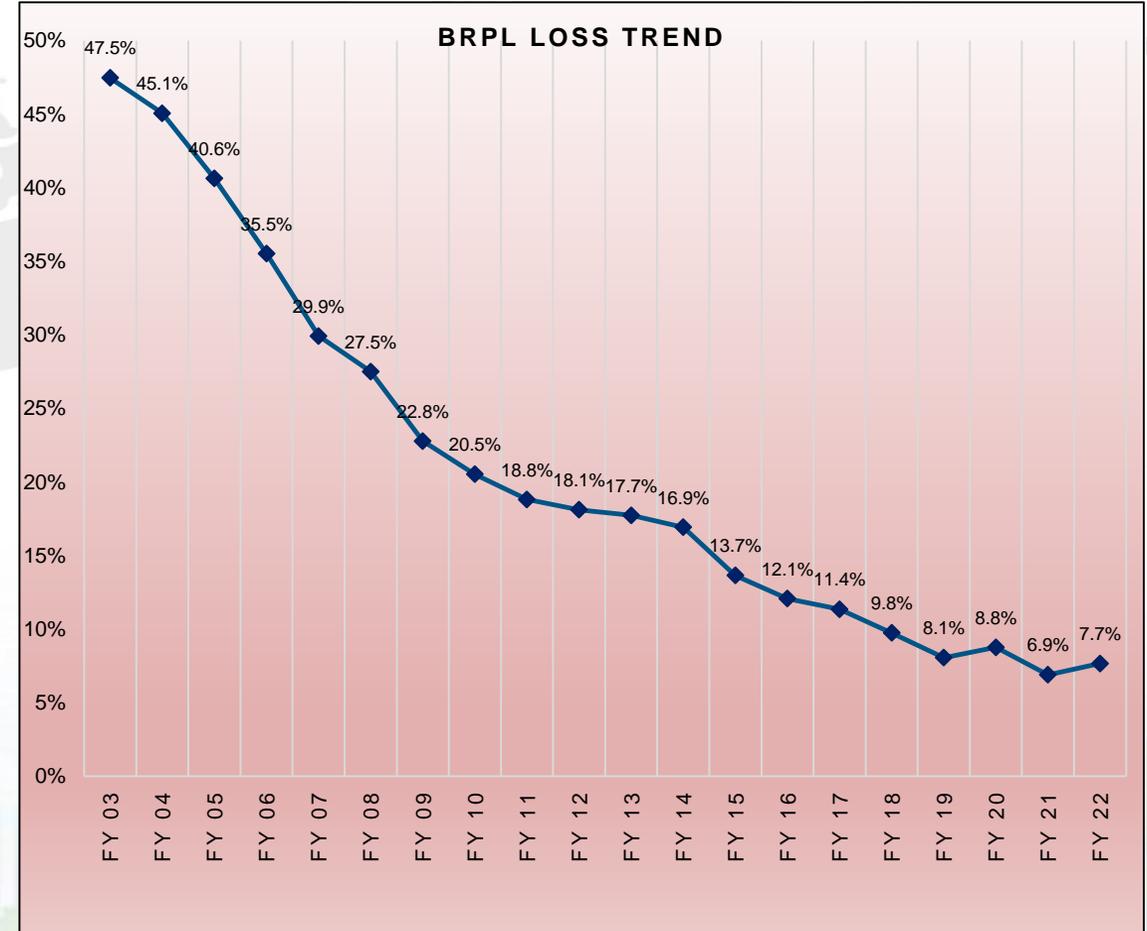
BRPL Fan Replacement Scheme

- BRPL Consumers can avail maximum 3 BLDC fans under buyback or maximum
- Old fans disposed off through environment friendly manner under buyback scheme.
- **~8000 Fans replaced**
- CO2 reduction: **897 ton of CO2**

Various Initiatives Taken by BSES

4. Energy Efficiency - Loss Reduction

Technical initiatives	Specialized / Commercial Initiatives
<ul style="list-style-type: none"> • New Technology Infusion • Technical Know How Improvement • Equipment/Conductor Replacement • Additional Network Creation • Power Factor/Voltage Improvement • Network Length Optimization 	<ul style="list-style-type: none"> • Tripled Customer Base • 100% Metering (AMR, Prepaid) • Accurate Energy Billing (Downloading) • Payment Gateways • Theft Control (Police/Legal Support) • Energy Audit (Grid/Feeder/DT Metering)



