

DOCKETED	
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Document Title:	Presentation - Smart Charging of Plug-in Vehicles and Driver Engagement for Demand Management
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Smart Charging of Plug-in Vehicles and Driver Engagement for Demand Management

Additional submitted attachment is included below.



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ENERGY

Smart Charging of Plug-in Vehicles and Driver Engagement for Demand Management and Participation in Electricity Markets Agreement #EPC-14-057

Vehicle-Grid-Integration Roadmap Discussion Panel 4: Customer Experience

October 30, 2018

Alameda County—PEVs and PHEVs at AlCoPark Garage



12 Nissan LEAF
24 kWh battery



2 Chevy Bolt
60 kWh battery



17 Ford Focus Electric
23 kWh battery



2 Toyota RAV4 EV
41.8 kWh battery



2 Toyota Prius Plug-in
4.4 kWh battery



2 Chevrolet Volt
16.5 kWh battery



3 Ford C-Max Energi
7.6 kWh battery

AlCoPark Garage—Primary public and fleet charging location

- Total Ports: 14 Level 1 and 36 Level 2



5 CT2100 each with a L1 and L2 port

5 CT2100 each with a L1 and L2 port

3 CT4020 each with two L2 ports



1 CPE200 DCFC with 1 SAE Combo and 1 CHAdeMO

4 CT2100 each with a L1 and L2 port

8 CT4020 each with two L2 ports

Floor 8

Public Access
7a-7p
Fleet Charging
7p-7a

Floor 2

Public Access
7a-7p
Fleet Charging
7p-7a

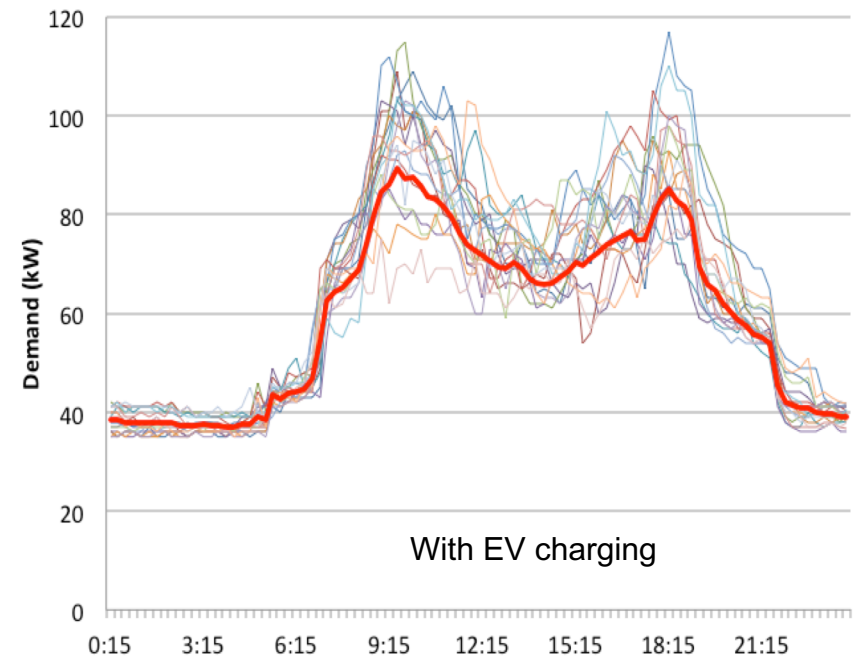
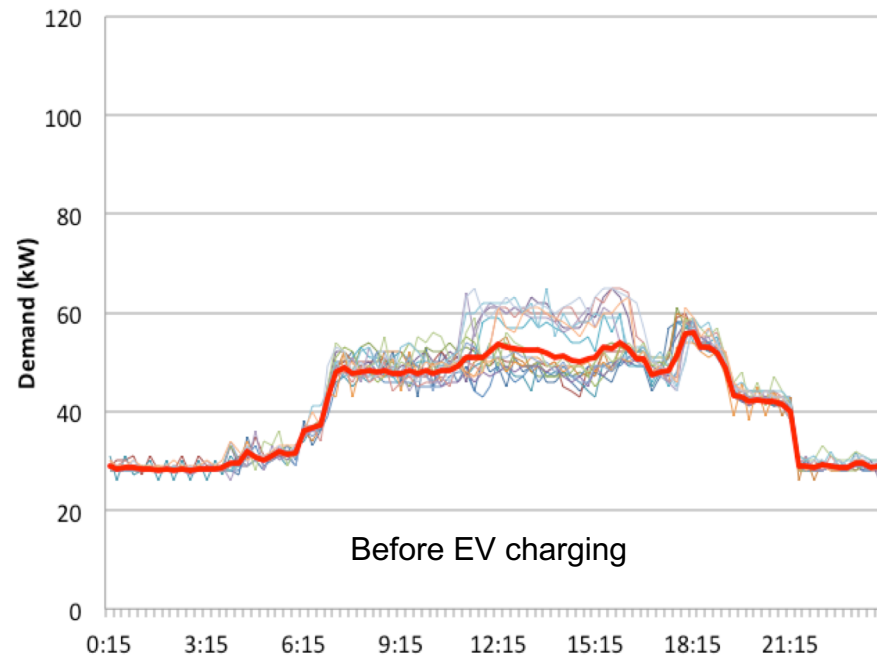
Street Level

