

DOCKETED

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Description:	October 5, 2016 Workshop - Presentation by Shiva Swaminathan of City of Palo Alto Utilities and Jonathan Changus of the Northern California Power Agency - *** THIS DOCUMENT SUPERSEDES TN 213885 ***
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Palo Alto's Approach to Encouraging EV Adoption & Utility Resource Planning

California Energy Commission Workshop

Discussion with POUs considering including transportation electrification into Utility IRPs

October 5, 2016

Topics

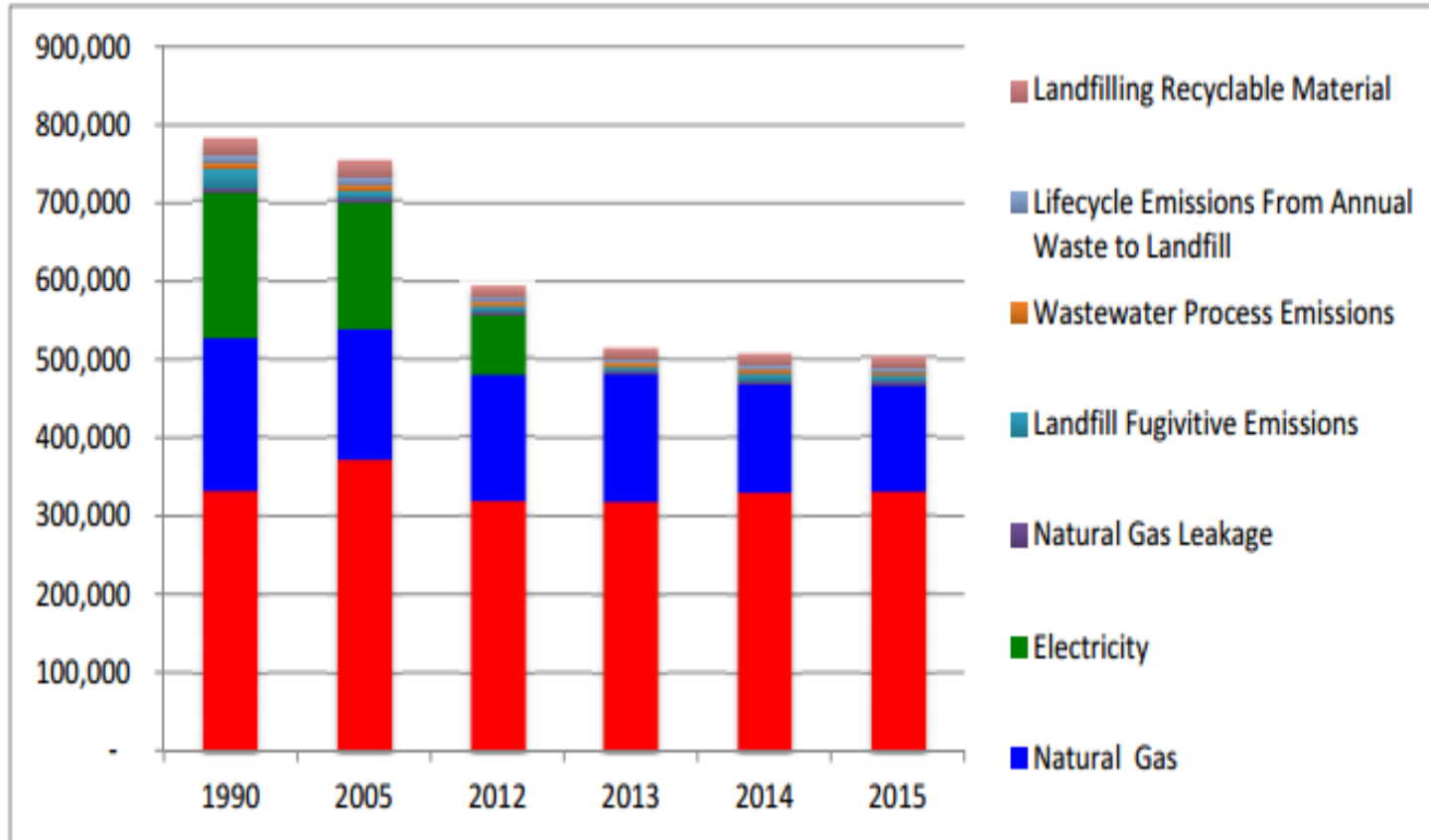
- About Palo Alto & Community Goals
- City of Palo Alto's Approach
 - Development Services/Buildings
 - Public Facilities/Fleet
 - Utilities
 - Sustainability Office
- Utilities Planning Process & approach to including EVs into IRP
- How can CEC help POUs like us?

City of Palo Alto Utilities

- City of Palo Alto
 - Resident Population 65k; Day Time, 70k to 100k
 - 25 square miles
- Community owned electric, gas and water utility
 - 30,000 customers, 72,000 meters
 - Annual revenue of \$200+M
- Electrical Load: 175 MW Peak & 1,000 GWh/year
 - Commercial customers – 80% of electric load
 - 100% Carbon Neutral Electric Supply Portfolio
 - Average retail rate ~ 12 cents/kWh
- Community GHG Emissions
 - 0.5M tons of CO_{2e} in 2015 - 36% below 1990 levels
 - Aspiration goal: 80% below 1990 levels by 2030
 - Major push to electrify: EVs and electrify natural gas appliances

