PART B: Prosumer Engagement Strategies and Case Studies

Session Content

- Innovative Strategies for Utilities to Engage with Prosumers Effectively
- International Case Studies Showcasing Successful Prosumer Enablement and Integration Programs and Sustainability Initiatives
- Time of Use Tariff (ToU) and Demand Response (DR)

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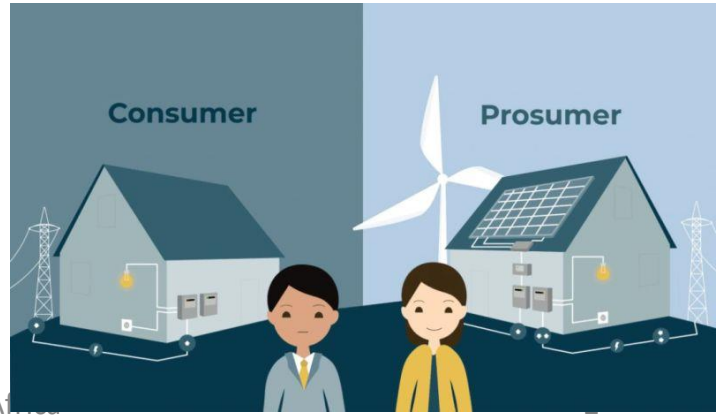
Challenges & Significance of Prosumer Engagement

Challenges

- Resistance to Change
- Lack of Consumer Education
- Data Privacy and Security for Building Trust
- Variable Consumer Motivations
- Financial Barriers
- Infrastructure Limitations
- Scalability and Standardization
- Legal and Contractual Considerations

Significance

- Behavioural Change
- Demand-Side Management
- Market Transformation
- Empowerment and Inclusivity
- Feedback Loops
- Resilience and Reliability
- Social and Environmental Benefits

