BSES Smart Grid Road Map

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BSES Delhi Discoms – A Synopsis

Reliance Infrastructure Ltd. acquired 51% stake in July 2002 in two Discoms

<table>
<thead>
<tr>
<th>SI No</th>
<th>Particulars</th>
<th>Unit</th>
<th>BRPL</th>
<th>BYPL</th>
<th>BSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Area</td>
<td>sq. km</td>
<td>750</td>
<td>200</td>
<td>950</td>
</tr>
<tr>
<td>2</td>
<td>Total Registered Customer</td>
<td>Million</td>
<td>2.2</td>
<td>1.6</td>
<td>3.8</td>
</tr>
<tr>
<td>3</td>
<td>Peak Demand **</td>
<td>MW</td>
<td>2,650</td>
<td>1,636</td>
<td>4,286</td>
</tr>
<tr>
<td>4</td>
<td>Consumption per Year</td>
<td>BU</td>
<td>12.3</td>
<td>7.10</td>
<td>19.40</td>
</tr>
<tr>
<td>5</td>
<td>Employees</td>
<td>Nos</td>
<td>10,398</td>
<td>6,907</td>
<td>17,305</td>
</tr>
<tr>
<td>6</td>
<td>Customer Density</td>
<td>Nos / Km</td>
<td>2,933</td>
<td>8,285</td>
<td>4,060</td>
</tr>
</tbody>
</table>

** summer 16
Understanding Distribution Business

To meet “Demand Curve” with Efficiency and Reliability

Efficiency Means: Low power cost, low loss, low operational cost, best customer services.

Reliability Means: Power quality and Availability

Regarding supply reliability:
- To match variable demand with unpredictable renewable generation and constant thermal source
- Manage peak demand
- Manage area demand with constraints (space)
Smart Grid - Data flow

USA Vision for Smart Grid
- Self-healing from power disturbance events
- Demand response – enabling active participation by consumers
- Operating resilience against physical and cyber attacks
- Providing power quality for 21st century needs
- Accommodating all generation and storage options
- Enabling new products, services and markets
- Optimizing assets and operating efficiency

Smart Grid – A definition
SmartGrid = Technical Grid + Smart ICT Control Services

ICT = Information Communication & Technology

Key is what bring smartness in Distribution ??

Data flow:
- Data generation
  - Smart Meter
- Data collection
  - Communication network
- Data processing
  - Server
- Data analytics
  - Vendor???
  - User???
- Decision & action
  - Management Interface device
Energy Meter has multiple Roles and Affects All Stakeholders

- Tariff compliance
- SLA compliance
- Information to customer
- Supply quality
- Billing dispute
- Street lights

- Network health
- Network Planning
- Outage management
- Fault prediction
- Supply quality
- Field team efficiency

- Cash box
- Theft control
- Prepayment system
- Non payment – disconnect
- Revenue cycle

- Service level norms
- Renewable integration
- Electric vehicles
- Load growth forecasting
- DSM & EE
Objectives of Meter Data Analytics

- Grid supply quality
- To detect theft
- Network Health & installation quality
- Consumer & Network meter Parameters
- Meter health and installation quality
- For network planning and peak management using DSM
- Consumer load – Characteristics

BSES is downloading data since 2007 and has developed analytics software for various application including theft detection and to predict power outages. Analytics data also used to manage summer afternoon and night demands using Solar and LED. Theft (commercial loss)~ 45% to 4%.
Present Status - Data flow

- APFC
  - Grid Feeders Meters
  - SCADA instruments
  - DT meters
  - Various sensor (trial)
- High end consumers meters
- Consumer meters
  - Prepaid meter –
  - Street light meter cum controllers

OFC/ VSAT

SCADA

EA Module

Oracle Base Data Base

CMRI

FRTU

MODEM

For action and operation decision

Power Purchase

Call Center

Health report Audit Report

Data Analytics

SAP Billing

Meter Data are collected electronically – since 2007
BSES Experience with Online data

SCADA - 130 grids, real time data, remote control, power scheduling

Grid Energy Management System - 130 grids, 15 minute data from meters, energy audit, health parameters

Smart Prepaid & group metering - token less meters, smartness on server

Sub station Automation System - FRTU

Innovation - E Rickshaw metering & online monitoring - capture theft through e rickshaw charging
BSES Smart Grid Road Map

- Grid Feeders
- SCADA instruments
- DT meters
- Various sensors (trial)
- High end consumers
- Few consumer-smart meter
- Prepaid meter
- Street light meter cum controllers
- Smart Meter
- APFC
- MDAS
- Power Purchase
- OMS
- GIS
- Fault
- SCADA
- OFC/VSAT
- Call Center
- Health report
- Audit Report
- Data Analytics
- SAP Billing
- Maximum utilization of existing resources
Government & Regulatory Push For Smart Grid

- **Tariff Policy 2016**
  - Tariff policy 2016 recommends deploying smart meters for consumer having consumption more than 500 Units/month by Dec 2017.
  - Tariff policy also recommends implementation of distribution SCADA and DMS within two years.

- **DERC**
  - DERC instructed all Discoms to submit DPR for compliance with tariff policy guidelines.
  - DERC has approved Smart grid Phase-1 DPR for all Discoms on 29.06.2016. Approved cost is as follows.

<table>
<thead>
<tr>
<th>Discom</th>
<th>Approved Cost (Crores)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BYPL</td>
<td>191</td>
</tr>
<tr>
<td>BRPL</td>
<td>262</td>
</tr>
<tr>
<td>Total</td>
<td>453 (65.7 M USD)</td>
</tr>
</tbody>
</table>
## Smart Grid Implementation Plan - Approach

<table>
<thead>
<tr>
<th>Phase</th>
<th>Year</th>
<th>BRPL (node points)</th>
<th>BYPL (node points)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase -1</td>
<td>March’ 18</td>
<td>20,000</td>
<td>10,000</td>
<td>• 5% estimated as DA points</td>
</tr>
<tr>
<td>Phase -2</td>
<td>2020-21</td>
<td>3,00,000</td>
<td>2,00,000</td>
<td></td>
</tr>
<tr>
<td>Phase -3</td>
<td>2022 onward</td>
<td>350,000 Every year</td>
<td></td>
<td>• Phase 2 would cover the DERC mandate</td>
</tr>
<tr>
<td>Phase -4</td>
<td>2026 onwards</td>
<td>450,000 Every year</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Phase 1 Implementation**:
  - Small size project implementation and technology performance evaluation
  - Ascertaining the vendor capabilities
  - Realization of benefits derived across domains
Smart Grid Architecture

Integration points
- Consumer meters
- Network meters like DT meters, streetlight meters, interface meters etc.
- Net meter + solar generation
- Substation / FSS automation
- DA devices like Switchgears, FPI etc.
- APFC, switching capacitors
- Sensors with FRTU, air quality, Tempr sensors etc.
- Electric vehicle
- Distributed generation
- Storage devices/ Batteries

Planning and implementation in stages

5% to 8% on dual technology
Few Salient features of Smart Grid RFP

- **Communication Canopy**
  - Communication Canopy on a single technology, while other communication channels like GPRS will also exist
  - Data flow to HES via hybrid communication channels

- **Smart Meter**
  - Explore NIC both Built-In or Plug-In type
  - Bids for Smart meters with and without connect-disconnect relay

- **Data source – not only meter but multiple source and data formats**

- **Meter Data Management**
  - MDM is to be from specialized vendor
  - MDM vendor should be responsible for integration with BSES systems
Thank You

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