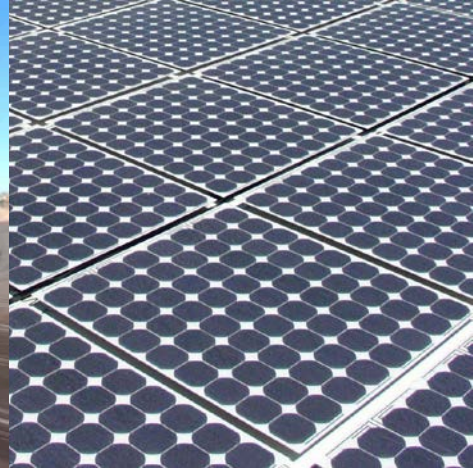
Los Angeles Department of Water & Power



EV Bus Charging Utility Opportunities

Advance Clean Transit Symposium

CA Air Resources Board , February 8, 2016

Discussion Today

Discussion today centers on:

- Utility Perspective for EV Charging.
- How EV Bus Charging Solves Problems and Saves Money.
- What is the story on rates? (TOU, Demand, etc.)
- Opportunities for Collaboration.

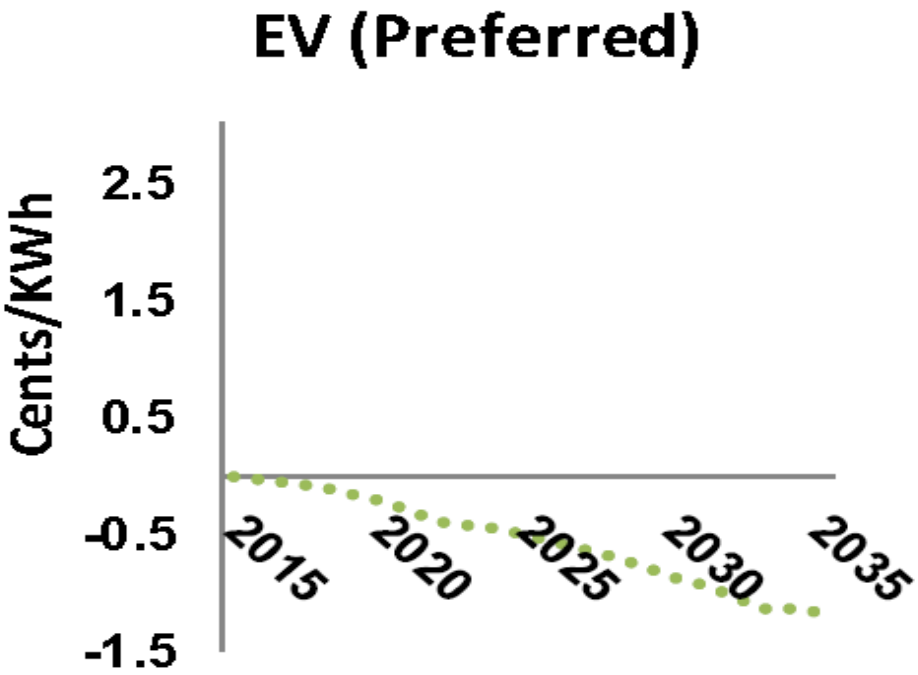
DWP's EV Charger Program

Why We Encourage Electric Vehicles (EVs)…

- Promote a green environment. (75% less GHG than gas).
- Promote customer efficiency
  (less than $1 per gallon of gas)
- Build a new industry for jobs.
- Integration of renewable.
- Local green energy
- Better use of utility assets.
- Every BEV = ½ a house night load.