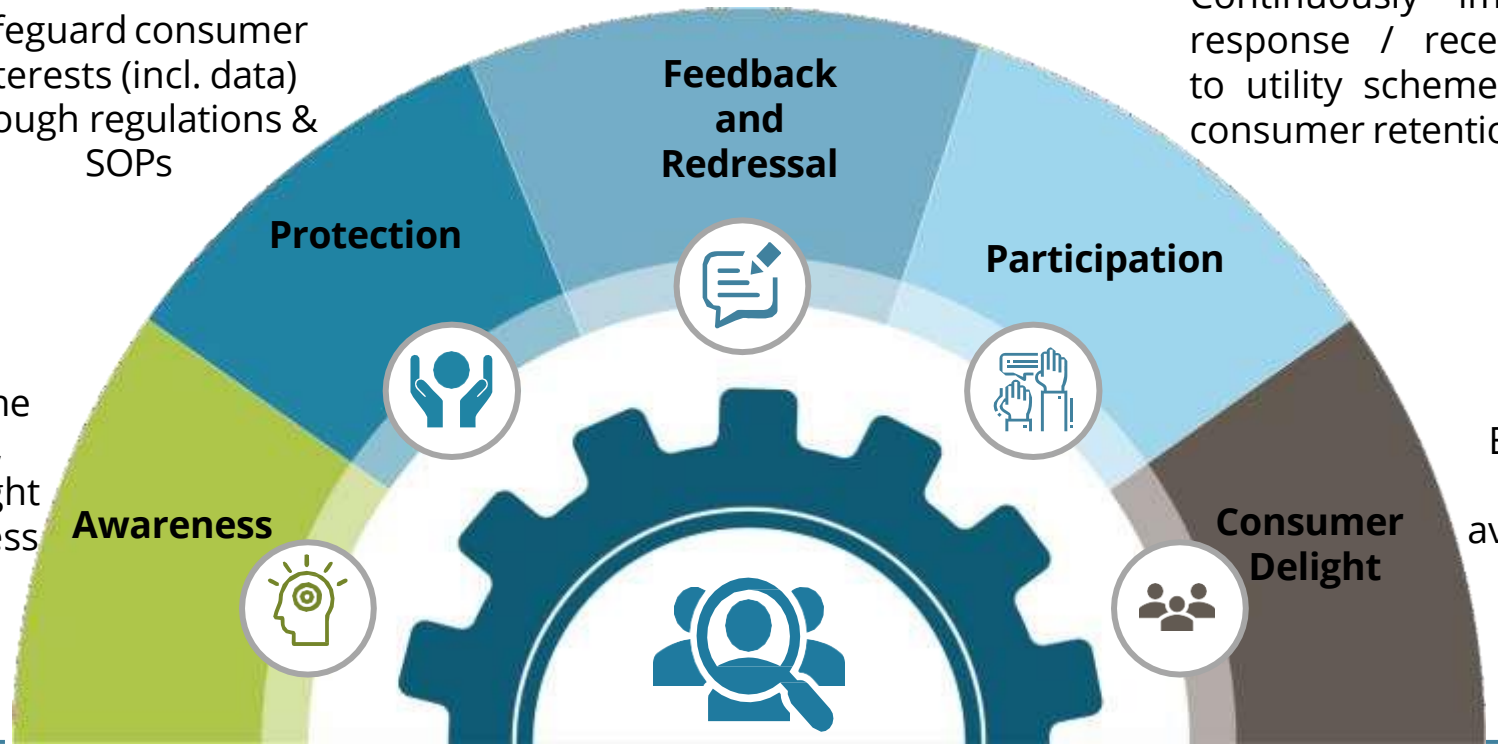


Key Aspects of Prosumer Engagement Strategies

Seek feedback. Resolve concerns through a proactive redressal mechanism

Safeguard consumer interests (incl. data) through regulations & SOPs

Continuously improve response / receptivity to utility schemes and consumer retention



Right information to the consumers (benefits, features, etc.) at the right time. Proactively address negative perception

Ease of access and convenience for availing value- added services.

Activities under each dimension to be implemented across various phases of project lifecycle

Phasing of Activities → **Planning Phase** → **Deployment Phase** → **Operation Phase**

Creative Approaches for Utilities to Engage with Prosumers

Approaches for utility-prosumer interaction:

- **Digital Platforms -** Real Time Interaction
- **Community Engagement -** Power of Collective Action
- **Gamification -** Making Energy Fun
- **Incentive Programs -** Motivating Prosumer Participation
- **Smart Home Integration -** Seamless Integration into Daily Life
- **Educational Campaigns -** Empowering Prosumers through Knowledge
- **Strategic Partnerships -** Collaboration for Success
- **Data Security and Privacy -** Building Trust
- **Measurement of Success -** Key Performance Indicators (KPIs)