Various Initiatives Taken by BSES

5. Technological Initiatives – Addressing Space Constraints



66kV Hybrid Installation



*Elevated Sub Station
For space saving*



*G+1 Substation
For space saving*



*2MVA PSS Installation
with Ester oil*



2-tier Sub-station

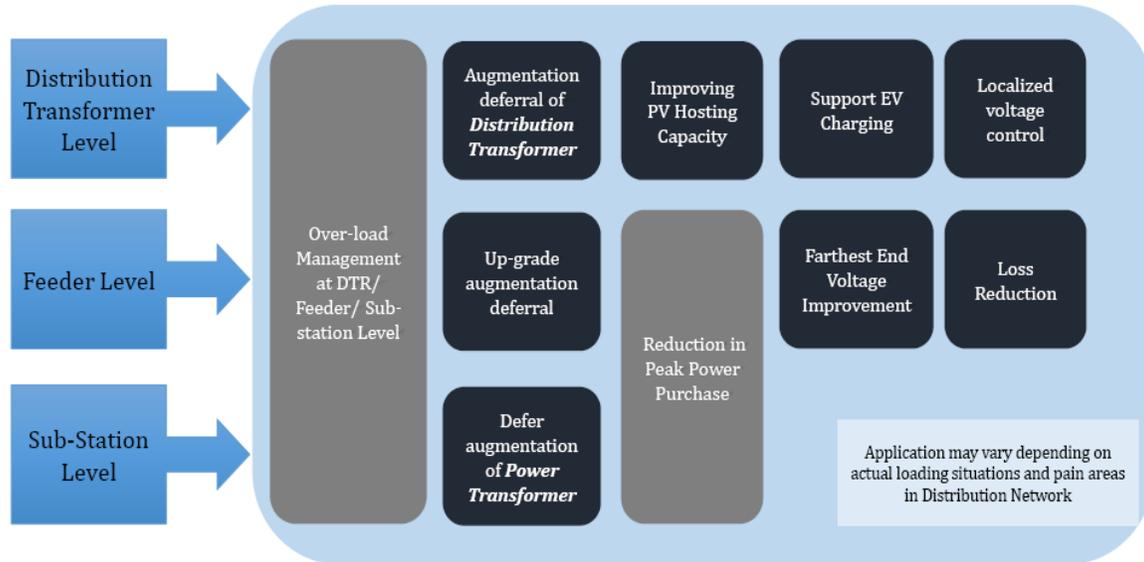


GIS Sub Station

Various Initiatives Taken by BSES

6. Battery Energy Storage System (BESS) at DTs

BESS key use cases for Distribution Utilities



Project Name: Pilot at six 11KV/415V Distribution Transformer sites

Objective: To provide relief of overloaded DTs during Peak loading period

Other benefits /utilization:

- ✓ Peak Shaving
- ✓ Energy Arbitrage,
- ✓ Reactive Power Support.

✓ **Cost Benefit Analysis:** Power Management team is discharging and charging the BESS based on real time market price.



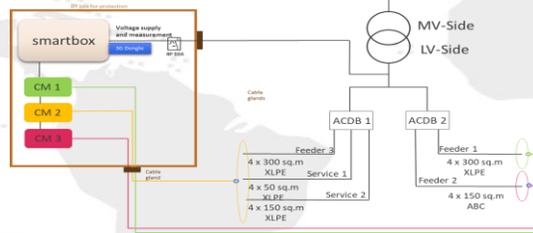
Various Initiatives Taken by BSES

7. Other Technological Initiatives



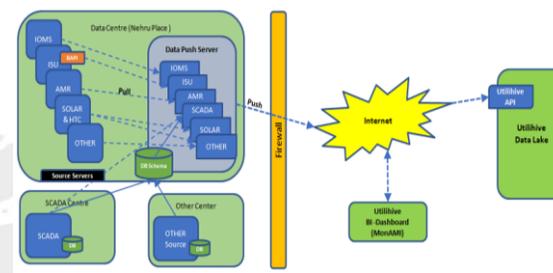
Demand Response Driven Energy Advancements and Moderation of Services (DREAMS) Project

- BSES has signed MoU with Govt of Norway supported "Smart Innovation Norway" to drive energy efficiency.