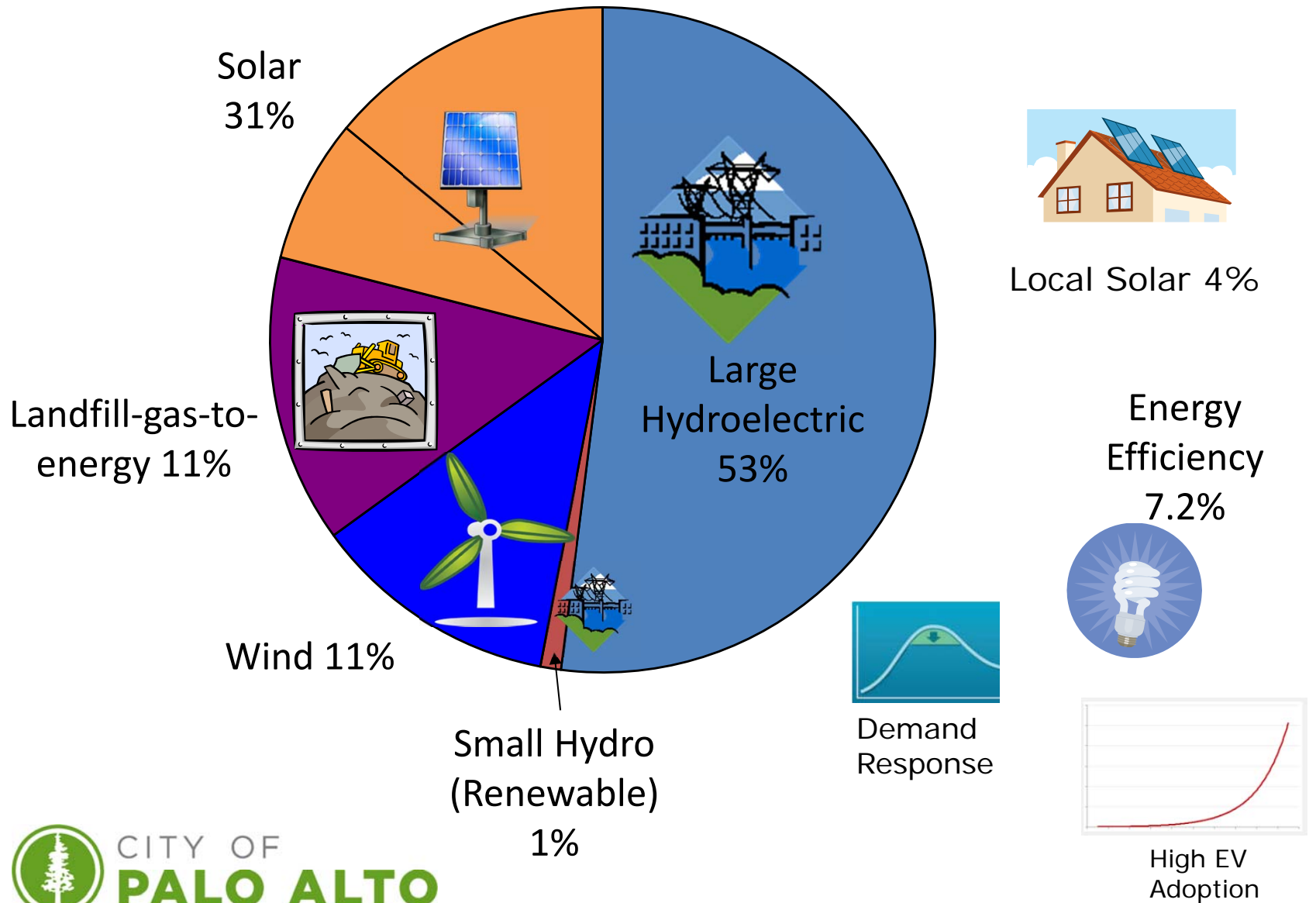
Community GHG Emissions

- 36% reduction since 1990
- 65% of remaining emissions related to transportation



1,000 gasoline vehicles displaced by ZEVs will lower road travel related emissions by ~1%

Carbon Neutral Supply Portfolio - 2017



Major Focus on Electrification

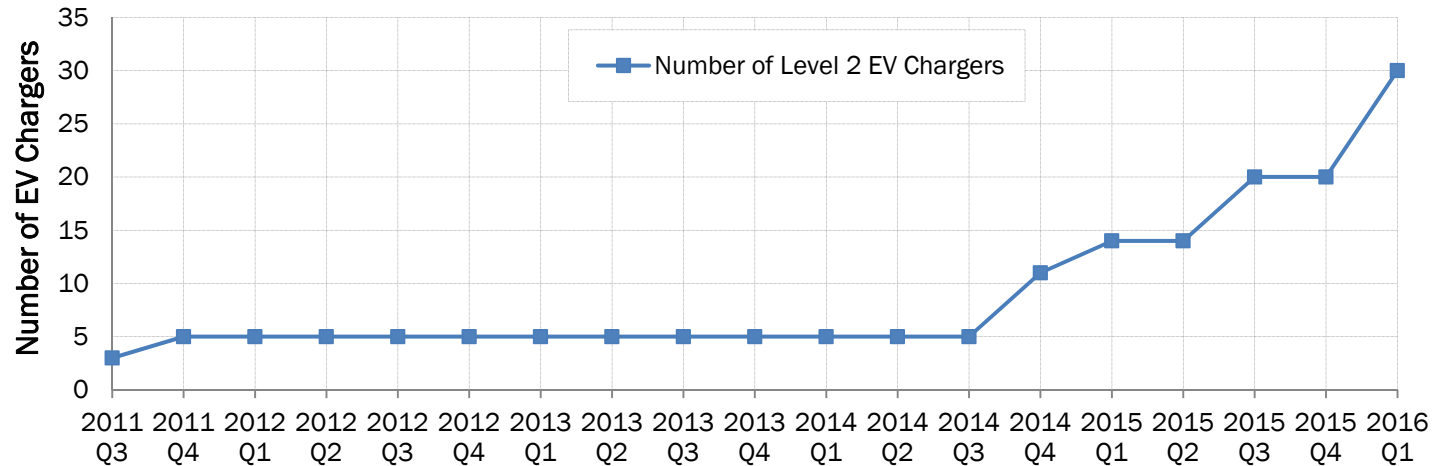
- Electrification of Buildings and Transportation
- Council approved electrification work plan in 2015
 - Residential electrification with HPWH/HPSH systems
 - Building code support for electrification
 - Explore electric retail rate options
 - Encourage Electric Vehicle Adoption