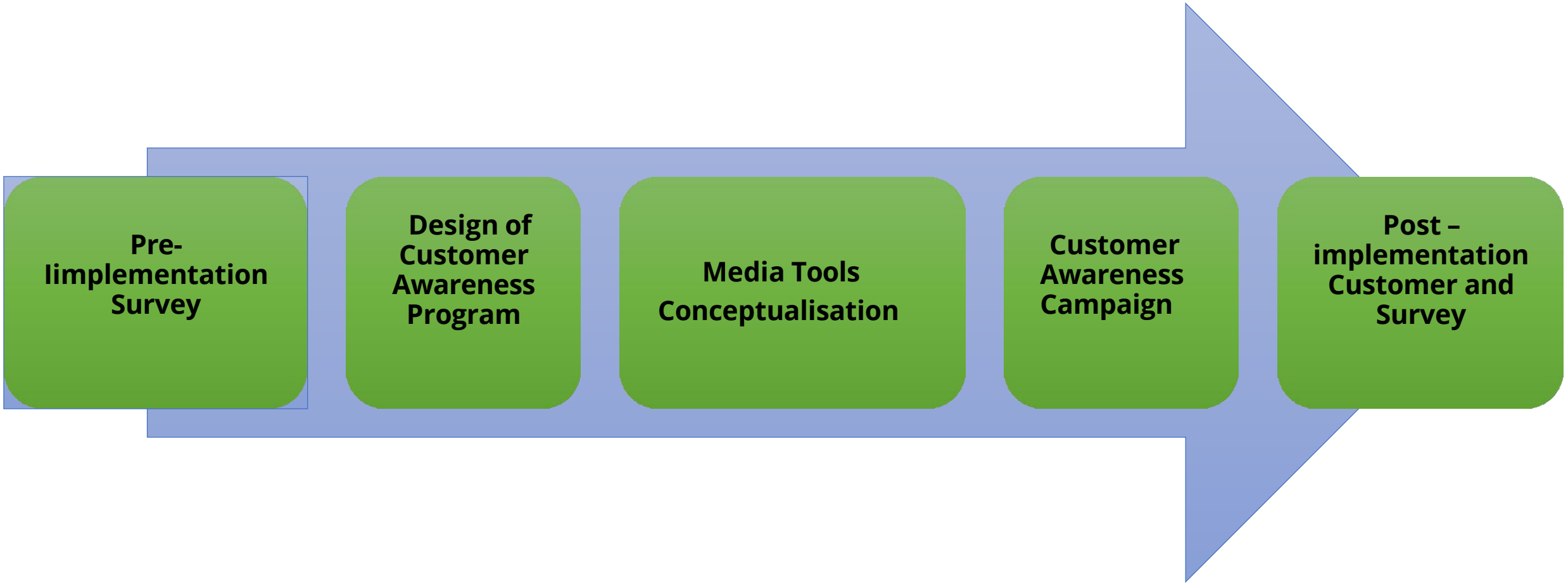
Understanding Customer Profile

- To design an effective Customer Education Program, its important to understand the Customer Profile and Customer Touch Points

Type of Usage	Education Level	Income Level	Consumption Level	Employment Level
• Residential • Commercial • Industrial • Agricultural	• Uneducated • School/College going/passed • Professional degrees	• Poor Class • Medium Class • Upper Class	• Low • Medium • High	• Working Class • Unemployed • Retired

Customer Touch Points	
	Customer Care Centre for New Connection, Queries and Complaints
	Meter Reader
	Electricity Bills – Printed, SMS, E-mails
	Utility Portal, Chatbots, Voicebots, Social Media
	Community Meetings, Information Booths
	Shopping Malls, Cinema Halls, TV, Radio

Proposed Execution Plan



Better Engaged Customer

We support SMART Meter deployment as it will help us monitor not only how much energy we are using but also how much it costs.

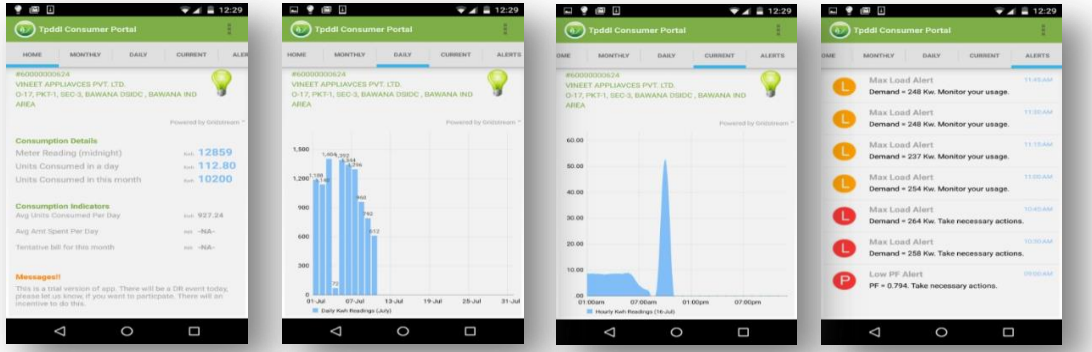
Willing to pay extra to get reliable electricity

I am excited as it will help us develop better habits on energy consumption and reduce electricity bills