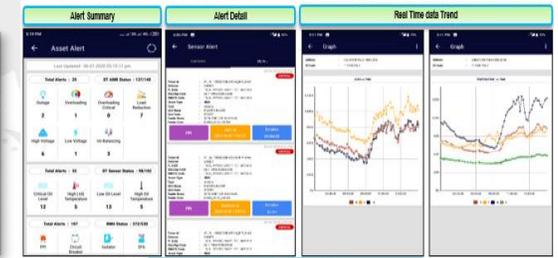
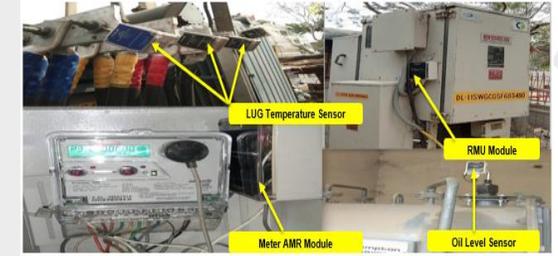
Digital Twin of LT Network Pilot

- Improve the reliability and cost-effectiveness of an emerging economy LT distribution network and provide the evidence-base to support roll-out across BRPL and India.
- BRPL participated as consortium partner under open call of united nation environment Programme named as "DIGITALISATION FOR FLEXIBLE AND RESILIENT ENERGY SYSTEMS" on the ground contribution to Digital Demand- Driven electricity network (3DEN) Initiatives.



Data Integration: Data Lake PoC Pilot

- Integrate different sources of Data using the common platform for an analytics & data integration solution.
- 360-degree visibility of Real time and historical data of Network / Asset points
- Map based UI to identify abnormality for more focused corrective actions



IoT based DT Sub-Station Automation

- Risk & condition-based monitoring through real-time information from a combination of 'on-asset' deployed sensors, advanced meter data infrastructure
- Mobile access of application to be provided for field staff.
- Appropriate hardware (Modem, sensor etc.) to be provided at Sub-station to take network status to IoT platform

Various Initiatives Taken by BSES

8. Customer Engagement and Empowerment



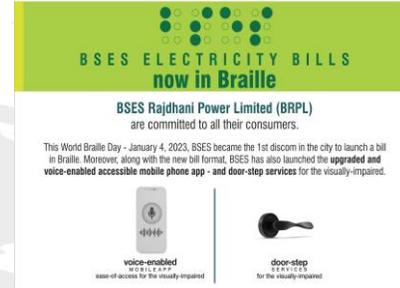
BRPL Website

- ✓ Online Payment
- ✓ Online applications
- ✓ Bill details
- ✓ Outage information
- ✓ New schemes and policy



BSES Chat Bot

- ✓ Duplicate bill
 - ✓ Complaint registration
 - ✓ Payment details
 - ✓ Electricity consumption etc.
- e-School Energy Program**



- ✓ Voice Enabled Braille electricity bill



eRWA Meet

Aap Ke Saath & Vartalaap

- A novel and first of its kind's initiative in the country by a Discom to organize virtual online meetings with its RWAs
- Connected virtually with 2,840 RWA's across South, West, Central & East Delhi in FY 20-21

> 12.5 Lac App Downloads



BRPL Power App (Bilingual – English & Hindi)

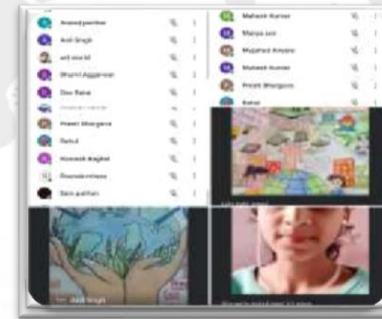
- ✓ Instant Payment
- ✓ Complaint registration
- ✓ Bill details
- ✓ E-services
- ✓ Consumption History

> 45Lakh WhatsApp requests



WhatsApp Services

- ✓ Pull services including duplicate bill, bill details, payment details, New Connection etc.



e-School Energy Program

- Energy Conservation & Safety Tips
- Drawing Competition
- Total 54 sessions in 20-21

