Great Place To Work. Certified APR 2019–MAR 2020 INDIA

TATA POWER-DDL

TATA POWER DELHI DISTRIBUTION LIMITED

A Tata Power and Delhi Government Joint Venture

Distribution Utility Meet (DUM)-2020

250 Million Smart Meters

Dwijadas Basak

(Chief Commercial)

28-Nov-20

with you Non-Stop

Over View

TATA POWER-DDL

TATA POWER – DDL

51:49 Joint Venture of

Tata Power and Government of Delhi

"To be the most trusted and admired provider of reliable, competitive power and services, and be the company of choice all stakeholders"

Licensed Area: North and North West Delhi (510 sq. km)

Consumer Base: 1.8 Million

TATA Power-DDL is an ISO 9001(QMS), 14001(EMS), 18001(OHSAS), 27001(ISMS), 8000(SA) and 50001 (EnMS) certified organization.

Smart Meter

2 Lacs Deployed

Billing -**98%**

Read availability-98.5%

Reading Opex. Saved

(No SIM Rental/Manual Read)

Modules Developed

1. Billing (NET/Post/Pre-Paid)
2. Revenue Protection
3. Connect/Disconnect
4. Dashboard & Analysis modules

Consumer Portal

1. Read Availability (Interval/Daily/Monthly)
2. Flexi. Consumption Alerts
3. ToU Consumption
4. Pre-Paid Details

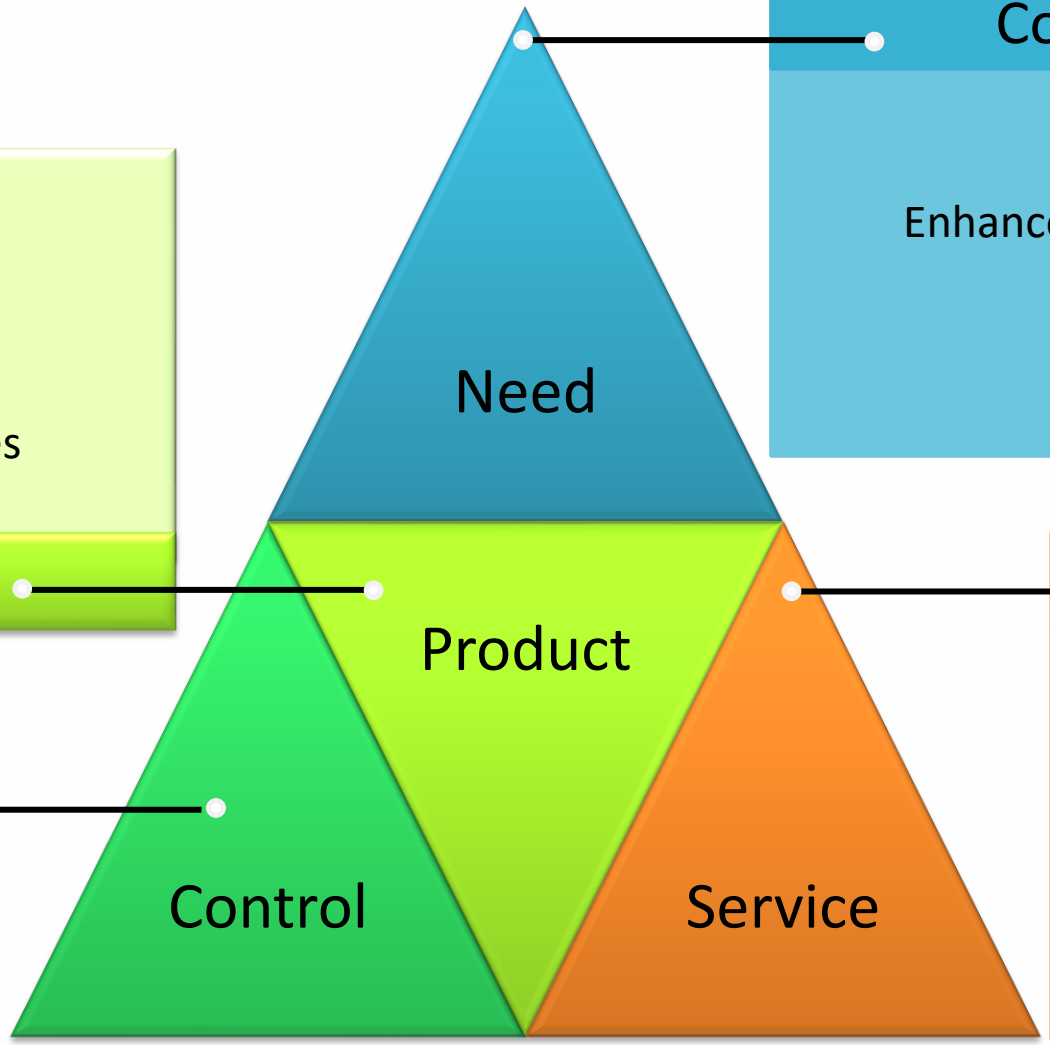
Understanding Eco-System

Consumer

Enhanced Participation

- Unified Products
- Low Cost Solution
- Durable Products
- Lesser Proprietary issues

Manufacturer



Utility

Understand Requirement

- AT&C Losses
- Billing Accuracy
- Operational Efficiency
- Compliances
- Energy Auditing
- Distribution Automation
- Network Health Monitoring

Regulations

Consider Life of Meters + NIC (like other IT/Electronic Products)

Understanding the Priorities of Consumer & DISCOM

Expedite Product Certification

Smart Meter & Utilities

A Rupee Saved Is A Rupee Earned

Operational Efficiency

Empowering Consumer

Removal of Manual Disconnection	Faster Detection of Inactive Meters	Better Demand Response Mngmt.	Real time power Quality Monitoring	Enablement For renewable integration	Less Outage
Real Time Energy Audits	Reduction in Revenue Billing Cycle Time	Reduction in power Purchase Cost		Home Automation Enablement	Consumption Monitoring
Removal of Manual Meter Readings	Reduction in AT&C Losses	Faster Outage Detection	DT Health & Phase Balancing	Low Energy Bills due to ToU Tariffs	Error Free Billing
Commercial Benefits		**Operation Benefits**		**Consumer Benefits**	