Departments Working Together to Encourage EV Adoption

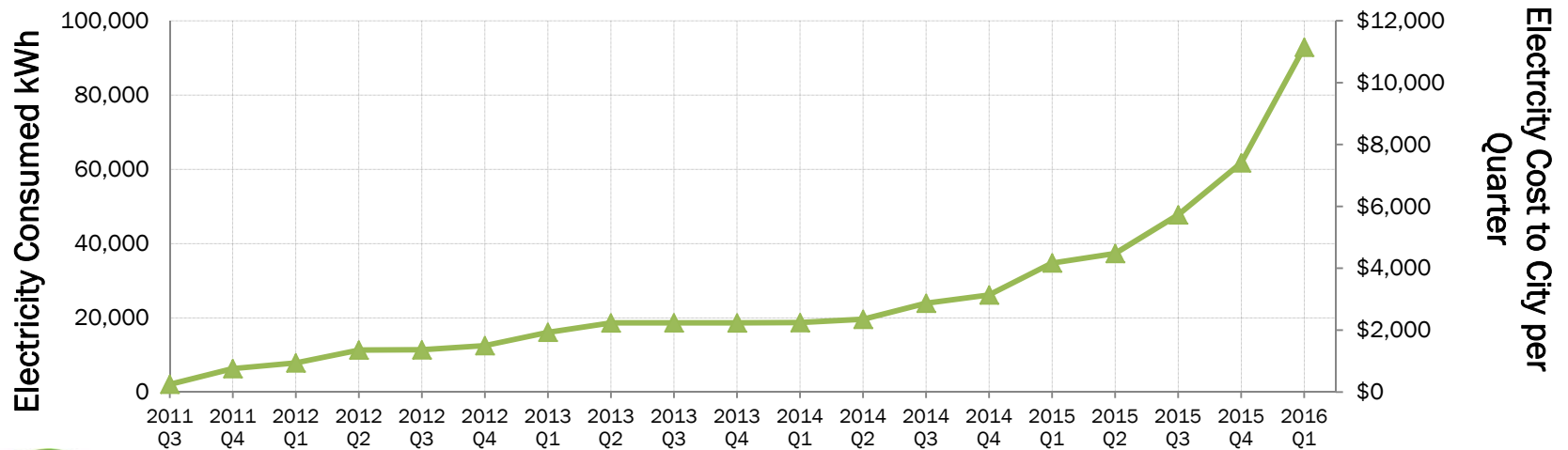
- **Building Department** (Building Code)
 - EVSEs in New Buildings and Major Remodels
 - Facilitate publicly accessible EVSE installation by residents
 - Over the counter permits for Level 1 and Level 2 EVSEs
- **Public Facilities/City Fleet**
 - Default Policy is to purchase EV for City Fleet, unless EVs found not-suited
 - Install EVSE at City Facilities
- **Utilities**
 - Programs using LCFS funds

City-owned EV Chargers

Number of City-Owned Smart EV Chargers



Electricity Consumed per Quarter by City-Owned Smart EV Chargers



Utility Programs to Encourage EV Adoption

1. Pilot Time-of-Use (TOU) electric rate
 - ☒ TOU pilot currently available to 150 residential customers
2. 2-tier residential electric rates with minimum bill amount
3. Evaluate retail electric rate schedules for home that electrify
 - ☐ Evaluate merits of increased baseline for electrified appliance
 - ☐ Use of LCFS funds to lower night time charging by EV owners
(increase the current 2 cents/kWh discount to 7 cents/kWh)