Social Media

- 258 K FB followers
- 22.6 K Twitter followers
- 10.8 K subscribers

Working on a Pilot for Load signature analysis and Voice enabled Smart services

Utility Transition Philosophy – BRPL



**Green Energy &
Decarbonization**



**Digitalization and
Technology**



**Customer
Engagement &
Empowerment**



**Organization
Culture**



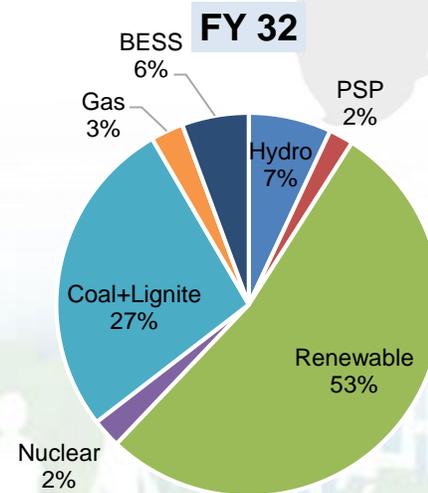
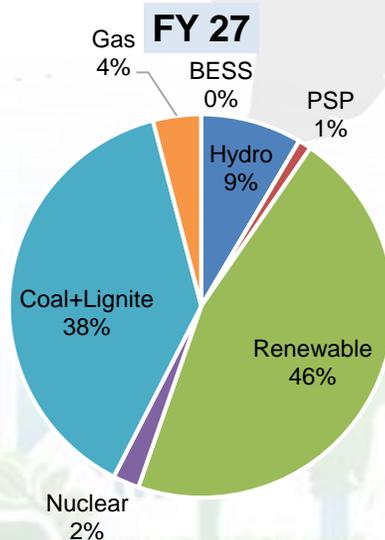
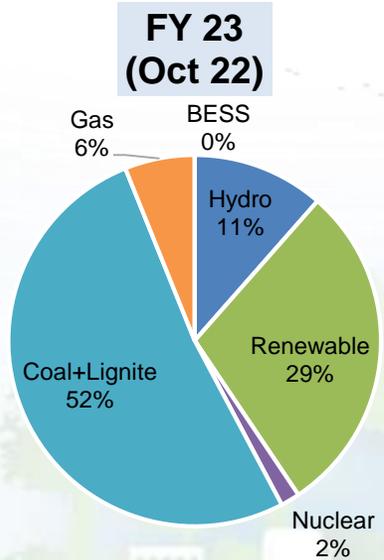
Green Energy & Decarbonization

Fuel	FY 23 (Oct 22)	FY 27	FY 32
Hydro	46.9	52.9	63.8
PSP		6.8	18.8
Renewable	119.1	284.8	486.8
Nuclear	6.8	13.8	22.5
Coal + Lignite	211.2	239.3	248.8
Gas	24.8	25.3	25.3
BESS	-	-	51.6
Total	408.7	622.9	917.5

Flagship policy initiatives for Energy Transition

- A. Renewable Integration:** Govt has introduced many policy initiatives including,
- Waiver of Transmission Charges for renewable generation for projects commissioned till Jun 2025
 - Policy on Bundling of Renewable energy with thermal power
 - Policy for enhancing domestic renewable manufacturing capacity
- B. Green Hydrogen Policy**
- C. Offshore wind policy**
- D. Promotion of Electric vehicles**
- E. Green day ahead market (GDAM) and Green open access**
- F. Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan (PM-Kusum)**
- G. 'One Sun, One World, One Grid' (OSOWOG)**

