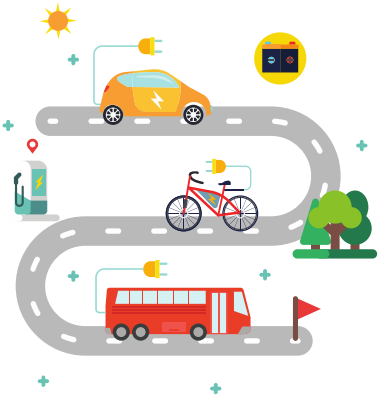

ELECTRIC MOBILITY FORUM

ENGAGE
Connecting Big Ideas To Action

Electricity Pricing and Charging Strategy for Electric Vehicles in India

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

Speaker:
Abhishek Ranjan
AVP & Head – Renewable and DSM Initiatives, BSES Rajdhani Power Ltd

Moderator:
Shravani Sharma
WRI India

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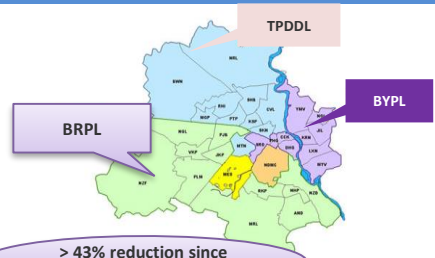
BSES Rajdhani Power Ltd. – A Profile

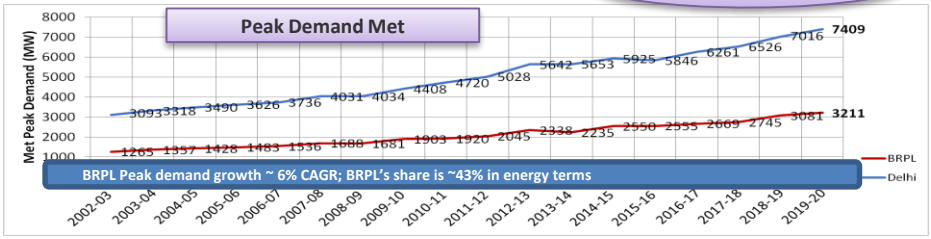
Distribution Area	750 sq. Km
No. of customers	2.55 Mln.
Customer Density	3400 /sq Km
Max Demand met (Till Date)	3211 MW
Annual Billed energy FY19	12,194 MU
AT&C Loss FY19	8.06 %