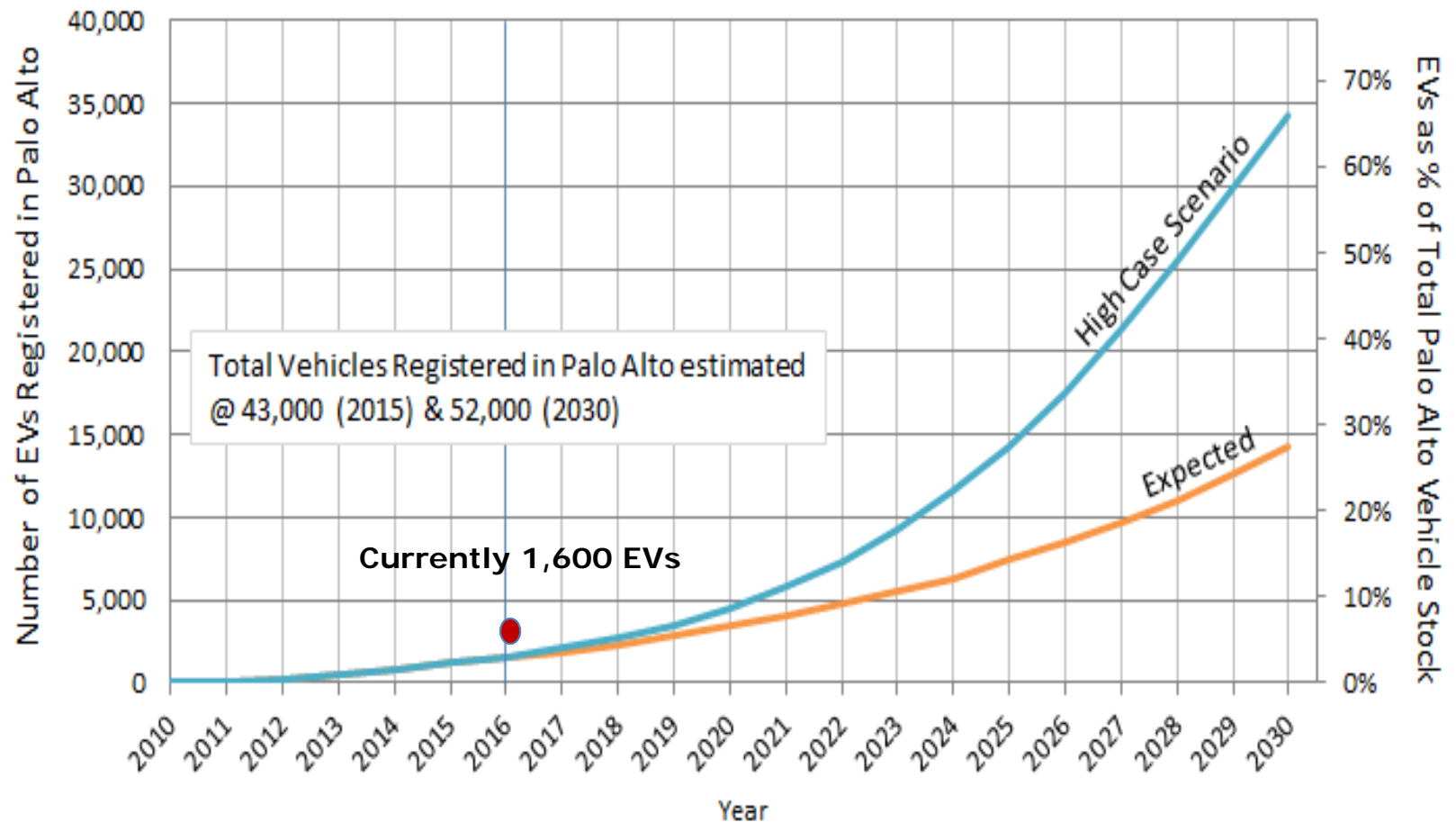
Utility Programs to Encourage EV Adoption

4. Use of LCFS funds to discount electric service upgrade fee
 - ☐ Lowering the connection fee, up to \$3,000
 - ☐ Fixed fees for service connections up to 400A (up from current 200A)
5. Use LCFS Funds to provide EVSE rebates for non-residential customers, up to \$3,000/unit
6. Provide incentive to customers who share access to EV charging info
7. Group Discount Buy of PVs & EVs – Bay Area SunShares

EV Projections for Palo Alto

Palo Alto Residential EV Projection

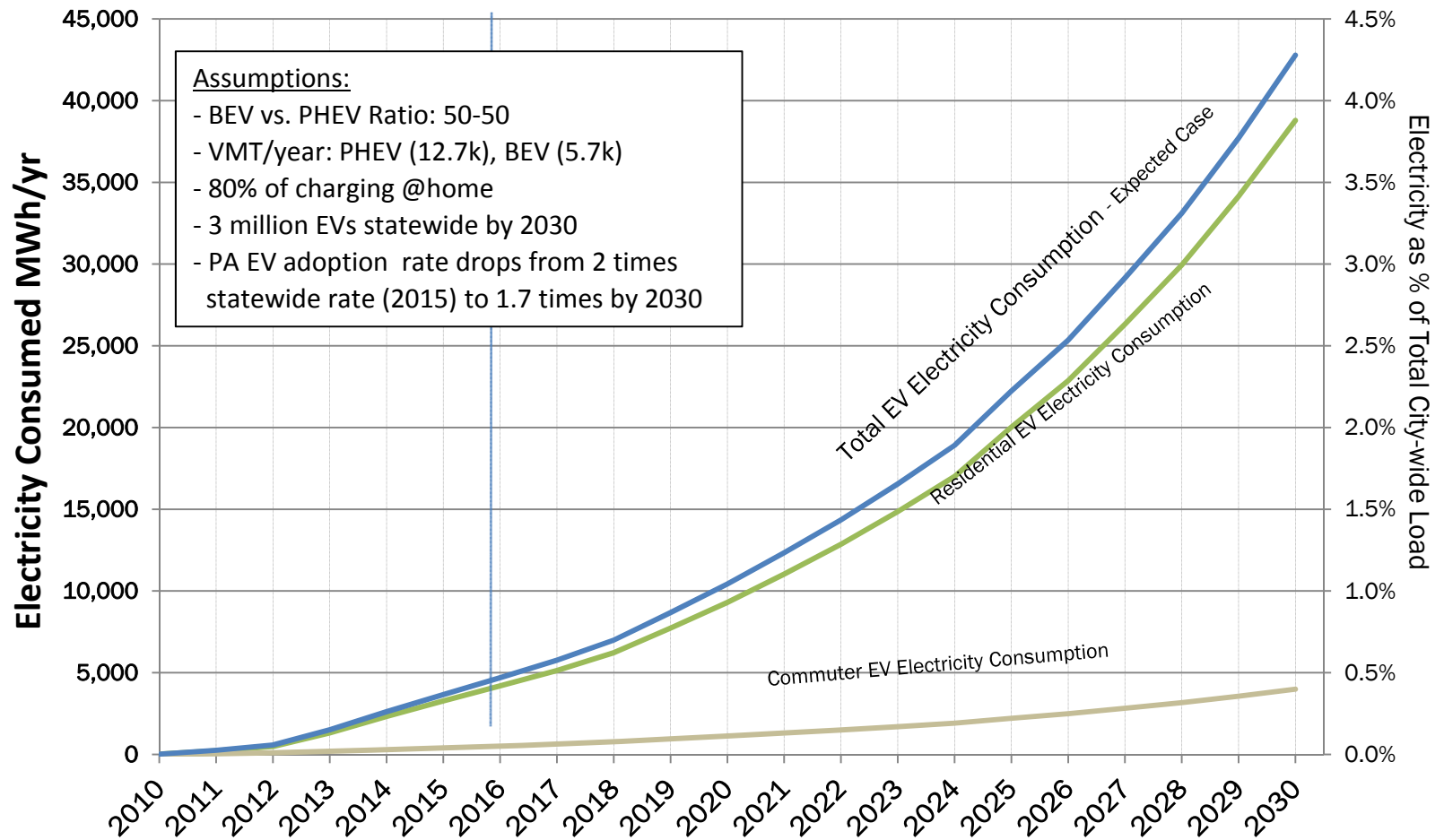
(Based on 3 to 10 Million Projected EVs in CA by 2030)