Smart Meter & Utilities

Architecture Starts when you 'carefully' put two bricks together

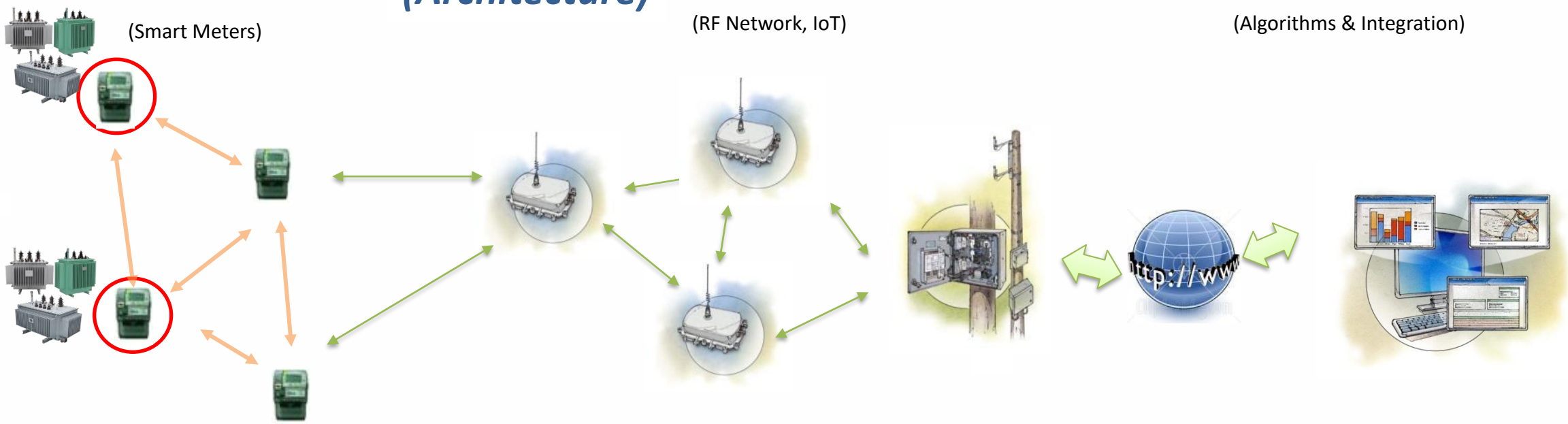
Smart Meter Implementation-Model

Utility & Model	Capex	Opex
Opex. Model(Cellular/RF) Dependency- High Modification Cost- High Skill Required- Low to Moderate Financial Condition- Not Good	Integration & Modification in Exiting IT System of Utility to upgrade & compatible	1. Smart Meter & Meter Accessories 2. Ami Communication Equipment 3. Backend IT System (HES/MDM) 4. Project Commissioning Services 5. Software's Annual Technical Support 6. Hardware AMC 7. Network Bandwidth 8. Cloud Infrastructure 9. System maintenance Fees 10. Customized Alteration
Capex. Model (Cellular) Dependency-Low Modification Cost-Low Skill Required- Moderate to High Financial Condition- Moderate/Good	1. Smart Meter & Meter Accessories 2. Ami Communication Equipment 3. Backend IT System (HES/MDM) 4. Project Commissioning Services	1. Software's Annual Technical Support 2. Hardware AMC 3. Network Bandwidth 4. Cloud Infrastructure 5. System maintenance Fees
Capex. Model (RF) Dependency-Min Modification Cost-Min Skill Required- High Financial Condition- Good	1. Smart Meter & Meter Accessories 2. Ami Communication Equipment (Router/Collector) 3. Backend IT System (HES/MDM) 4. Project Commissioning Services	1. Software's Annual Technical Support 2. Hardware AMC 3. Network Bandwidth (Limit to Backhaul) 4. System maintenance Fees

Mix in Geographic issues

Integration of Smart Meters with Distribution Automation & SCADA System

(Architecture)



Stage 1	Stage 2	Stage 3
"Innovate"	**"Reuse"**	**"Integrate"**

- 5 Sensors installed on Transformer
- Smart Meter installed on Transformer
  - Monitors Electrical Parameters
  - Takes inputs from the 5 Sensors
- 1 Relay installed on transformer
- Smart Meters based on the algorithm for Digital Inputs, issues a digital output signal
	- Sensor Data Transmitted via existing RF Network /IoT Platform	- Algorithms processes the digital inputs and issues a digital output signal on runtime.
		- Passes information to downstream SCADA system

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Integration of Smart Meters with Distribution Automation & SCADA System

In field *(Application)* At Backend

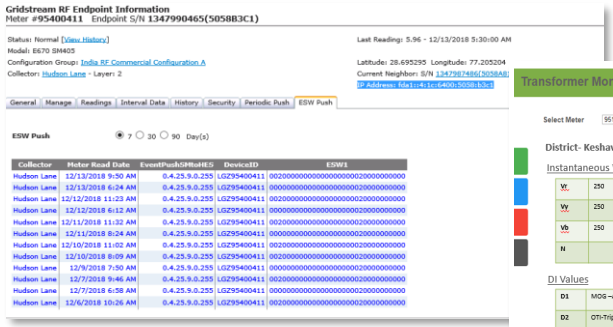
Smart Meter redesigned to capture Transformer Sensor Data