24-h Access

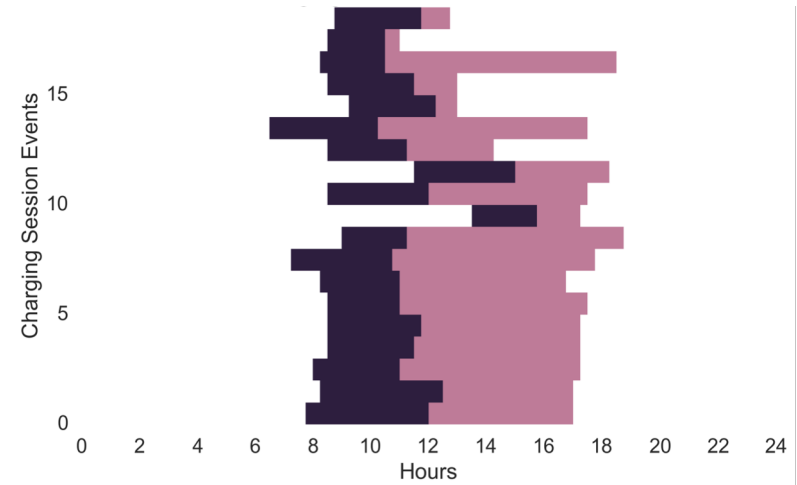
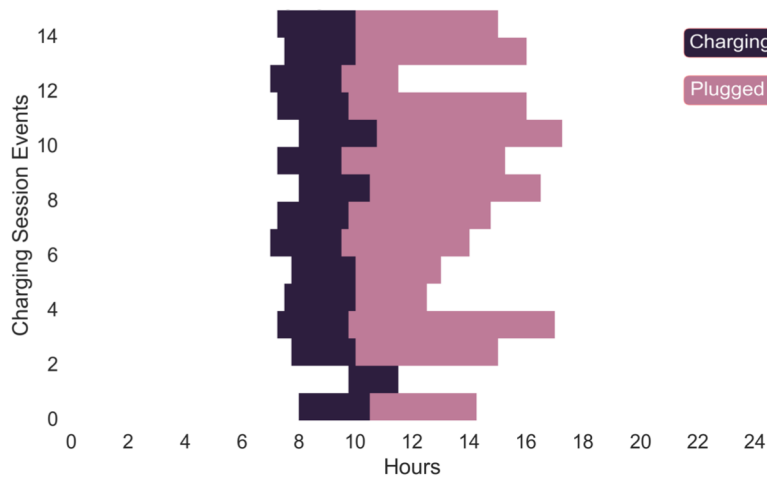
Basement

Fleet Operations;
No public access

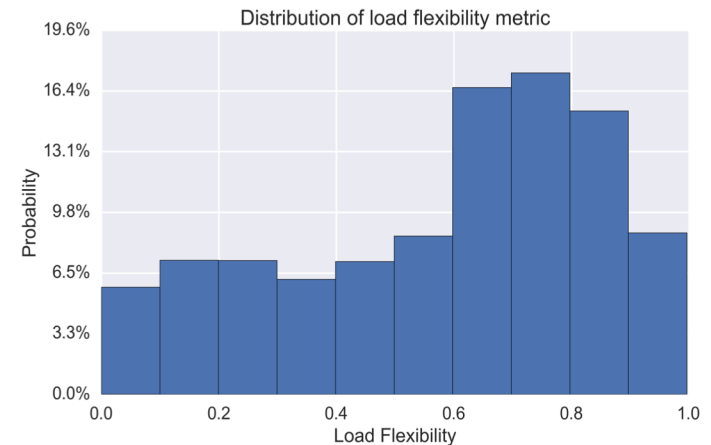
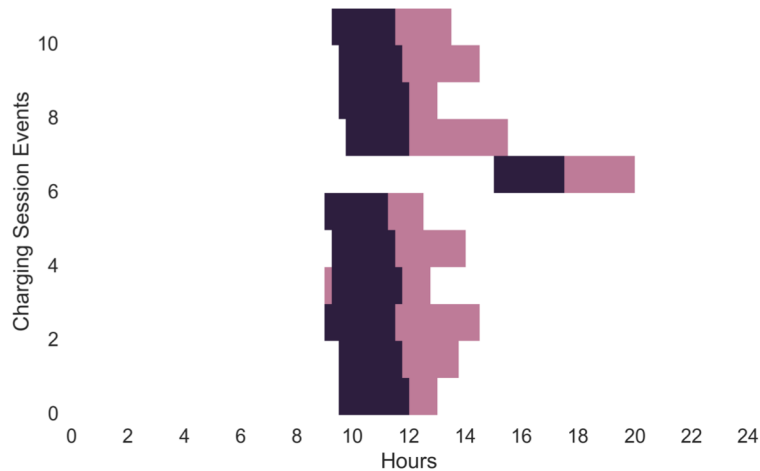
Impact of EV Charging on Electric Demand at AlCo Park Garage