Best Practices of Prosumer Engagement

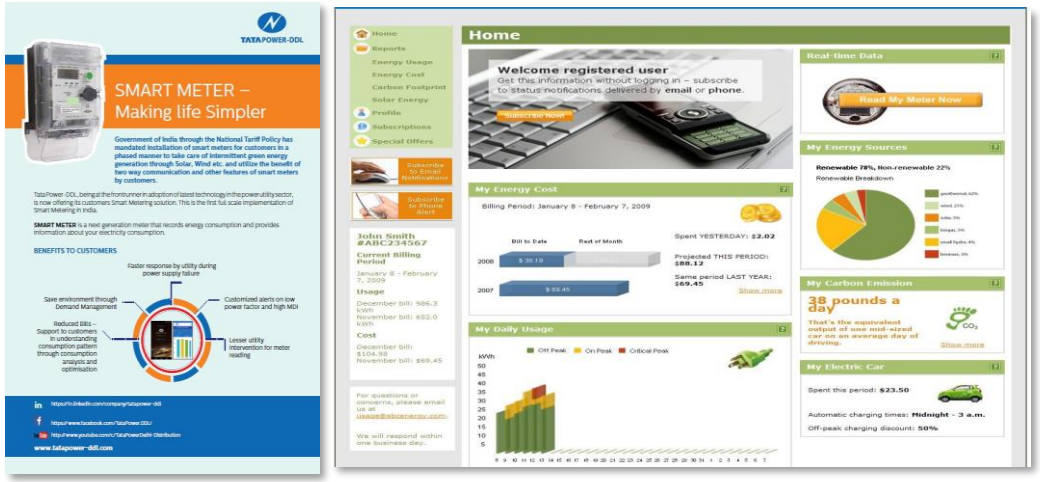
Best Practices by Utilities for Customer Engagement 1

- RWA and IWA covered for Smart Meter Awareness
- Creating Brand ambassadors and Training Metering Staff
- Seminar/Workshop Key Consumers Groups
- Training of Field Operations Team
- Smart Meter Demo & Testing Van – Know your Smart Meter
- Displays through Leaflet, Poster, Hoardings & Standees
- Utilized Social Media & Other Media Coverage platforms



Monthly Consumption	Daily Consumption	Load Survey	Alert's

Source: Tata Power Delhi Distribution, India



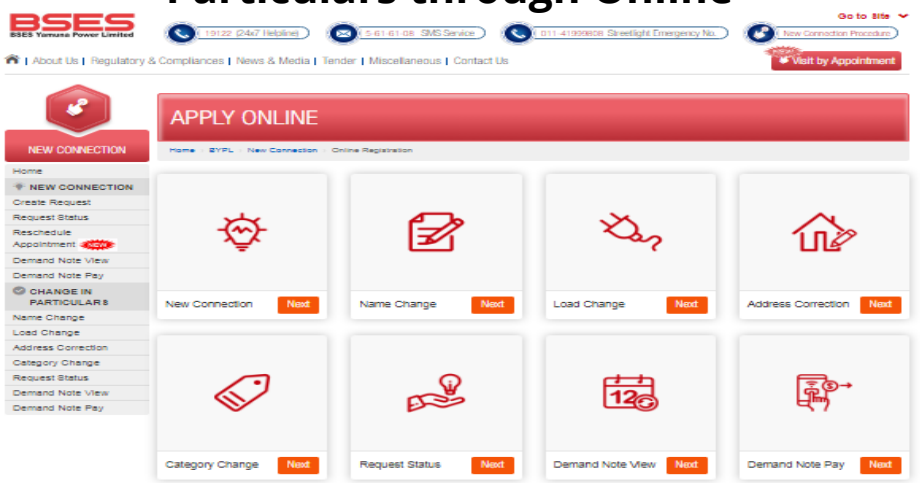
Portal for Consumer Analytics

Source: Tata Power PPT

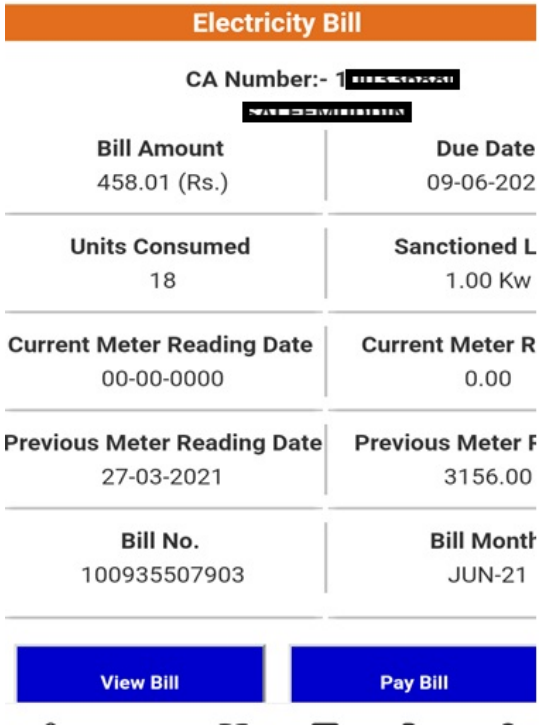
Best Practices by Utilities for Customer Engagement 2