a) Meter Redesigned

b) Closer look at 5DI and 1 DO

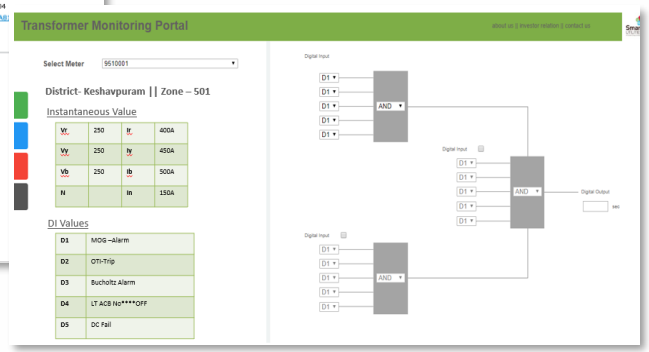
c) Relays activated

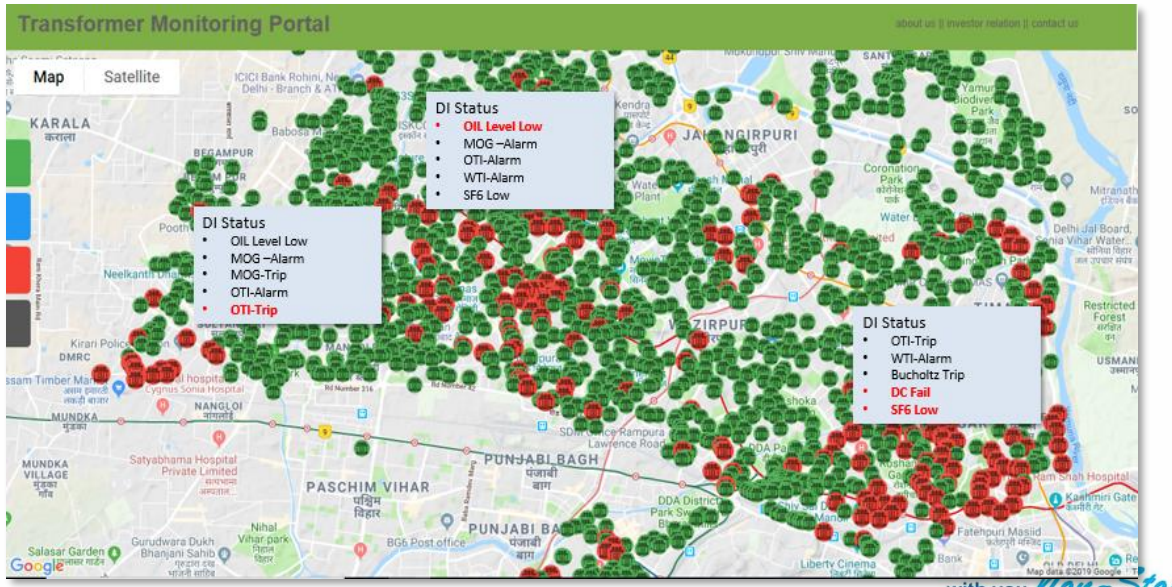
At the Backend Servers (Network Operation Center)