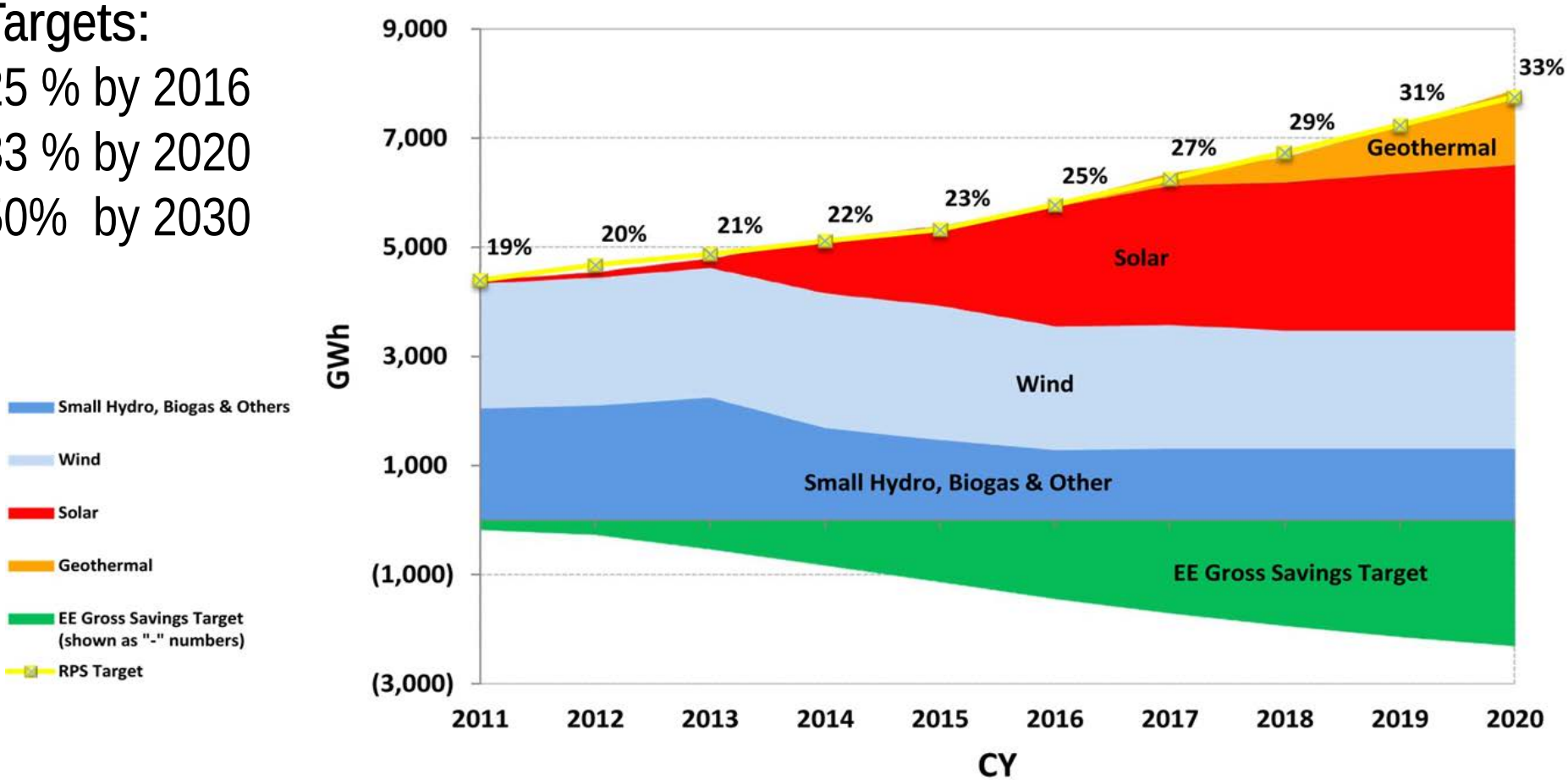
Benefits to Customers

- Energy sales off peak saves everybody money. (Cents/kWh)
- Transportation Electrification is the only program to lower the cost of electricity for all customers:
  - Energy Efficiency
  - Local Solar
  - Fuel Increases
  - 50% Renewable
  - Coal Replacement
  - Once Thru Cooling
  - Reliability Program