"No Current" Complaint Registration Modes

New connection and Change in Existing Particulars through Online



SMS with Link to View Bills



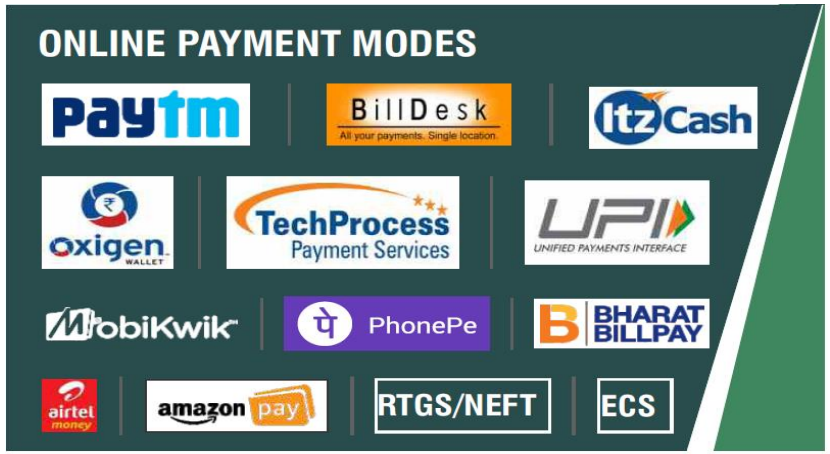
Virtual Customer Help Desk

AI Based Call Center

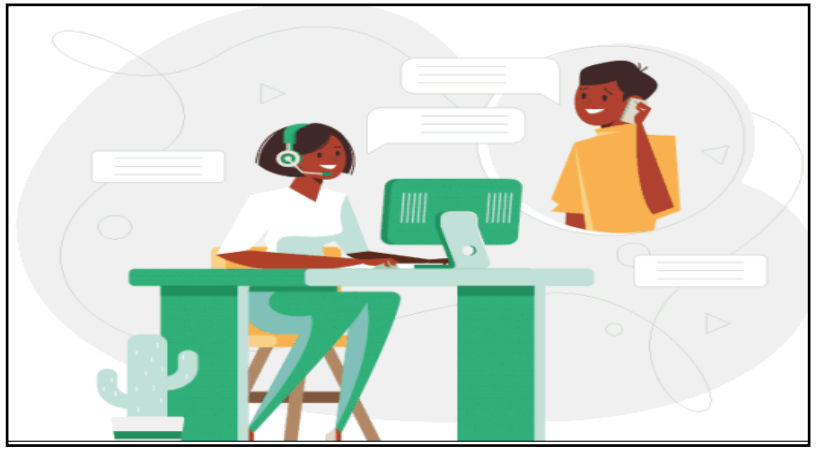
**Source: BSES Yamuna Power, Delhi, India*