1) Digital Data

2) Algorithms

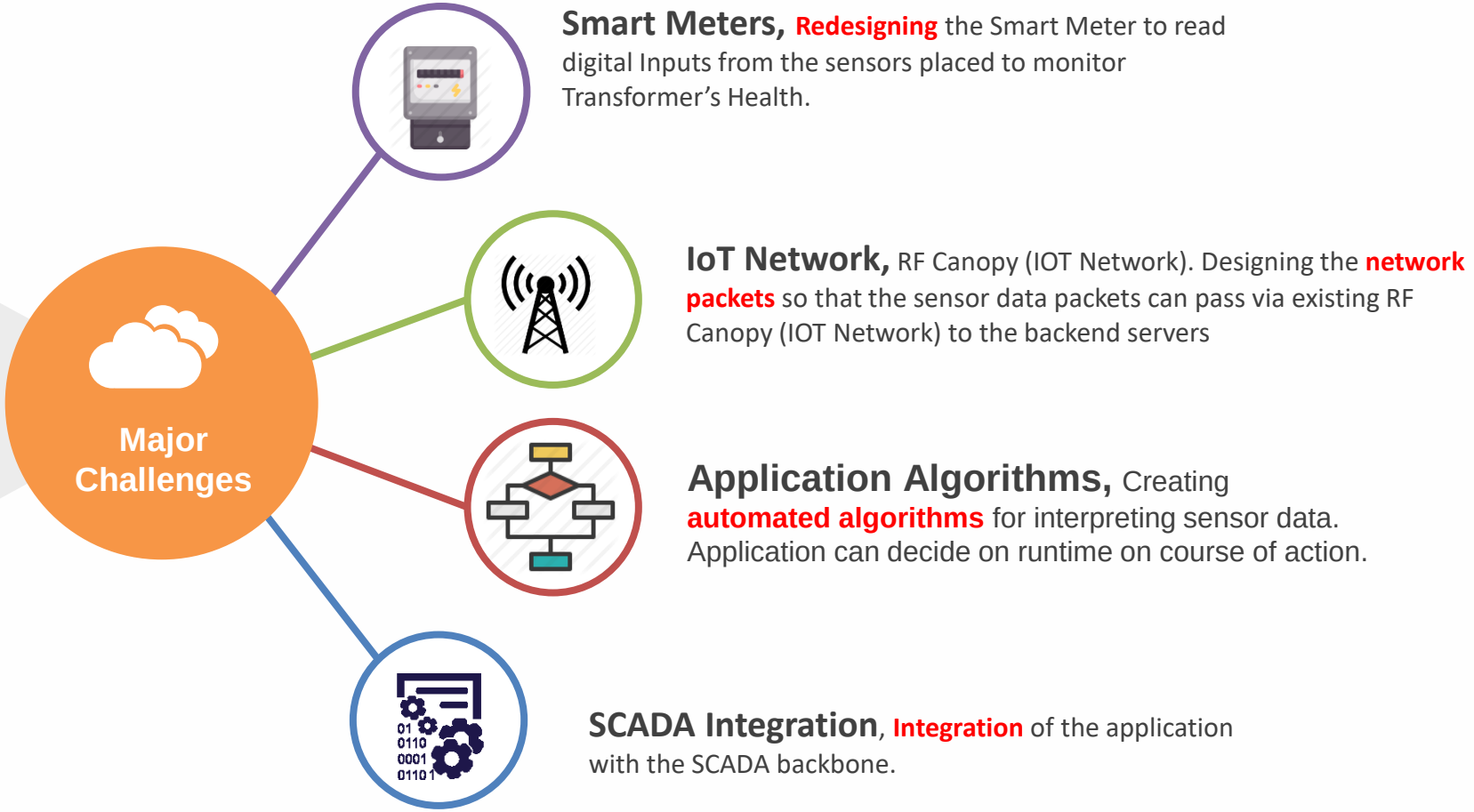




3) **Runtime visual** representation to the (24X7) Network Operation Team

Integration of Smart Meters with Distribution Automation & SCADA System

Challenges



Smart Meters, **Redesigning** the Smart Meter to read digital Inputs from the sensors placed to monitor Transformer's Health.

IoT Network, RF Canopy (IOT Network). Designing the **network packets** so that the sensor data packets can pass via existing RF Canopy (IOT Network) to the backend servers

Application Algorithms, Creating **automated algorithms** for interpreting sensor data. Application can decide on runtime on course of action.

SCADA Integration, **Integration** of the application with the SCADA backbone.