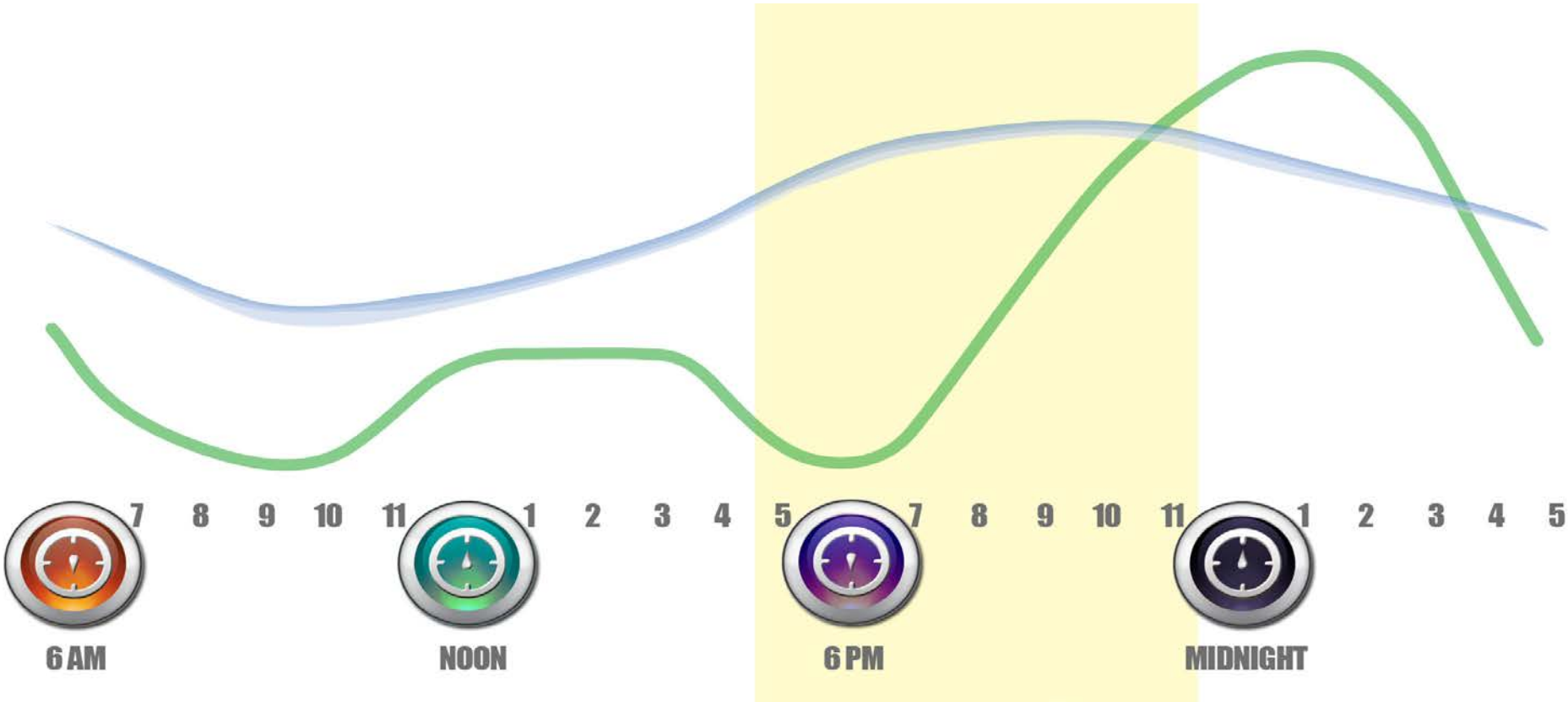
Integration of Renewable Power

RPS (SB2 1X & SB 350)
Targets:
25 % by 2016
33 % by 2020
50% by 2030



As the Electric Grid gets cleaner, so does Electric Transportation.