Figures are in GW



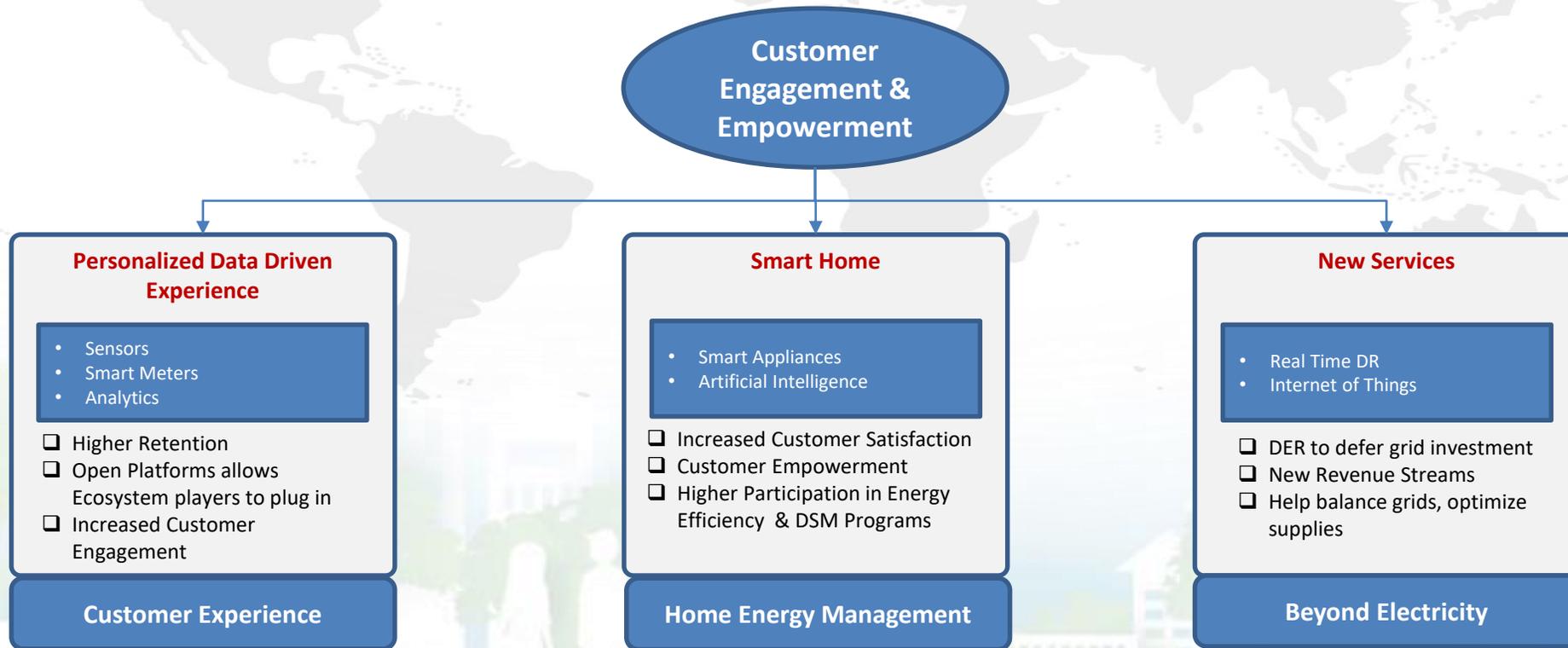
Digitalization and Technology

- Network of sensors, drones, cameras, and other automation devices provides a continuous stream of data on the status and performance of equipment
- Dynamic visualizations display of data on operations, performance, and potential safety hazards
- Analytics that use AI and machine learning combine data to determine appropriate actions