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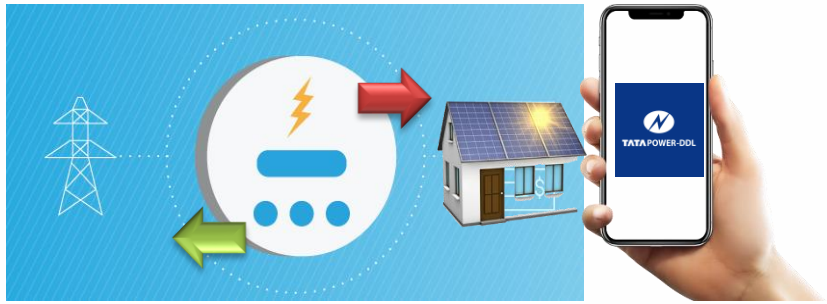
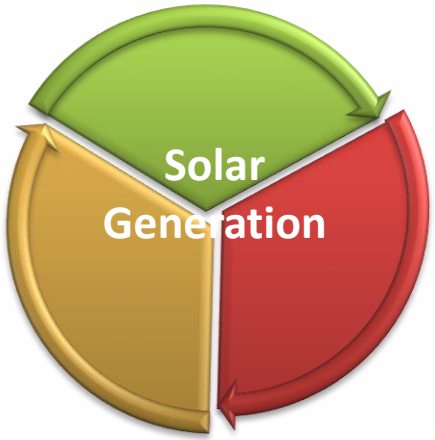
Benefits in Use of Smart Meter with Rooftop Solar & Edge of the Grid Solutions

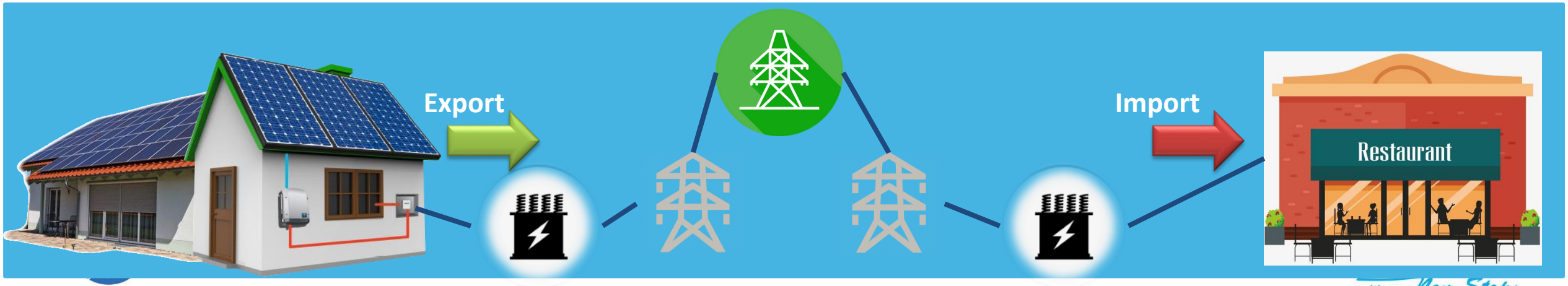


Availability of Import/Export Data with Customer



TOD Benefits on Peak hours generation

Better Power Forecasting



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Use/Sell by consumer defined user(Consumer/Prosumer)- DER/EV/BESS/PV

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Pre-Paid Post-Paid or Mix of Both

