Electricity Pricing and Charging Strategy for Electric Vehicles in India

February 24, 2020
3:00 PM - 4:00 PM (IST)
WRI India Delhi

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AVP & Head – Renewable and DSM Initiatives, BSES Rajdhani Power Ltd

Moderator:
Shravani Sharma
WRI India
## BSES Rajdhani Power Ltd. – A Profile

<table>
<thead>
<tr>
<th>Distribution Area</th>
<th>750 sq. Km</th>
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</thead>
<tbody>
<tr>
<td>No. of customers</td>
<td>2.55 Mln.</td>
</tr>
<tr>
<td>Customer Density</td>
<td>3400 /sq Km</td>
</tr>
<tr>
<td>Max Demand met (Till Date)</td>
<td>3211 MW</td>
</tr>
<tr>
<td>Annual Billed energy FY19</td>
<td>12,194 MU</td>
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<tr>
<td>AT&amp;C Loss FY19</td>
<td>8.06 %</td>
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</tbody>
</table>

### Consumer Mix

- **About 86% residential contributing to ~70% consumption**
- **RE ~ 29% of portfolio (1300MW+) by ’21-22**

### Peak Demand Met

- **BRPL Peak demand growth ~ 6% CAGR; BRPL’s share is ~43% in energy terms**
- **> 43% reduction since Year ‘02**

### RE Portfolio

- **RE ~ 29% of portfolio (1300MW+) by ’21-22**
Role of Utility

- Provide EV education and awareness to their consumers
- Participate in the managed charging communication standards development process
- Engage vendors to share utility needs and learning from other comparable DER efforts
- Provide a test bed or pilot effort for new solutions
- Develop solutions to integrate EV charging into demand response systems
- Continue to evolve rate structures matched with active load management strategies
- Encourage greater deployment of managed charging-capable infrastructure among customers

Source: Smart Electric Power Alliance, 2019
Managed Charging by Utility
Managed Charging by Utility

- Centralised load management
- Local load management to support optimized utilization
- Dynamic re-routing based on
  - Electricity load
  - Reserved slots
  - ToD pricing

Our Partner Techperspect – Electreefi App
### Proposed EV TOD tariff - Delhi

<table>
<thead>
<tr>
<th>S.No</th>
<th>Period</th>
<th>Applicable Off Peak Rebate during identified off peak time slots</th>
<th>Applicable Peak Surcharge during identified peak time slots</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>May – September (Other categories of consumers)</td>
<td>05:00 – 09:00 (30%)</td>
<td>00:00 – 02:00 (40%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>14:00 – 18:00</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>18:00 – 24:00</td>
</tr>
<tr>
<td>2</td>
<td>April – November &amp; February - March (For EV charging)</td>
<td>02:00 – 10:00 (45%)</td>
<td>22:00 – 24:00 (46%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>18:00 – 22:00</td>
</tr>
<tr>
<td>3</td>
<td>December – January (EV Charging)</td>
<td>00:00 – 05:00 (32%)</td>
<td>05:00 – 10:00 (44%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>18:00 – 24:00</td>
</tr>
</tbody>
</table>

TOD Tariff & no Demand Charge for EVs along with Active Managed Charging expected to promote stable distribution, RE integration and cost economics for EVs.
Solar Generation and Demand Curve

50% of solar generation off-sets Normal Hours and 50% off-sets peak hour load for TOD customers.
• Large seasonal and diurnal variation in demand and hence loading of assets
• High RE share including robust growth in Roof Top Solar

> 60 MWp RTPV & counting

Daily variation in load

<table>
<thead>
<tr>
<th>Season</th>
<th>Capacity (MW)</th>
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<tbody>
<tr>
<td>Summer (Jul)</td>
<td>~1160 MW</td>
</tr>
<tr>
<td>Winter (Jan)</td>
<td>~1200 MW</td>
</tr>
<tr>
<td>Fall/Spring (Oct/ Apr)</td>
<td>~600 MW</td>
</tr>
</tbody>
</table>
Space constraints for network upgradation