Best Practiced for Consumer Engagement 3

Online Payment Modes

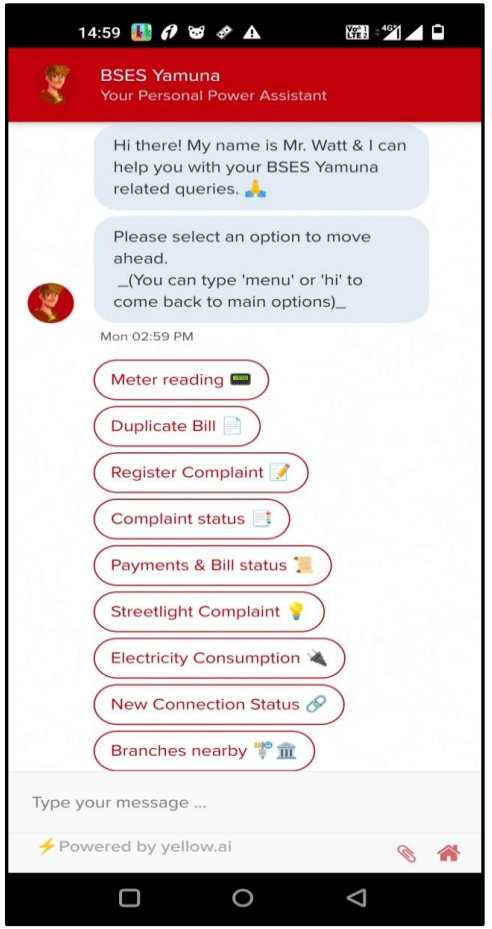


Call Back Services



BSES Mobile App

Chatbot



Source: BSES Yamuna Power, Delhi, India

International Case Studies Showcasing Successful Prosumer Enablement

Case Studies - International

Case Study 1: Denmark - "Energetic Communities”

Utility Name: RenewaPower Denmark

Overview: Denmark's energy landscape underwent a transformation with the establishment of community-based energetic initiatives. Local utility companies collaborated with residents to form energy cooperatives. Prosumers participated in joint investments for renewable energy projects, including wind farms and solar installations. The initiative created a sense of community ownership, and prosumers were actively involved in decision-making processes.

Key Outcomes:

1. **Community Empowerment: Prosumers actively participated in the planning and decision-making of energy projects, fostering a sense of ownership.**
2. **Renewable Energy Adoption:** Significant increases in renewable energy capacity, with communities achieving energy independence.
3. **Economic Benefits:** Prosumers experienced reduced energy costs and received dividends from successful cooperative projects.

Case Studies - International

Case Study 2: Singapore - "Smart Nation, Smart Grid”

Utility Name: SmartGrid Solutions Singapore

Overview: Singapore's utility company implemented a comprehensive smart grid initiative to engage prosumers and enhance energy efficiency. Prosumers were equipped with smart meters and integrated home energy management systems. The utility introduced dynamic pricing models, encouraging prosumers to shift their energy consumption to off-peak hours. Gamification elements were integrated into a mobile app to incentivize energy-saving behaviors.

Key Outcomes:

1. **Dynamic Energy Consumption:** Prosumers adapted their usage patterns based on dynamic pricing, leading to optimized energy consumption.
2. **Behavioral Changes: Gamification encouraged prosumers to compete for energy-saving achievements, fostering a culture of sustainability.**
3. **Grid Reliability:** The smart grid contributed to improved grid stability and reduced transmission losses.

Case Studies - International

Case Study 3: Australia - "Virtual Power Plants”

Utility Name: EcoPower Australia

Overview: In Australia, a utility company pioneered the concept of Virtual Power Plants (VPPs) to **engage prosumers in distributed energy generation**. Prosumers with solar panels and energy storage systems were interconnected in a virtual network. Through a centralized platform, the utility aggregated surplus energy during peak times and redistributed it to the grid or other prosumers in need. Participants received financial incentives for contributing to the VPP.

Key Outcomes:

1. **Grid Support:** The VPP provided additional grid support during peak demand, reducing the need for centralized power plants.
2. **Financial Incentives:** Prosumers received incentives for contributing excess energy, creating a revenue stream for their participation.
3. **Scalability:** The VPP model demonstrated scalability, encouraging other regions to adopt similar distributed energy systems.

Case Studies - International

Case Study 4: Japan - "Energy Sharing Neighborhoods”

Utility Name: J-Grid Collaborate Japan

Overview: Japanese utility companies focused on creating energy-sharing neighborhoods where prosumers actively participated in local energy markets. Using blockchain technology, the utility established a transparent and secure platform for peer-to-peer energy trading. Prosumers with solar panels or electric vehicles could sell excess energy or share charging services with their neighbors, fostering a collaborative energy ecosystem.

