State and Utility Perspective of Smart Grid

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Smart Grid Vision for India’s Power Sector
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BESCOM covers an area of 41,092 Sq. Kms. with a population of over 168 lakhs. The company has three operating zones - Bangalore Metropolitan Area Zone, Bangalore Rural Area Zone and Chitradurga Zone.

Bangalore Electricity Supply Company Limited (BESCOM) has taken over the responsibility from KPTCL for the distribution of electricity in 8 districts and commenced its operations from 1st June 2002.

**Districts, which are serviced by BESCOM:**

- Bangalore Urban
- Bangalore Rural
- Kolar
- Tumkur
- Chitradurga
- Davangere
- Ramnagaram
- Chikballapura
### BESCOM’s Annual Revenue Requirement (ARR)

<table>
<thead>
<tr>
<th>Particulars</th>
<th>FY08</th>
<th>FY09</th>
<th>FY10 (Provisional)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue</td>
<td>5916.48</td>
<td>6336.72</td>
<td>6871.44</td>
</tr>
<tr>
<td>Expenditure</td>
<td>5903.91</td>
<td>7748.96</td>
<td>6811.22</td>
</tr>
<tr>
<td>Gap</td>
<td>(+)12.57</td>
<td>(-)588.24</td>
<td>(+)60.22</td>
</tr>
</tbody>
</table>

### Peak Base Demand Variation (BESCOM)

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Demand (in MWs)</td>
<td>3300</td>
</tr>
<tr>
<td>Base Demand (in MWs)</td>
<td>2900</td>
</tr>
</tbody>
</table>

* Restricted
BESCOM aims to be the best electricity distribution company in India through a strategy which focuses on Customer Satisfaction, Regulatory Compliance, Meeting Stakeholder’s Expectations through an internal reporting, monitoring and control system.

"Smart Grids is a mean to fulfill BESCOM’s mission and realize its vision....."
Utility Perspective on Smart Grids

- Benefits of Smart Grids
- Business Model
- Finance
- Regulatory Approvals
- Technology
- Consumer Benefits and Acceptance
- Capacity Building of Employees
<table>
<thead>
<tr>
<th>Traits</th>
<th>Traditional Grid</th>
<th>Smart Grid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loss Reduction</td>
<td>Inability to address the problem of very high AT&amp;C losses in India plaguing the discoms</td>
<td>Prevents disruptions, minimizes impact, more of consumer participation thus having a proactive approach for better energy management and energy accounting. Being Smart, leakage can be detected quickly and prevented.</td>
</tr>
<tr>
<td>Peak Reduction</td>
<td>Reactive approach. Utilities tend to purchase high cost power during peak hours and pay UI charges as well.</td>
<td>Smart Grid technology enable utilities to reduce purchase of costly power, avoid paying UI charge and maintain grid discipline</td>
</tr>
<tr>
<td>Integration of Distributed Generation with system</td>
<td>Classic grids were designed for one-way flow of electricity</td>
<td>Allows individual consumers to generate power onsite and feed into the grid without raising reverse flow reliability and safety issues Capacity to integrate electricity generated through solar wind and motor vehicles.</td>
</tr>
<tr>
<td>Reliability of Supply</td>
<td>Post breakdown repair</td>
<td>Self Healing. Power quality a priority with a variety of quality/price options according to needs</td>
</tr>
<tr>
<td>Consumer benefits</td>
<td>Less consumer participation due to non-price visibility, rare time-of-day pricing rare, few choices. Consumer is user.</td>
<td>Consumer can optimize his monthly bill.</td>
</tr>
<tr>
<td>Rural Outreach</td>
<td>Provision of Electricity in rural areas is still an issue.</td>
<td>Micro Grids and efficient use of available supply will pave the way for increasing the outreach of electricity.</td>
</tr>
<tr>
<td>Quality of Supply</td>
<td>Limited efforts for quality of supply</td>
<td>Quality parameters can be monitored and controlled at each node point</td>
</tr>
</tbody>
</table>
## Possible Business Model for State Utilities