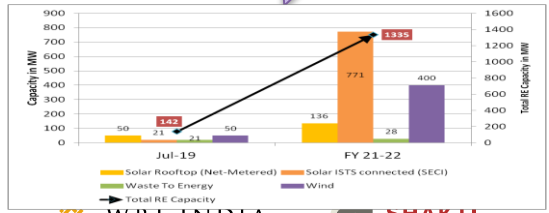


Consumer Mix

About 86% residential contributing to ~70% consumption

RE ~ 29% of portfolio (1300MW+) by '21-22





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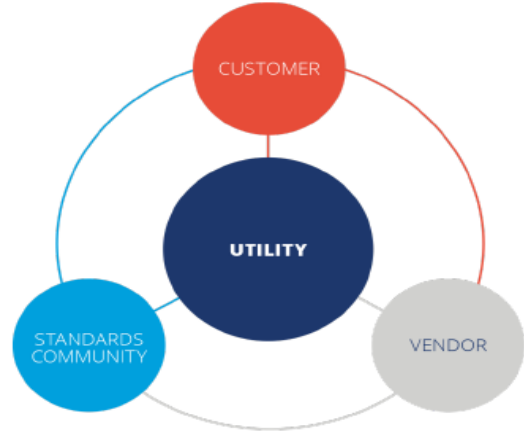
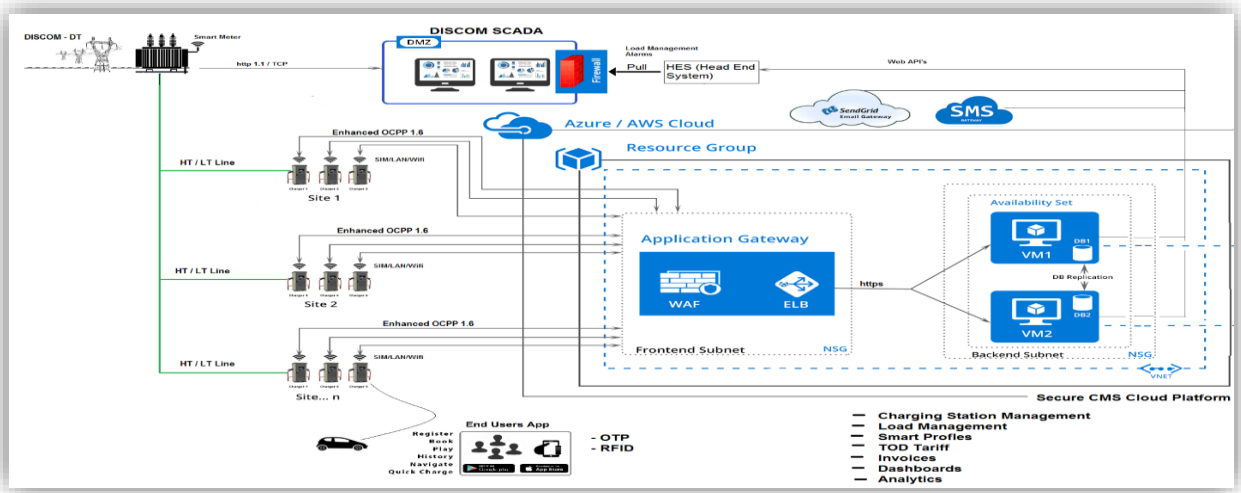
Role of Utility

- 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



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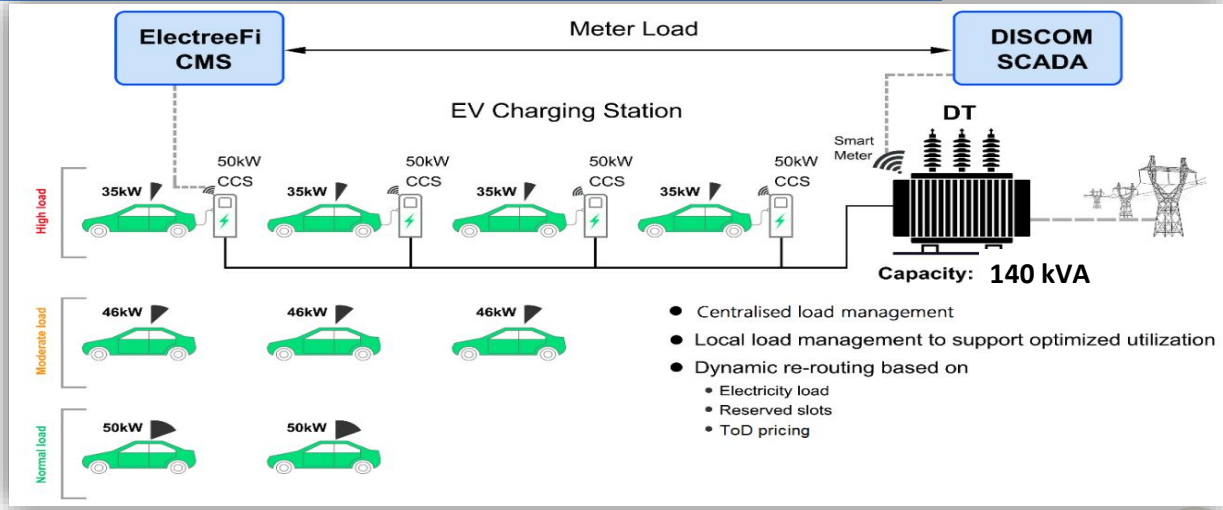
Managed Charging by Utility