- Overall lower utilization of assets
- Rooftop Solar can help reduce day peak loading of assets
Daily Load Curve – Peak Summer Day

Representative Daily Load Curve of DT (Rated Capacity - 1000 KVA)

Valley Filling opportunities and avoidance of peak timing for EV charging
Ramp rate of > 300 MW per Hour needed – Impact on DT loading and Conventional sources

Unchecked EV charging may aggravate ramp requirement
Let’s revisit challenges

- Increasing demand and energy needs, restricted to few time blocks a year (Weather impact) – Uneven loading of assets
- High Diurnal and seasonal load variation – Both at System level and Distribution Transformer level
- Underutilized assets – Optimal utilization of capital?
- Space constraints – Where to put up enhanced infra?
- Unchecked EV Charging may aggravate evening ramping requirements – pressure on Distribution assets as well as Power Purchase Cost

Summer

Winter

Smoother demand with BESS and DR; Maximize utilization of RE
Transition to ZEV Fleet at BRPL

- Fleet of over 200 vehicles
- Currently 11 vehicles replaced
- Plan to replace entire fleet with EV in Phases
- EVSE in place at Corporate office
- AC slow charging at other offices

- Managed Charging Network
- Tie up with Charging Network operator
- Set up Public EVSE as per Fleet requirement
- Cost of Public EVSE (Capex + Opex) to be recovered from EV user. Cost of Network strengthening to be socialized

Pilot for managed charging platform under Utility control
E-MOBILITY

BSES Rajdhani Power Ltd. (BRPL) as a responsible and environment conscious & regulated power distribution licensee is actively performing the following key roles:

a) Reduce carbon footprint through clean mobility as well as higher share of RE power in portfolio
b) Play a lead role and set examples as a responsible, corporate player for faster adoption of electric mobility
c) Demonstrate the adequacy & feasibility of the present EV technology & EV charging infra so as to alleviate possible consumer issues including range anxiety

BRPL is also a member of EV100 club and committed to electric its fleet in a phased manner.

BRPL being a regulated distribution licensee under Electricity Act 2003 is committed towards providing services and strengthening the distribution infrastructure in an optimal manner to promote electric mobility without impacting the service level of existing consumers. The majority of EV charging (2.3 & 4.4 wheelers) are expected to be on LT network which is going to be interspersed with existing consumer.

BRPL EV Fleet
We are actively engaging with key stakeholders for creation of an ecosystem for the promotion of E-mobility. In case you wish to setup a charging infra in BSES Rajdhani Power Limited (BRPL) Licensee area (South & West Delhi), please provide the information in the Interest form provided in the link below and email us at brpl.evinfra@relianceada.com

Click Here for EV Interest Form

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Form</th>
<th>Download</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>EV Connection form</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Technical Evaluation Report for EV Charging station</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Checklist of activities to be performed by Charging station owner / operator</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Indemnity Bond</td>
<td></td>
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<tr>
<td>5</td>
<td>Metering Panel arrangement for Roadside EV charging units</td>
<td></td>
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Summary

• Corporate transition to EV Fleet – Role model for early EV adoption
  – Corporate vehicles (2W/3W/4W); Employees’ vehicles (2W/4W); Vendors’

• Promote distributed EV charging infrastructure
  – Lesser network upgrades and hence lesser tariff burden

• Home charging – A dominant and preferred way
  – Key enablers include TOD / TOU rates, Simple programmable low cost EV charger, Linked with Discom’s ADR/BDR programs

• TOD / TOU rates for EVs
  – Valley Filling for optimal grid utilization and RE integration leading to green mobility; No Demand Charge should be levied initially.

• Active Managed Charging
  – ADR for public chargers based on state of grid loading

• V2G (Future)
  – Ancillary services
Thank You