EV Night Time Charging Matches Peak Wind Production



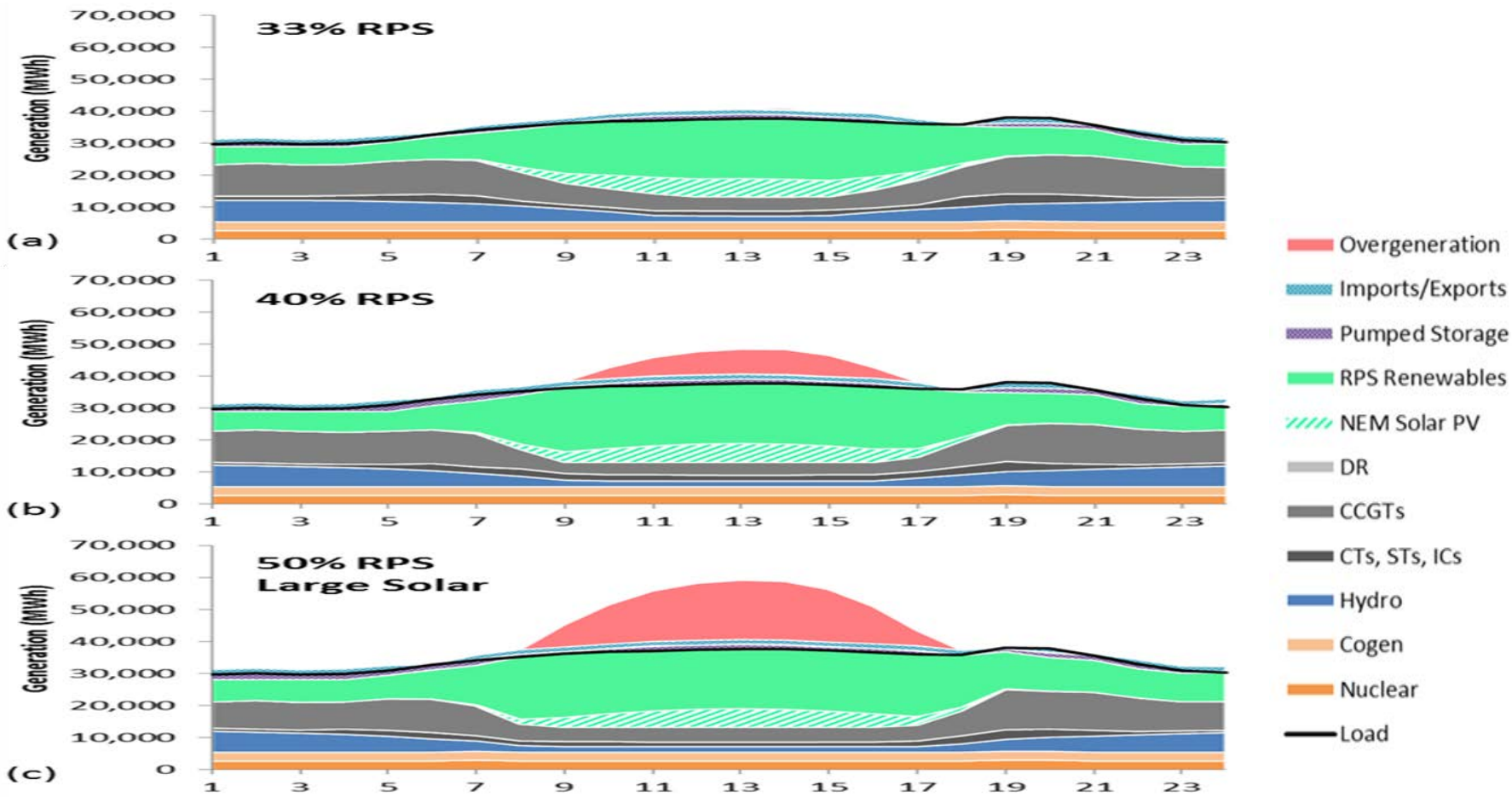
Los Angeles Department of Water & Power

The Future Solar Bubble

Overgeneration Statistics	33% RPS	40% RPS	50% RPS Large Solar
Total Overgeneration			
GWh/yr.	190	2,000	12,000
Percent of RPS energy	0.2%	1.8%	8.9%
Overgeneration frequency			
Hours/yr.	140	750	2,000
Percent of hours	1.6%	8.6%	23%
Extreme Overgeneration Events			
99th Percentile (MW)	610	5,600	15,000
Maximum Observed (MW)	6,300	14,000	25,000