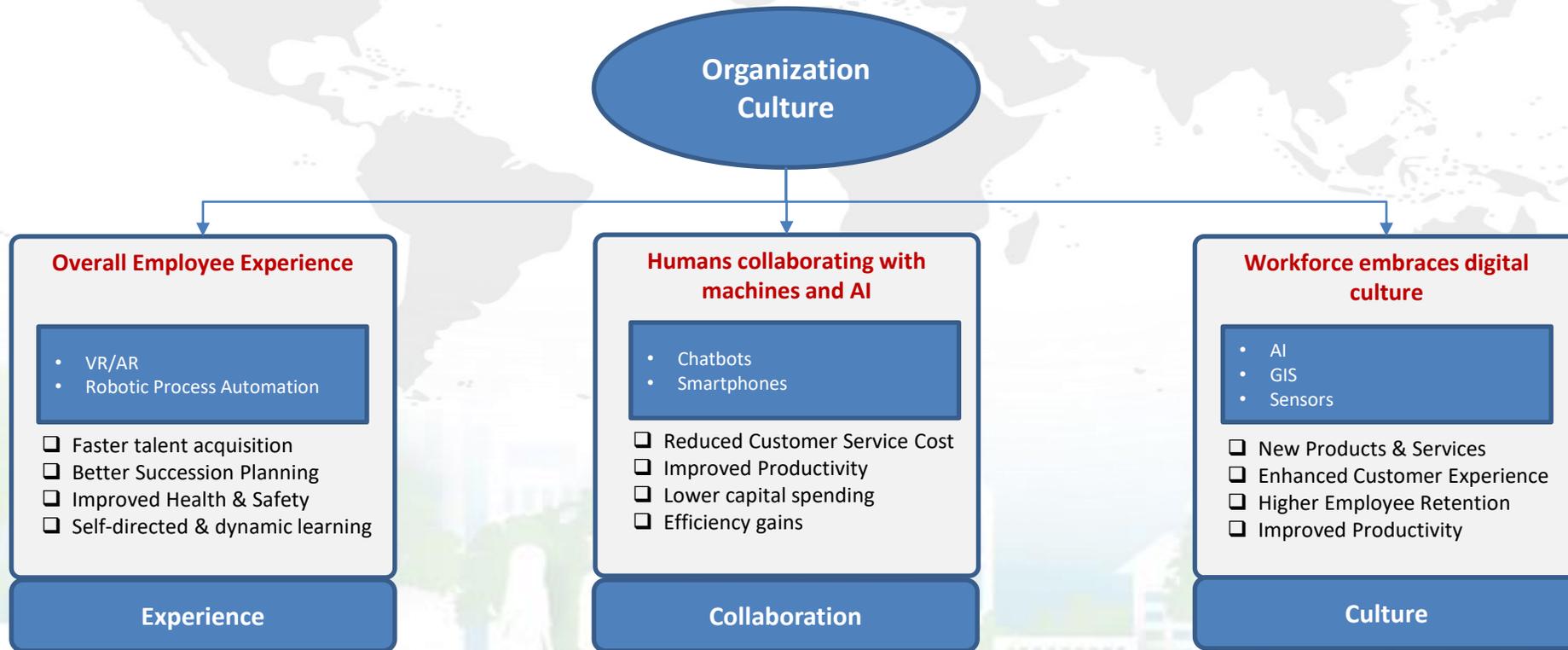
Customer Engagement & Empowerment

- Personal relationship with their utility
- Dedicated “smart home platform” that they can access through their phone, laptop, tablet, or smart home speaker
- Personalized, data-driven customer experience in real time, as well as services such as home energy management enabled by AI; transactions management; and other products and services in addition to electricity



Organization Culture

- New-generation, tech-savvy professional who relies on connected, often collaborating with bots that integrate AI to accomplish tasks
- Performance, learning and development are measured in real time
- Digital traits of agility, innovation, and higher collaboration levels embedded in the culture



Future Technological Intervention for Operational Efficiency Improvement, Innovative Market Models and Consumer Engagement

- ADMS – GIS based advanced distribution management system with integrated OMS, CIS, WMS, Protection Management System.
- Self healing grids.
- DERMS with EV, Solar, BESS integration.
- ADR platform – for Demand flexibility capacity building.
- Smart Home integrated with utility ADR platform.
- AL/ML based advanced load forecasting tools.
- Smart box or LT digital twins.
- Smart Metering with advanced MDMS and universal HES
- Meter data analytics and customer support for power efficiency improvement and quality improvements.
- Smart Home integrated with utility ADR platform

Network Building

- Underground Distribution substation.
- Multitier Distribution substation.
- Micro substation.
- Micro grids.
- Underground Grids.
- Hybrid substation.
- Mobile Grids and DT substations.
- E-house based grids.
- Grid scale – Battery energy storage.
- Roof top solar with Smart inverters & battery energy storage.

IT and Cyber Security

- Smart Meter Management Centre.
- Cyber Security Management Centre.
- ERP with on line procurement and planning modules.
- Enterprise Data Lake and Single source data station for faster change management across all platforms.
- Digital twin for assets.

Other Tech Intervention

- IoT Sensors for asset health monitoring.
- Asset management tools for asset life cycle improvements.
- Condition monitoring and Predictive maintenance
- RF ID based asset tracking for distribution asset management.

Essential for Better Customer Service

- **Utility duct**
 - *In line with under ground metro lines to cater Power cables, Water pipes, Gas pipes, Optical Fibre cables, DTH cables optimizing length resulting lower losses, minimising damage across utilities, Reliability and performance improvement like loss and downtime reduction, reducing road damages and frequent repairing and most important city aesthetic improvement*
- **Utility – OFC network**
 - *Reduced dependency on telecom*
 - *Discom OPEX optimisation and better performance of OT tools like SCADA, LDR, ERP etc.*
 - *Supporting 5G rollout in Metro city and rural areas.*

Way Forward

- Going forward, power and utility companies will likely see increased opportunities to create value based transformation.
- Balanced combination of all factors lead to “distribution utility of the future”.
- Every stakeholder need to contribute towards sustainable growth and energy transition goals.





Thank You

For discussions/suggestions/queries email:

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