Electricity Used by EVs

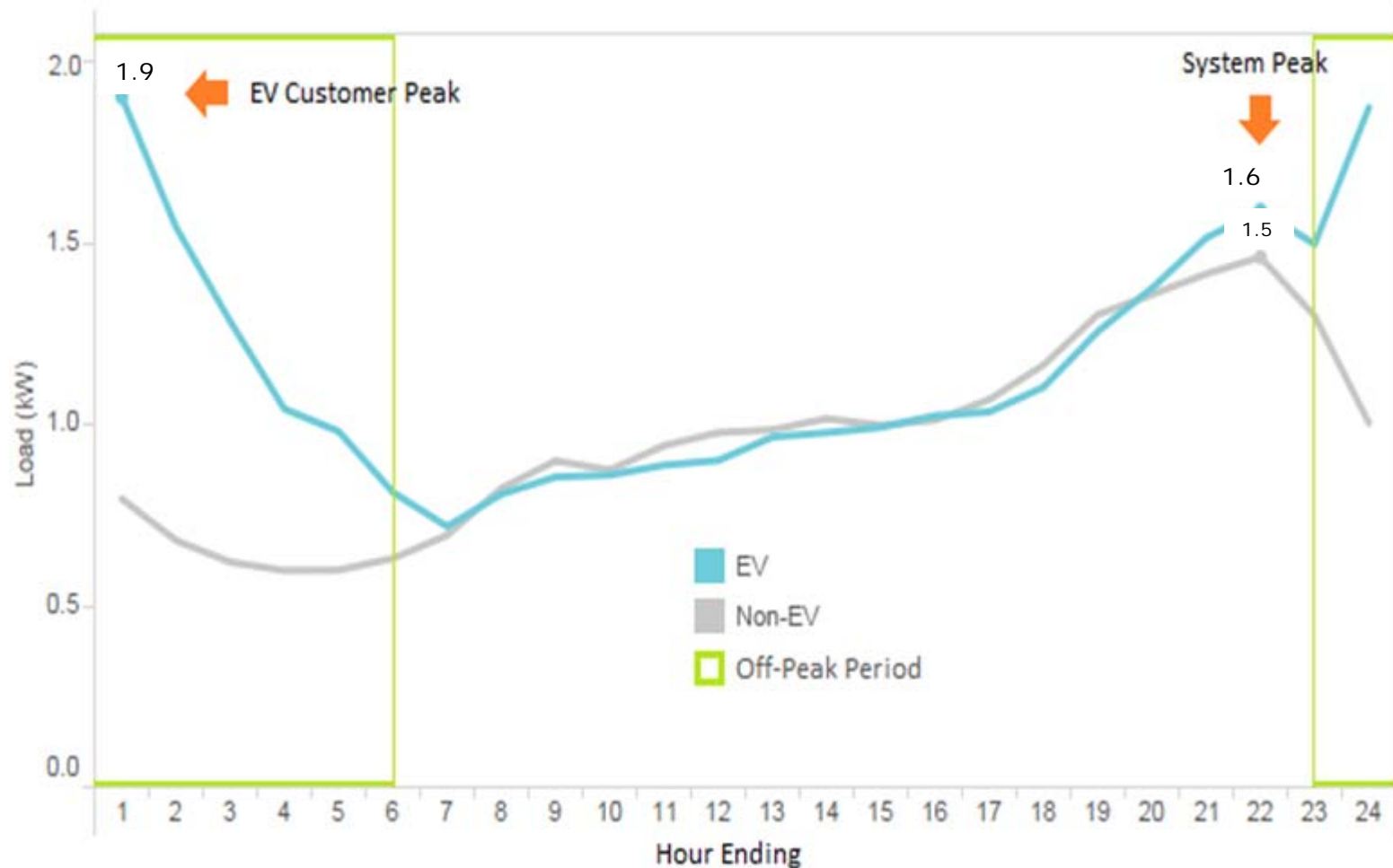
~4 % of total electricity energy use in Palo Alto by 2030