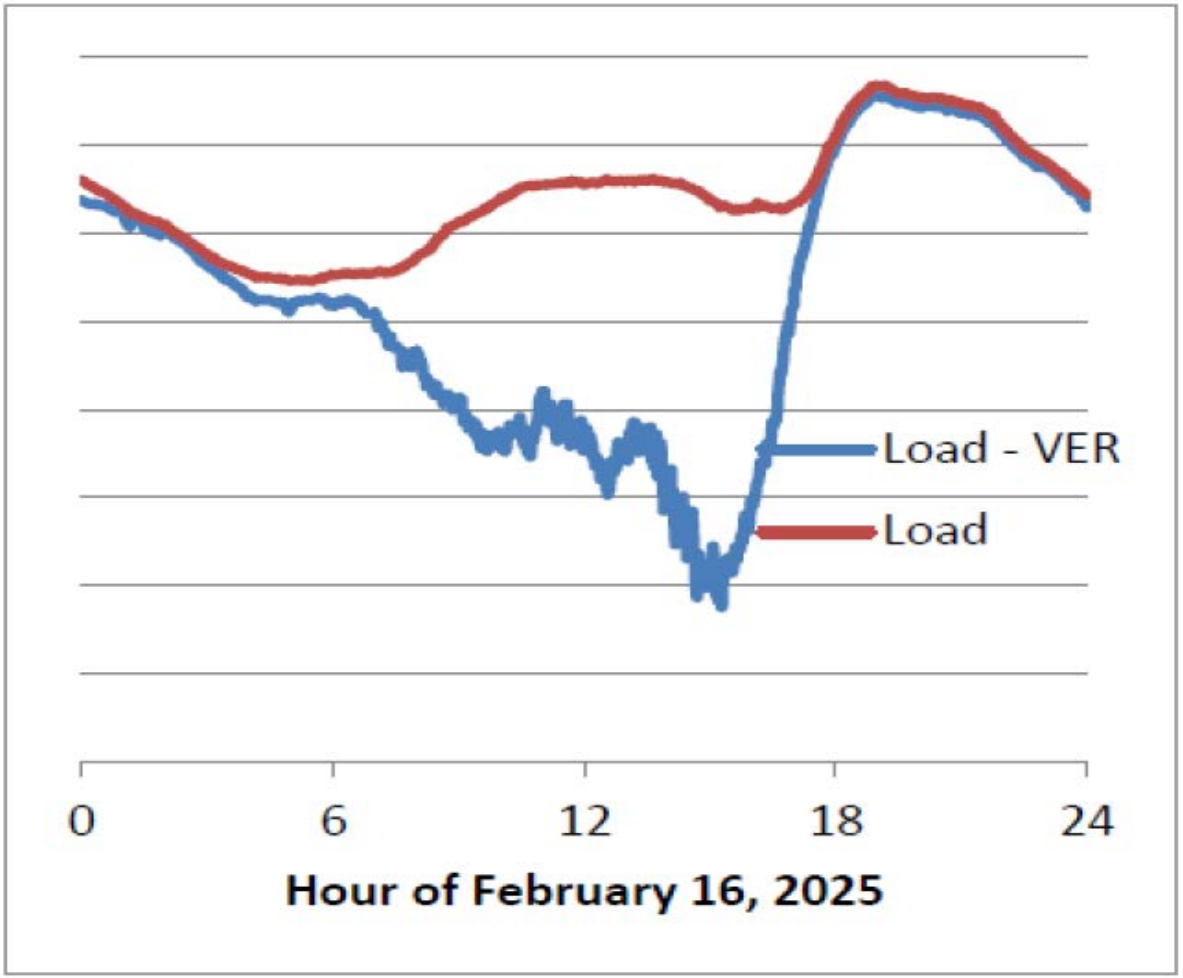
Solar Bubble Graphic

Generation mix on an April day in 2030
Large Solar Portfolio at 33%, 40% and 50%



Another Problem To Solve

- What happens when the sun goes down?