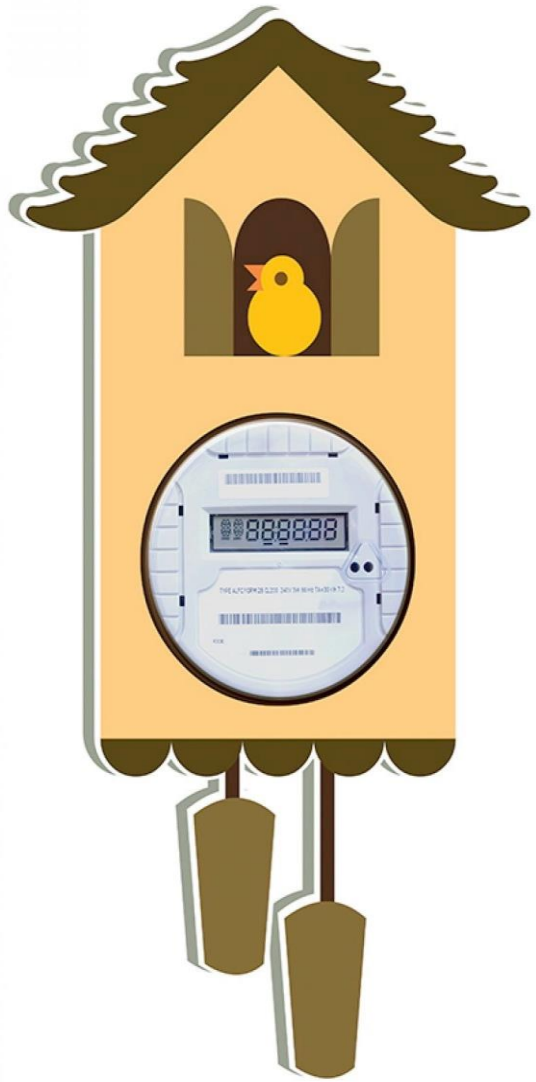
Key Outcomes:

1. **Localized Resilience:** Energy-sharing neighborhoods increased resilience by decentralizing energy production and consumption.
2. **Economic Collaboration:** Prosumers engaged in economic collaboration, leading to reduced energy costs for participants.
3. **Technological Innovation:** The blockchain-based platform showcased the potential for innovative technologies in enhancing energy distribution systems.

Real-time or Time of Use (ToU) Tariff Schemes and Demand Response

Benefits of Time of Use (ToU) Tariff

- Mitigation of peak demand
- Avoidance of usage of Diesel Generator (DG) Sets
- Avoidance of inverters/UPS with lead acid batteries at customer premises
- Inclusion of renewable energy (RE) as a base load
- Control electric vehicle (EV) charging pattern
- New market opportunities
- Cost savings to customers
- Reduction in power purchase cost for the Utility
- Deferral of transmission and distribution infrastructure upgrades



Case Study:
Time of Use (ToU) Tariff Design Using Regulatory Sandbox Approach for Utility-Led Demand Side Management in Uttar Pradesh, India

Project Overview

- Diverse group of **50** voluntary consumers enrolled
  - Commercial customers : 17
  - Residential customers: 30
  - Industrial customers: 3
- Cumulative load represented: 41MW
- Keen interest and willingness demonstrated by participants to engage in the initiative

Sl No		Sanctioned Load (kW)
Commercial Consumers		
1	Customer 1	1980
2	Customer 2	4279.5
3	Customer 3	1600
4	Customer 4	501
5	Customer 5	660
6	Customer 6	800
7	Customer 7	880
8	Customer 8	2200
9	Customer 9	830
10	Customer 10	350
11	Customer 11	1425
12	Customer 12	383
13	Customer 13	600
14	Customer 14	750
15	Customer 15	889.6
16	Customer 16	1332
17	Customer 17	440
Residential Consumers		
1	Customer 1	5
2	Customer 2	10
3	Customer 3	5
4	Customer 4	2
5	Customer 5	10
6	Customer 6	20
7	Customer 7	3
8	Customer 8	4
9	Customer 9	1
10	Customer 10	10
11	Customer 11	2
12	Customer 12	2
13	Customer 13	2
14	Customer 14	2
15	Customer 15	5
16	Customer 16	13
17	Customer 17	14
18	Customer 18	10
19	Customer 19	8
20	Customer 20	15
21	Customer 21	10
22	Customer 22	8
23	Customer 23	12.5
24	Customer 24	18
25	Customer 25	15
26	Customer 26	15
27	Customer 27	10.4
28	Customer 28	18
29	Customer 29	7.95
30	Customer 30	3
Industrial Consumers		
1	Customer 1	1917
2	Customer 2	144
3	Customer 3	2000