Projection of Electricity Consumption of EVs in Palo Alto



Residential Load Profile: Non-EV vs. EVs

25 kWh/day vs. 30 kWh/day



Estimated average electricity use by EVs: 5 to 8 kWh/day

Palo Alto's IRP/LEAP History

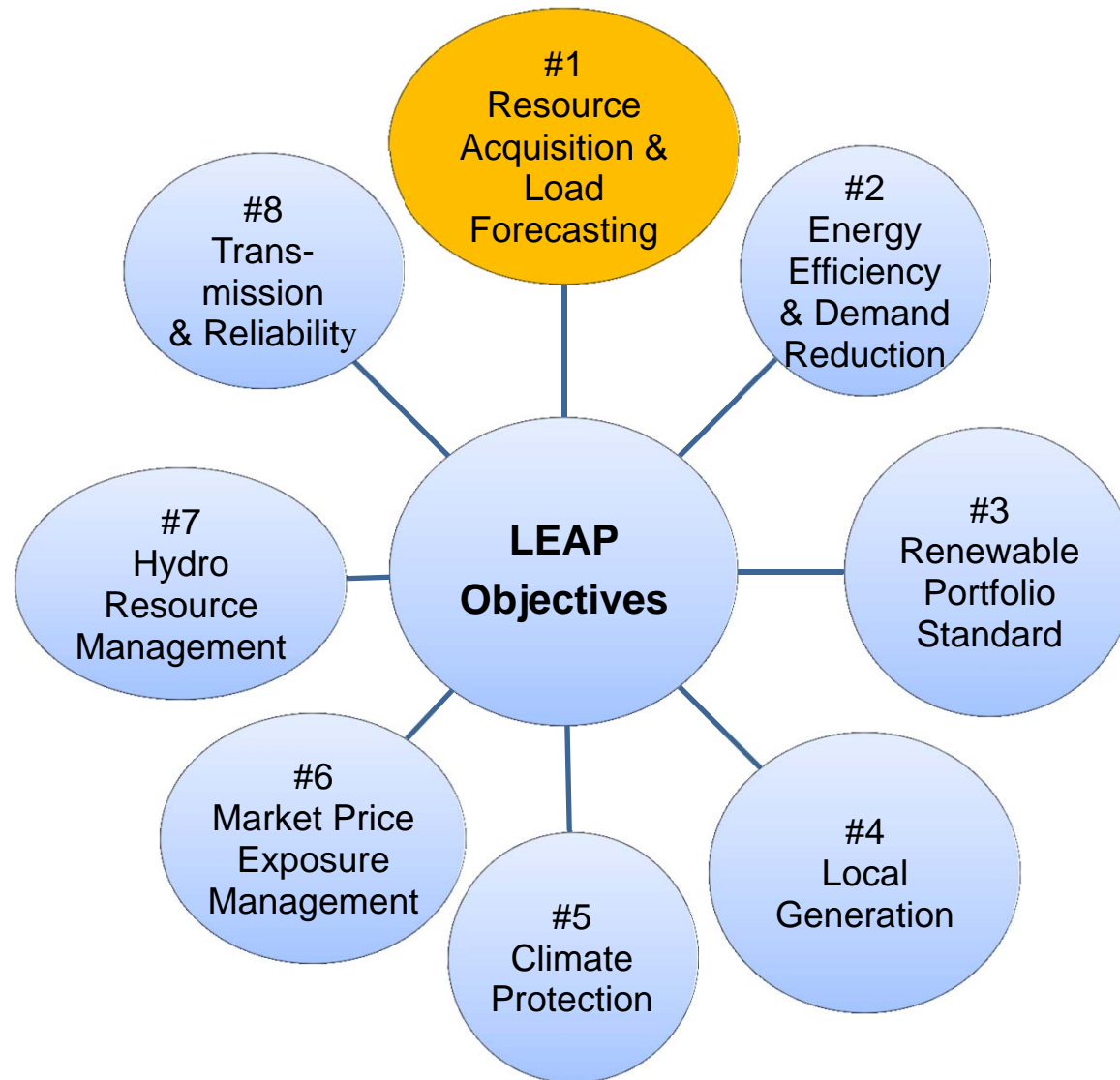
Palo Alto Initiatives

- 1992: First 10 year Electric IRP
- 2002:** Palo Alto adopts its first RPS
- 2003:** First Long-term Electric Acquisition Plan (LEAP)
- 2005:** First Western IRP (updated every 5 years)
- 2006:** Electric Resource Adequacy Program adopted
- 2007:** City Climate Protection Plan – GHG reduction goals
- 2007:** LEAP Updated –loading order and RPS update
- 2010:** First 10 year Energy Efficiency Plan; 2012 update
- 2011/12:** LEAP Updated –carbon reduction goals & storage
- 2013:** Carbon Neutral Plan adopted
- 2014:** Local Solar Plan adopted
- 2015:** Electrification work plan adopted
- 2016:** Aspirational GHG Reduction goal of 80% by 2030

California Initiatives

- 1996:** Public Benefit Charge & Direct Access
- 2002:** RPS introduced
- 2005:** “loading order”
- 2006:** AB 32
RPS accelerated
CA Solar Initiative
- 2010:** Energy Storage
- 2011:** 33% RPS
- 2015:** SB 350
- 2016:** SB 32

LEAP Strategies (IRP Framework)