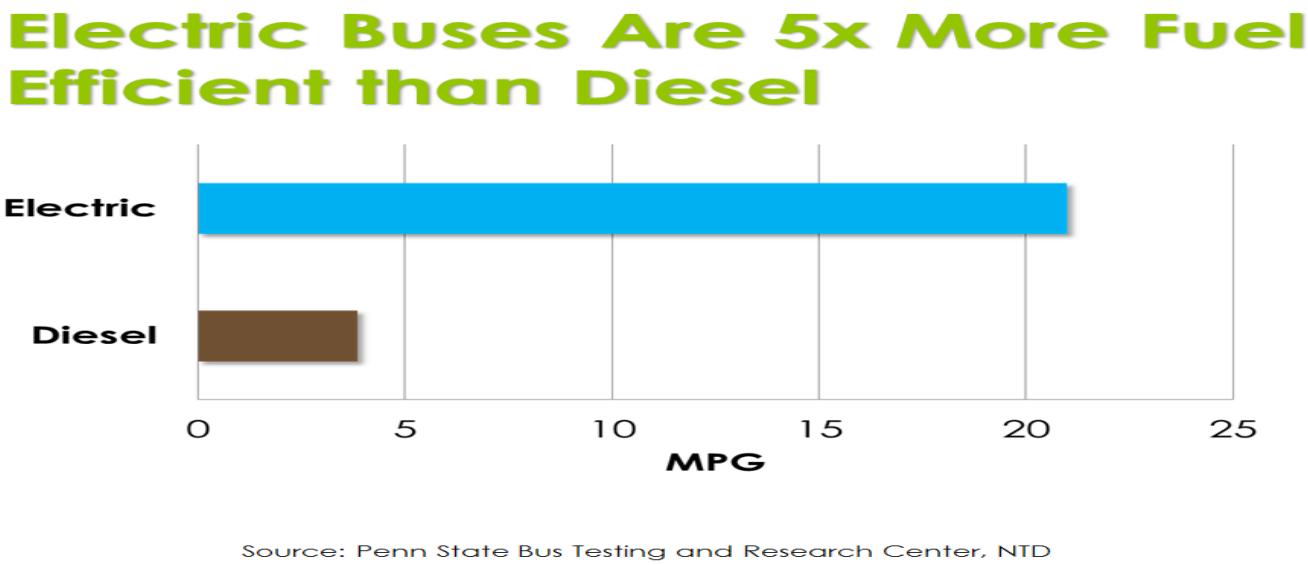
Los Angeles Department of Water & Power

How EV Bus Charging Solves These Problems.

- An electric bus is equivalent to approximately 20 light duty EVs (depending on usage).
- Most charging can be done off peak.
- Mid-day charging may help solve over generation of solar.
- Smart Charging will assist.

How to Save Money…

- If you use power, do it efficiently.
- If you don't need it, turn it off.
- Use electricity when it is cheap. (Rates: Off peak, Future Dynamic Pricing and Demand Response).
- Make your own electricity.(Solar, Energy Storage)



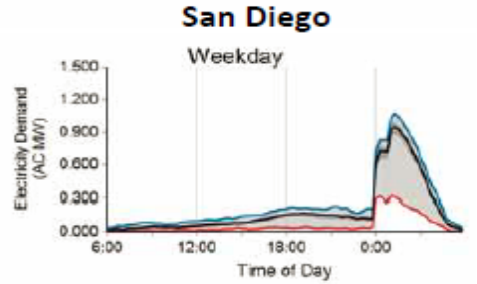
Electric Rates- Time of Use

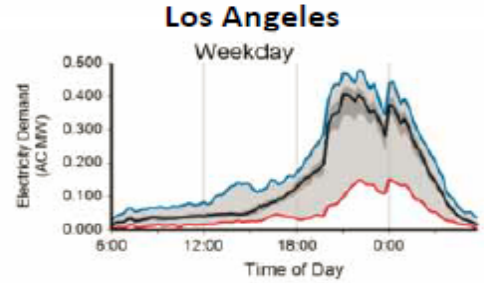
- Time of Use: Send price signals when power is expensive

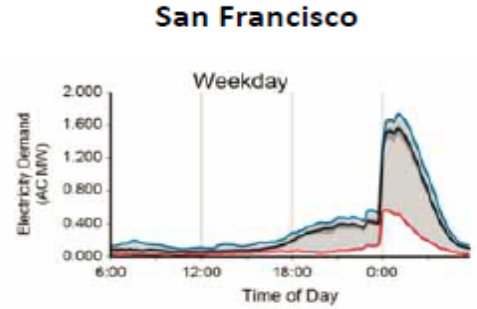
Idaho National Laboratory

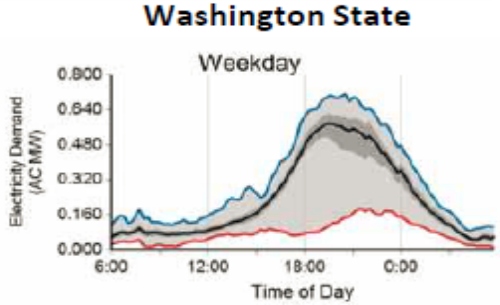
Accomplishments – Residential L2 EVSE Connect

- **Weekday EVSE 4nd Quarter 2013**
- **Time of use rates in San Diego and San Francisco clearly impact when vehicle charging times are set**









Legend: 92 day reporting quarter. Data is max (blue line), mean (black line) and minimum (red line), for the reporting period. Dark gray shaded is plus and minus 25% quartile.

Electric Rates- Demand Charges

- Demand Charges: Recovers cost for being able to deliver large quantifies of power no matter how frequent. May or may not be time sensitive.
- Solutions for Demand Charges?