<table>
<thead>
<tr>
<th>S No</th>
<th>Business Models</th>
<th>Role of stakeholders</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Public Private Partnership (PPP)</td>
<td>a) Technology providers will share technology and processes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b) Utility will implement the project.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c) Utility will get benefit and technology providers will get benefits of proof of concepts of technology.</td>
</tr>
<tr>
<td>2</td>
<td>Ministry of Power Financing – x %</td>
<td>a) Provide Policy, Programmatic Leadership and capacity building</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b) Technical Support will be funded by MOP</td>
</tr>
<tr>
<td>3</td>
<td>Utility Financing – x%</td>
<td>a) Manage the Process, technology and implement the project</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b) Benefits with utility</td>
</tr>
<tr>
<td>4</td>
<td>Multilateral/Bi-Lateral Financing And donor agencies</td>
<td>a) Donor agencies and other societal beneficiaries partial fund the activities.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b) International Best Practices and Capacity Development</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c) Utility gets the benefit</td>
</tr>
</tbody>
</table>
### BESCOM Business Model

<table>
<thead>
<tr>
<th>S No</th>
<th>Stakeholders</th>
<th>Role and benefits</th>
</tr>
</thead>
</table>
| 1    | BESCOM                             | a) Manage the Process  
b) Establish Technical Group  
c) Implement the Project           |
| 2    | Ministry of Power                  | a) Provide Policy, programmatic Leadership and capacity building  
b) Will help MOP for larger roll out |
| 3    | Private Sector                     | a) Technology providers will share technology and processes  
b) Technology providers will get benefits of proofs of concepts of technology |
| 4    | Multilateral/Bi-Lateral Financing And donor agencies | a) International Best Practices and Capacity Development  
b) Partnership with International Distribution Companies  
c) Other societal beneficiaries contribution |
Financial Perspective

- Huge Investments Huge Benefits
- Technology Risks
- Technology has a low life span
- Utility does not have money!!
- Financial Institutions are hesitant to lend money to utilities
- Stakeholders are eager to participate in Smart Grid Program but ambivalent to move with State owned Utilities
- Participation of societal stakeholders in investment is a challenge
1. Shift from traditional investment approval procedure
2. Provide flexibility to utility for offering to consumer different options of retail tariff.
3. Innovative tariff design to flatten the load curve
5. Involve societal stakeholders such as environment, health conscious to bear the partial cost for the smart grids
6. Involve communication authorities for creating infrastructure to meet the communication needs of power sector
Technology Perspective

- Identification of right technology
- Limited availability of proven technology for Indian Environment
- Smart Grid Technology has a low life span compared to traditional ones
- Capacity building of consumer to adopt to smart grid technology,
- Increased interaction of utility beyond meter - Home area Network
- Safety and privacy of consumer and data

Utilities need to thing about future….. They need Smart Grids…

because Business As Usual (BAU) will not be sustainable
BESCOM : Agent of Change

Smart Grid Pilot Implementation
Existence of Basic Framework in BESCOM for a Smart Grid Pilot

- **Logistics and Procedural**
  - Utility Leadership
  - State Government support for a pilot
  - Presence of local IT and professional skills

- **Technological and Design**
  - High Loads imply high scope of control and measurability
  - Limited size and length of feeders
  - Ring Main Units for supply of robustness above the distribution network
  - Availability of full SCADA system at a feeder level
    - Unique at a state level in Karnataka
  - Limited agricultural loads here (which have their own technology and policy implications)

- **Synergy with our ongoing activities**
  - R-APDRP (Will provide baseline data, Consumer and asset codification, GIS, Billing etc)
  - SCADA (All feeders are monitored in real time across Karnataka)
  - Distribution Automation System (DAS) (Upgrading of Ring Main Units to provide robustness of supply)
BESCOM Plan for Smart Grid

- Stakeholder Consultation (Completed – 5 Jan 2010)
- Sensitization of Key Stakeholders (Completed)
- Ministry of Power has already been approached for funding the activity
- Smart Grid Pilot Design (The selection of National and International Consultants is under way)
- Release of RFP for selection of technology providers (Jan 2011)
- Selection of Technology Partners (March 2011)
- Start of Smart Grid Implementation (1 April 2011)
After Thoughts!!

- We tend to overestimate the effect of technology in the short run and underestimate the effect in the long run – Roy Amara