ToU Price Signals Design and Communication

- **Data Extraction:** Extracting pricing data from IEX at every night
- **ToU Price Calculation:** Calculating Time of Use prices based on the extracted data
- **Incentives and Surcharges:** Finding incentives and surcharges based on the pricing criteria
- **Pricing Signal Chart:** Preparing a pricing signal chart for 96 blocks
- **WhatsApp Group Communication:** Sending the price signals chart on the WhatsApp group at midnight every day
- **Adjustment Rate Calculation:** Calculating adjustment rates separately for commercial, industrial, and residential categories
- **Shadow Bill Preparation:** Prepare monthly shadow bills showing ToU tariff savings compared to the regular utility bills to all customers

Benefit to Electricity Distribution Utility

•Average Peak Load in 2023: 28,000 MW
•Target: Achieving a 5% reduction in peak load (1400 MW reduction)
• During peak hours, UPPCL procures electricity at higher prices

1. Savings to UPPCL from Reduced Peak Demand

- Demand Reduction during Peak Hours: 1400 MW
- Average Reduction in Power Purchase Cost: INR 4/kWh
- Savings per Hour during Peak Hours: INR 56,00,000

Cost of Incentives to be Paid to Customers for Load Shifting

- Load Shifted from Peak to Off-Peak Hours: 1400 MW
- Average Incentive Offered by UPPCL: INR 2/kWh
- Cost per Hour: INR 28,00,000
- Net Savings from 1400 MW shifting = 56,00,000 – 28,00,000= **28,00,000**

Considering 4 hours of Peak load shifted on 300 days in a year,
Total Savings to UPPCL in a Year = 4 * 300 * 28,00,000 = INR 336,00,00,000

2. Additional Revenue to UPPCL by imposing Surcharge during Peak Hours

- Average System load considered at 24,000 MW; and a minimum of 30% of this load may be moved to TOU Scheme (7200 MW)
- For the 50 customers who participated in the TOU Pilot Project has a total load of 24 MW; and the additional revenue to UPPCL through Surcharge During Peak Hours worked out to INR 98,36,537 (Details of the calculations in Annexure-C of the Report)
- **Additional Revenue to UPPCL from Peak Load Surcharge for 7200MW is estimated at INR 354, 11,53, 452**

Total Benefits to UPPCL estimated: INR 336 Crore (Peak Load Reduction) + INR 354 Crore (Additional Surcharge Revenue) = INR 690 Crore

Keys Outcomes (1/2)

Understanding Consumer Behavior

- Conducted a detailed load curve analysis to study electricity **consumption patterns** and usage behaviors of consumers.
- Obtained valuable insights into **peak demand periods**, off-peak hours, and overall load distribution.

Consumer Benefits

- Participants in the ToU tariff scheme experienced significant **financial savings**.
- Increased energy efficiency observed among consumers, contributing to **reduced energy consumption.**

Improved Load Management

- Implementation of the ToU pilot project led to **enhanced load management for Utility.**
- Optimized grid utilization and efficient allocation of resources resulted in improved operational efficiency.

Key Outcomes (2/2)

Revenue Generation Potential

- Utility witnessed potential revenue generation through the successful implementation of the ToU scheme.
- Effective load management practices enabled better utilization of existing infrastructure.

Sustainable Impact

- The ToU tariff scheme contributed to a reduction in carbon footprint through decreased usage of DG sets.
- Aligns with sustainability goals by promoting energy conservation and cleaner energy sources.

Future Implications

- The findings suggest the effectiveness of the ToU tariff scheme in load management and demand response.
- Provides a foundation for scaling up the scheme to a wider consumer base, promoting sustainable energy practices.

Thank You

Any questions?

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