Our Partner Techperspect – Electreefi App

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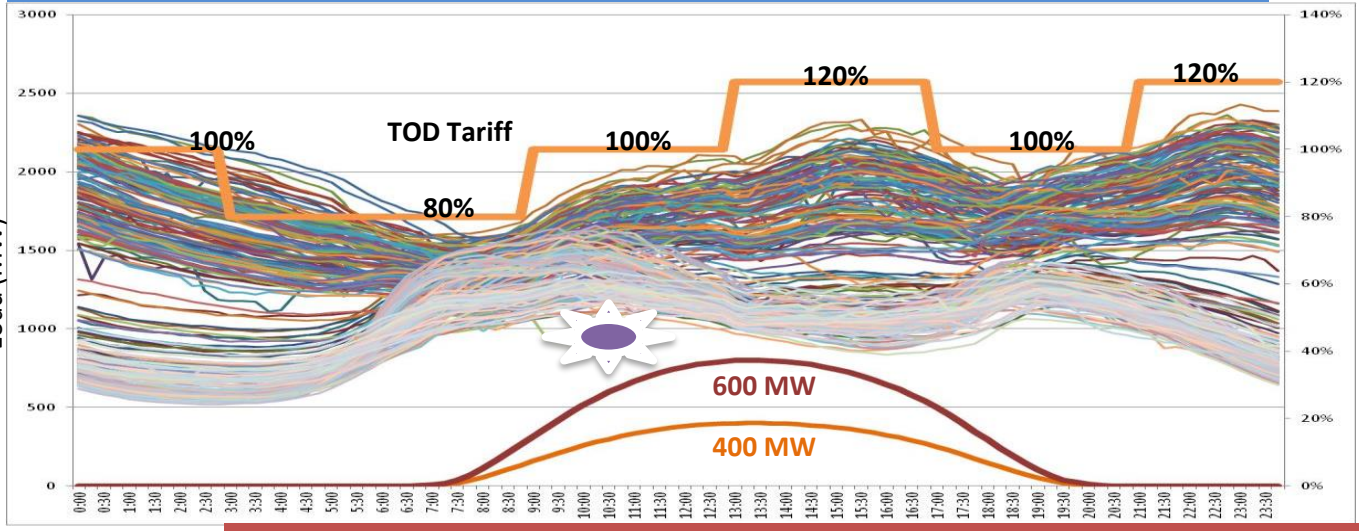
Proposed EV TOD tariff - Delhi

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

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

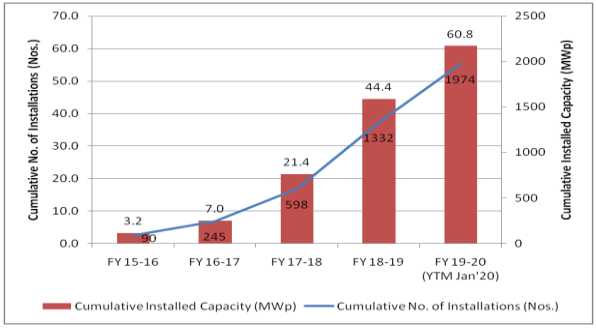


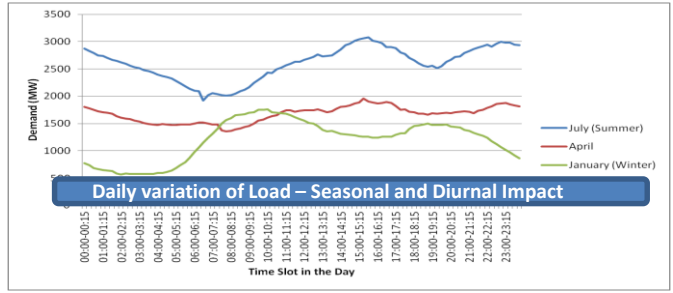
50% of solar generation off-sets Normal Hours and 50% off-sets peak hour load for TOD customers

Power Portfolio & Network Landscape (1/2)

- 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 of Load – Seasonal and Diurnal Impact

Daily variation in load	
Summer (Jul)	~1160 MW
Winter (Jan)	~1200 MW
Fall/Spring (Oct/ Apr)	~600 MW

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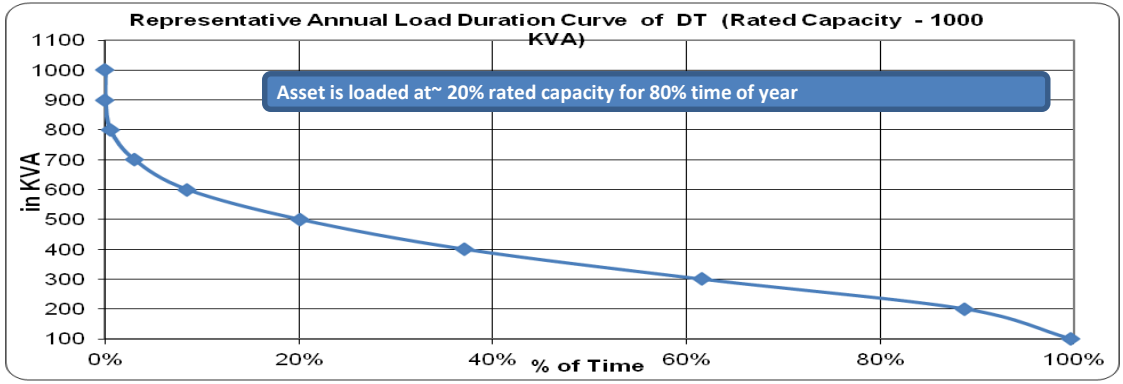
Power Portfolio & Network Landscape (2/2)