Utility Demand Charges - Nissan Leaf		Cost/mo.
CA	Glendale Water and Power	$ 16.00
	Hercules Municipal Utility:	$ 377.00
	Los Angeles Department of Water and Power	$ 700.00
	Burbank Water and Power	$ 1,052.00
	San Diego Gas and Electric	$ 1,061.00
	Southern California Edison	$ 1,460.00
AZ	TRICO Electric Cooperative	$ 180.00
	The Salt River Project	$ 210.50
	Arizona Public Service	$ 483.75
OR	Pacificorp	$ 213.00
WA	Seattle City Light	$ 61.00

What Is DWP Doing to Support Infrastructure?

City Infrastructure:

- Retrofitted and installed over 300 chargers on City Property. Includes LADWP, City Hall, the Convention Center, LAX, City Parking Structures. More in progress.
- Installed 15 DC Fast Chargers in and around LA.

Customer Infrastructure:

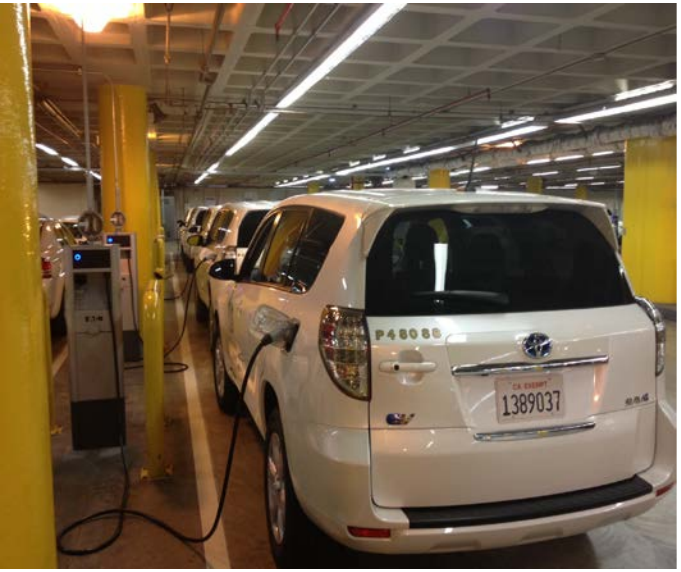
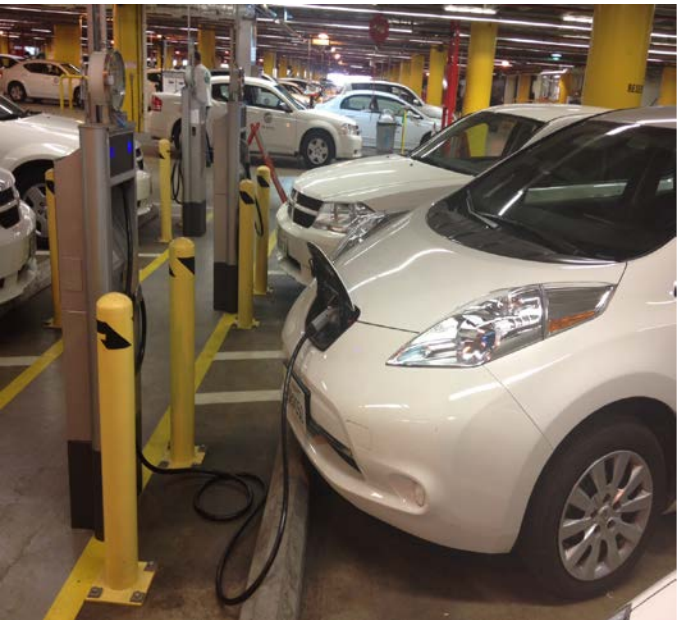
- Residential Charger Rebates for 4.5 years.
- Commercial Charger Rebates for 2.5 years.
- Grants for Heavy Duty EV

What's Next for LADWP?

- Education and Outreach (i.e. Drive Events, Recognition).
- Municipal Leadership (Municipal fleet and Policy).
- Publicly available charging on City Property. (L2, DCFC)

NEW CUSTOMER EV CHARGER REBATE PROGRAM

- Residential Infrastructure
- Commercial Infrastructure for public, workplace.
- Heavy Duty Charger Incentives.

Los Angeles Department of Water & Power

Questions