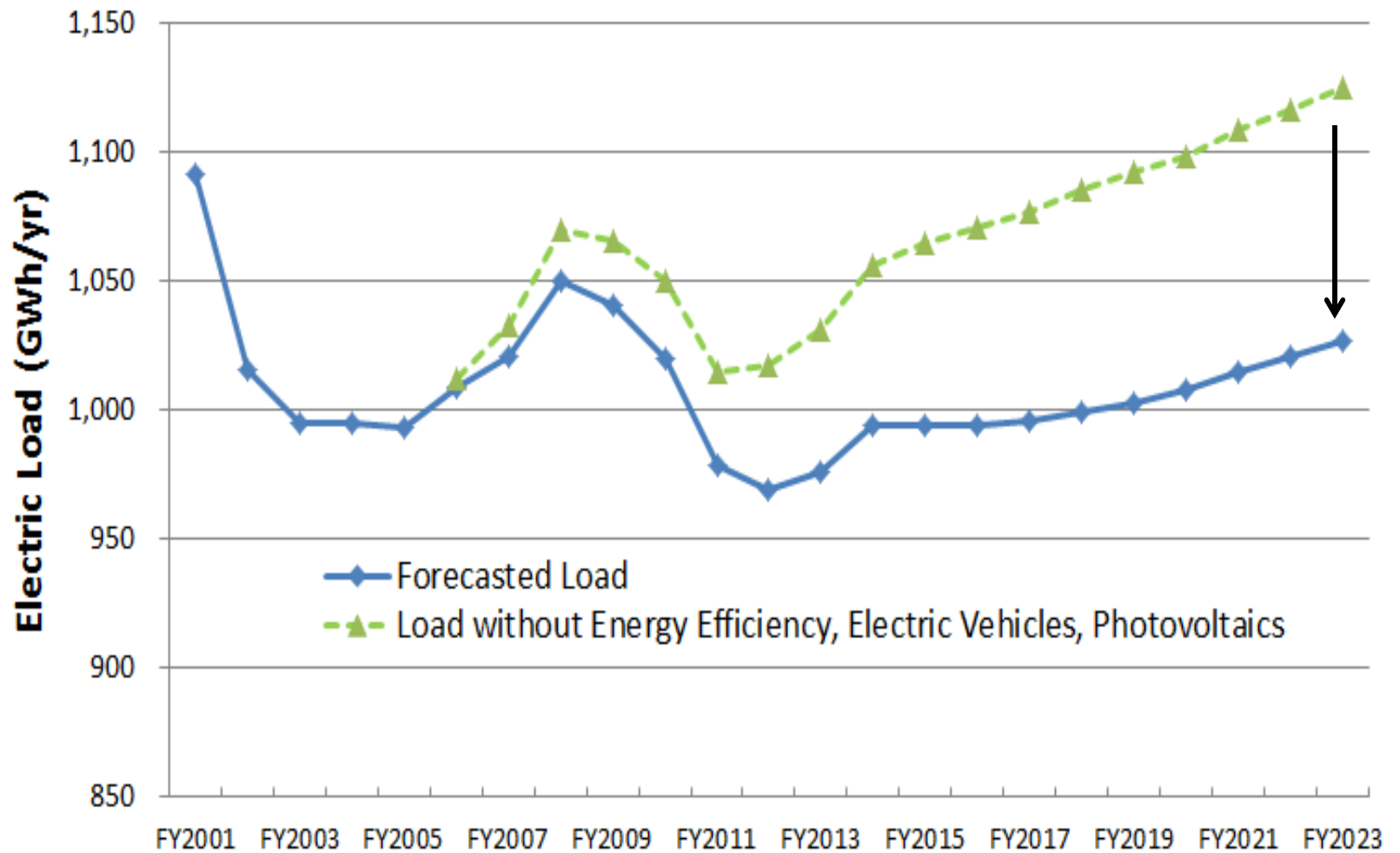


Load Forecasting Approach for LEAP

- Econometric Model with Exogenous Variables introduced when justified

- Econometric model captures long term trends of load growth
- Exogenous variables:
 - Accelerated local solar adoption: current 1% to 4% by 2023
 - Impact of accelerated energy efficiency
 - Impact of EVs
 - Large customers moving in/out of town
 - Economic shocks/building vacancy rates

Load Forecast: Impact of Efficiency, local PV, EV



Use of Annual Forecasts for Planning & Operations

- Energy/Capacity Resource Planning and Balancing
- Energy Efficiency, Local PV, DR Potential Assessment
- CAISO, CEC, PG&E
- Budgeting and Rate-making; performance tracking
- Distribution system planning & investments
 - Distribution transformer and feeder loading
 - Impact of EVs, NZE homes, HPWH/HPSH, PVs
 - PF correction with Capacitors and PV Inverter controls

EV & IRP Related General Observations

- Response to Questions Posed by CEC

☐ Use of LCFS Credits

- LCFS Credits highly valued by Palo Alto
- Valued at \$230/EV/year @ price of \$100/credit

☐ Relationships and service level of EVSE vendors: adequate

☐ Use of Grant Funding for EVSE

- City government relies on grant funding for EVSE installation. e.g. BAAQMD grants

☐ Impact of EVs in meeting SB350 goals: 50% RPS & doubling EE

- Palo Alto already close to 50% RPS
- Electrification of natural gas appliances such as HPWH and HPSH may help meet SB350 efficiency goals

CEC Can Assist Small POU's with EVs & IRP

- EV Registration data from DMV, by POU or ZIP Code
 - Number and Characteristics (BEV, PHEV, FCV, CNG, gasoline)
 - Comparative state and regional vehicle characteristics
- Provide medium/long term statewide EV forecasts
- Provide guidance on ways to forecast electricity use of EVs
 - E.g. 3 to 4 miles/kWh; average miles travelled PHEV/BEV
 - Time-of-day loading patterns
 - Case studies of other POU's
- Engage small POU's through joint action agencies such as NCPA and SCPA