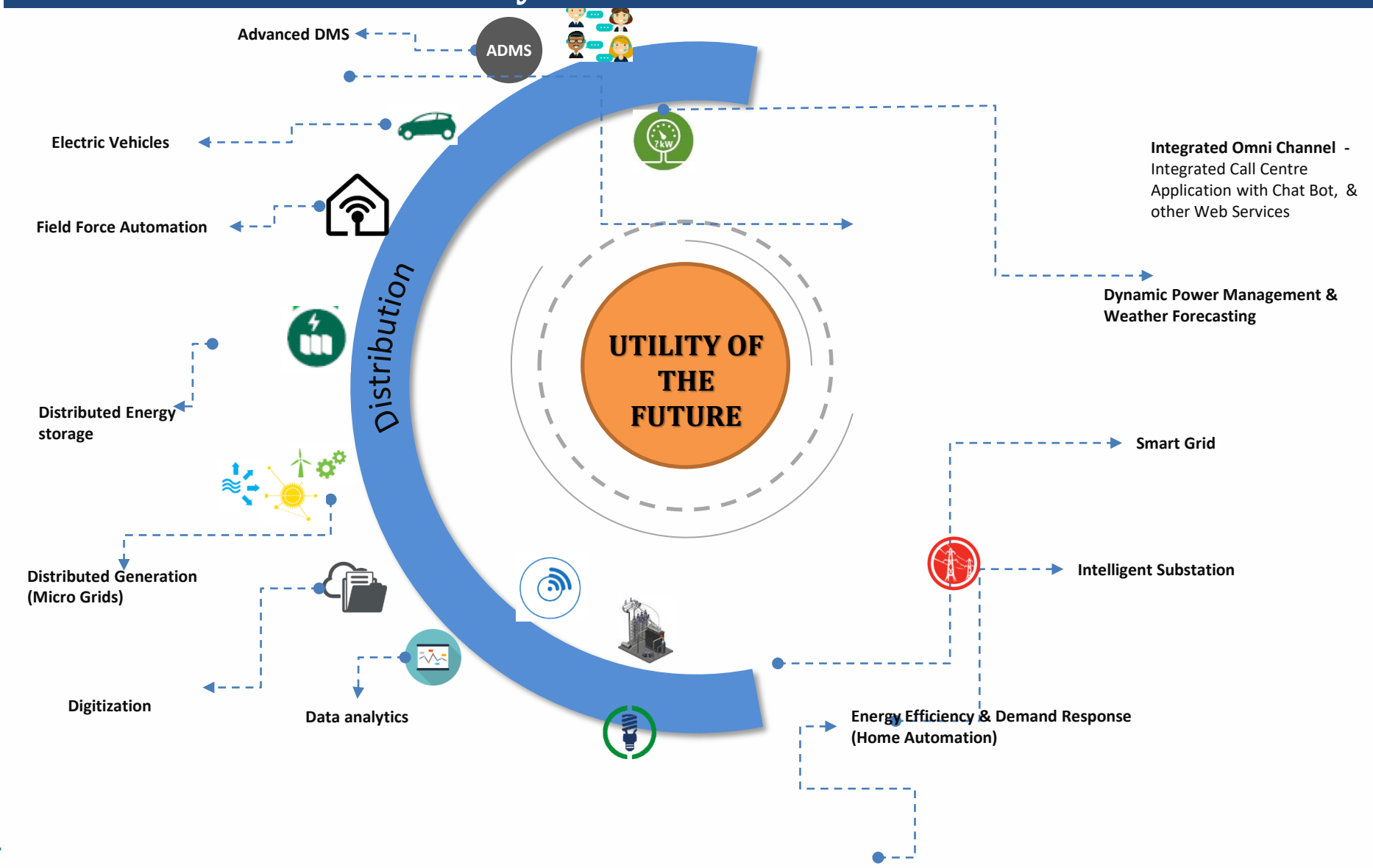
Mix of Both

A. Pre-Payment Smart Meter is most desired Solution for every utility.

1. Advance Availability of cash
2. Drawbacks Already taken care of like
   - -Difficult to recharge
   - -No option of remote recharge
   - -Tariff updation
   - -Balance Availability
   - -Supply Pass issues
3. For All utilities most of consumer base of covers under low segment(SP_WC & PP_WC) & with multiple of complaints. Hence
   - -Min. number of complaints related to Billing.
   - -Focused Approached should be given to Bulk Consumers.
4. **Incentive Scheme:** Incentive to be given to consumers on Bulk Recharge & shifting to Post-Paid to Pre-Paid.

B. Need of Post Paid meters could not be denied for essential services and provisions should kept available.

We need to be Future Ready !



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Thank You