- Space constraints for network upgradation
- Overall lower utilization of assets
- Rooftop Solar can help reduce day peak loading of assets

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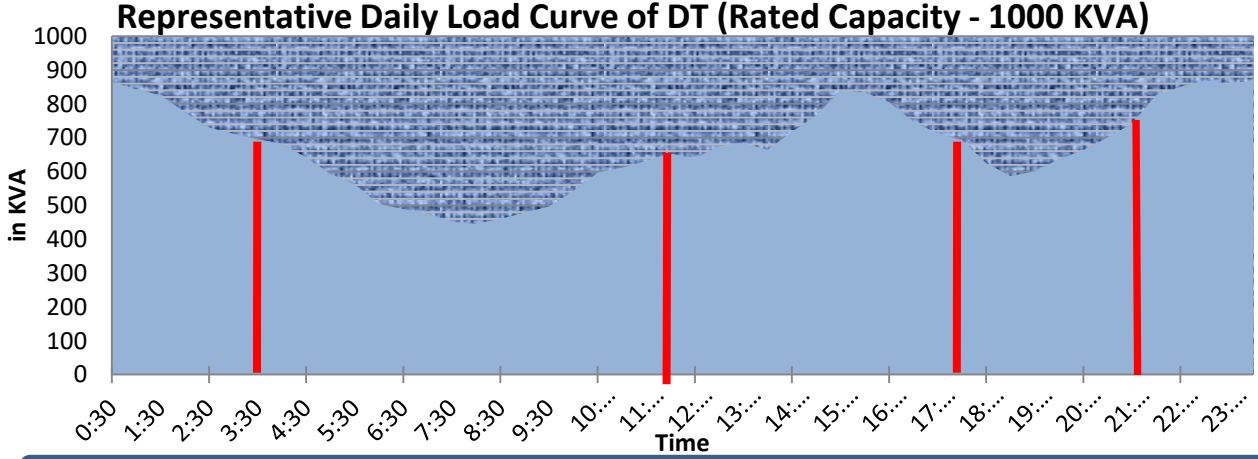
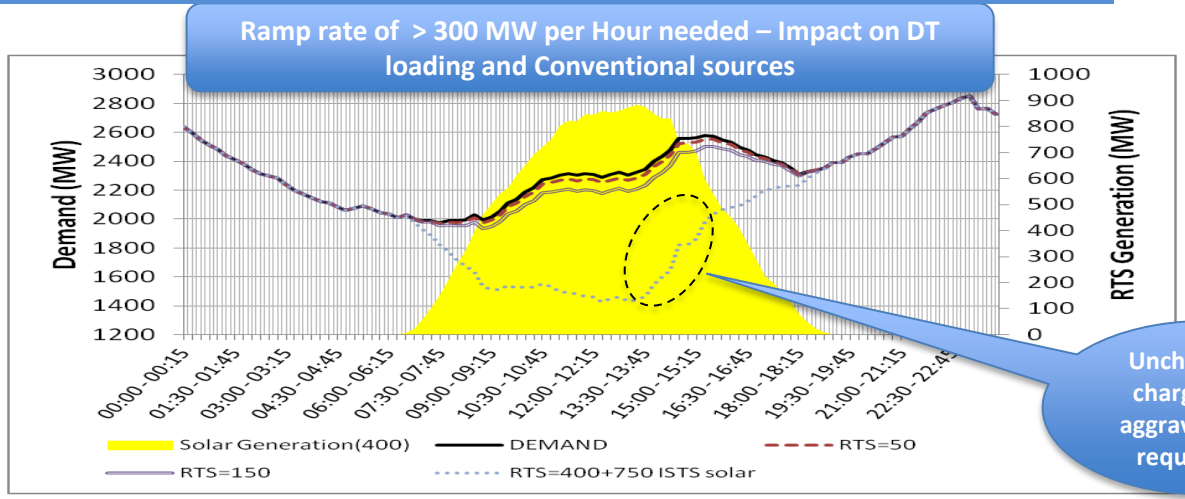
Daily Load Curve – Peak Summer Day