Public Power Preparing For EVs

- NCPA and SCPPA have both established EV Working Groups
 - Forum to establish best practices, share program designs, discuss/explore market developments
- LCFS and ARFVTP have supported POU EV charging activities in the past and are key to spurring future investment:
 - Significant changes to these programs could impact EV charging activity and forecasts
- Learning from Energy Efficiency – one size does NOT fit all:
 - EV charging potential will vary among POU communities
 - CPAU EV charging needs/forecast may be significantly different than Redding or Roseville

CONTACT INFORMATION

Shiva Swaminathan, 650-329-2465

Shiva.swaminathan@cityofpaloalto.org

Jonathan Changus

Jonathan.Changus@ncpa.com



CALIFORNIA ENERGY COMMISSION

COMMISSIONER JANE A. SCOTT
1515 NINTH STREET
SACRAMENTO, CA 95814-5512
www.energy.ca.gov



September 15, 2016

Shiva Swaminathan
City of Palo Alto Utilities
250 Hamilton Avenue
Palo Alto, CA 94301

Dear Mr. Swaminathan:

The California Energy Commission is hosting a workshop on Wednesday, October 5, 2016 to discuss how California's publicly owned utilities (POUs) are considering including transportation electrification into their Integrated Resources Plans. The workshop will be held in Sacramento at the Energy Commission in the Art Rosenfeld Hearing Room and will begin at 9:00am. I would like to invite you to present information on your utility's approach and activities to address transportation electrification. We have also invited representatives from other publicly owned electric utilities and independent experts to make presentations as well.

To comply with Senate Bill 350 (de León, Chapter 547, Statutes of 2015) sixteen publicly owned electric utilities must adopt IRPs no later than January 1, 2019, and adopt updates at least every five years thereafter. The Energy Commission will review IRPs submitted by POUs for consistency with SB 350 and, if needed, provide comments, suggestions, and requests for more information. The Energy Commission expects to adopt guidelines to govern submission of information and data and reports needed to support its review of IRPs. The October 5th workshop will focus on transportation electrification.

Transportation electrification could include several applications, such as trucks used in freight movement, refuse collection and port drayage, a multitude of off-road applications, electric and plug in electric passenger vehicles and light trucks, transit buses, and electric rail. We are seeking initial information about your planning, capabilities and challenges as well as your recommendations regarding state government actions to implement the SB 350 transportation electrification objectives.

The Energy Commission also co-funds deployment of electric vehicle charging infrastructure through annual funding awards under the Alternative and Renewable Fuel and Vehicle Technology Program (ARFVTP). We are interested in your achievements to date and seek your feedback on configuring deployment of future funding in the context of other investments, including POU electric transportation actions.

Each presenter will have a total of 30 minutes. We ask you to kindly provide a 20 minute presentation summarizing your plans, activities and insights and save 10 minutes for questions and brief discussion. Your presentation should focus on the following topics related to your service area:

1. How would you characterize your approach and current and proposed activities to include transportation electrification elements in integrated resource plans? Do you expect to establish electric transportation targets or goals?

2. What are your current capabilities to address in IRPs transportation electrification procurement? What do you see as challenges?
3. What are your estimates of the existing baseline and projected growth of electric transportation and estimates of greenhouse gas emission reductions by 2020, 2030 and 2050? What analytical method do you use to make these calculations? What data do you expect to gather to evaluate progress, how do you plan to gather it, and can you share the data with the Energy Commission?
4. What have you achieved in electric transportation to date and what do you anticipate for future deployment regarding:
 - Utility fleet vehicles and workplace charging for your employees;
 - Procurement funding and funding mechanisms for service area electric vehicle charging deployment in market subsectors (residence, workplace, multi-unit dwellings, public destinations and corridors) and the number and types of installations, amounts of funding and project locations;
 - Reliability of charging stations in your service area;
 - Anticipated need for electric distribution system upgrades and cost;
 - Tariffs;
 - General public and business education and outreach, and plans to engage disadvantaged communities; and
 - Other activities.
5. How would you characterize your interaction with private companies providing electric vehicle charging equipment, installation, operation and services? How do you expect relationships and business models to evolve and change?
6. To what extent have you taken advantage of state government incentives (ARFVTP grants, Clean Vehicle Rebates, and Low Carbon Fuel Standard credits)? In what market subsectors do you see a need to for continuation of these incentives to complement POU electric transportation activities? Do you have any recommendations to improve implementation of government incentives?
7. To what extent do you anticipate transportation electrification growth to impact strategies for SB 350 requirements, such as achieving the 50 percent renewable portfolio standard and doubling of additional achievable energy efficiency savings by 2030?
8. Where do you need assistance to achieve the SB 350 requirements related to transportation electrification?

Please RSVP to Tim Olson at Tim.Olson@energy.ca.gov or 916-654-4528 by September 21, 2016 to confirm your interest in participating on October 5, 2016. Tim is also available if you have additional questions or comments. I look forward to your participation and seeing you at the workshop.

Sincerely,

Jane A. Scott
JANE A. SCOTT
Commissioner

Forecasting Approach to IRP

❑ Load Forecasting

- Econometric model captures long term trends of load growth
- Evaluate impact of state mandates and initiatives
- Exogenous variables:
 - Accelerated local solar adoption: current 1% to 4% by 2023
 - Impact of accelerated energy efficiency
 - Impact of EVs
 - Large customers moving in/out of town; building vacancy rates
 - Economic shocks

❑ Resource Forecasting

- 'Loading Order' for Long Term Resource Procurement
- Least Cost Dispatch via NCPA Pool
- Local resources (efficiency, DR) vs. central resources
- Cost of Resources to serve load and uncertainties
- Distribution system constraints and transmission cost