Valley Filling opportunities and avoidance of peak timing for EV charging

Impact of RTPV and Solar farms (outside Delhi) on Demand

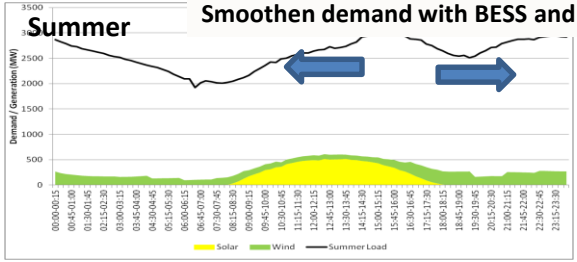


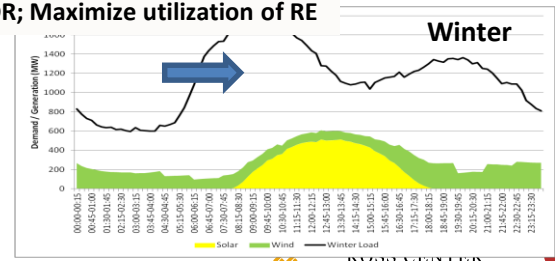
ISTS Solar – Solar Farms outside Delhi DT – Distribution Transformer RTS – Rooftop Solar PV

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

Smoothen demand with BESS and DR; Maximize utilization of RE





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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

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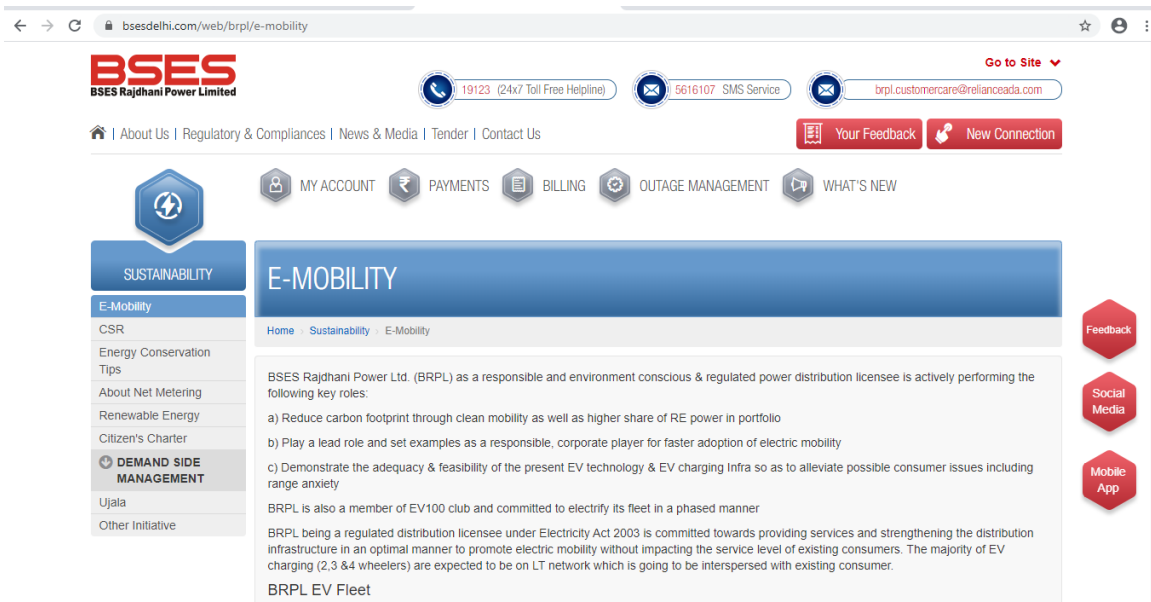

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We are actively engaging with key stakeholders for creation of an ecosystem for the promotion of E-mobility. In case you wish to setup a charging infra in BSES Rajdhani Power Limited (BRPL) Licensee area (South & West Delhi), please provide the information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

Click Here for EV Interest Form

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

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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

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Thank You

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