Connected and active charging times vary

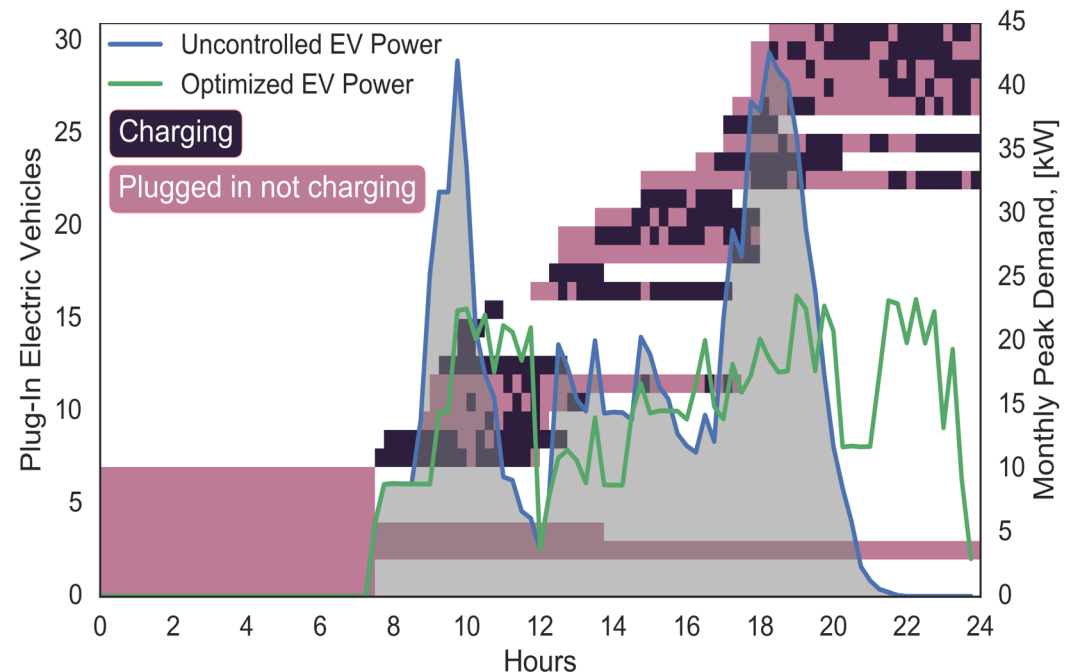
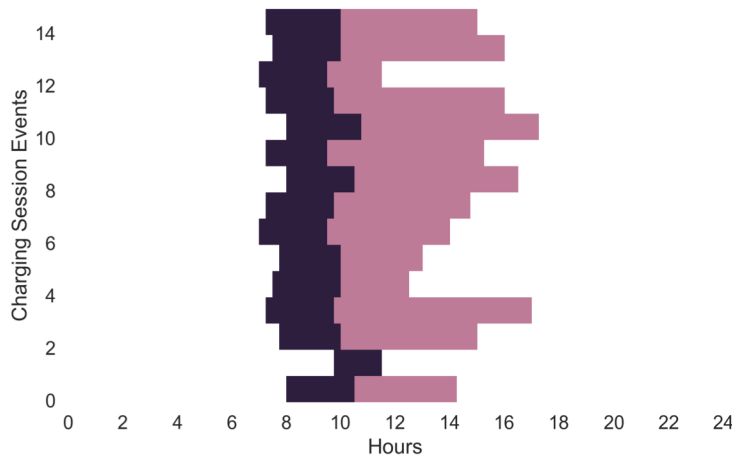


$$l_{flex} = \frac{d_{session} - d_{charge}}{d_{session}}$$



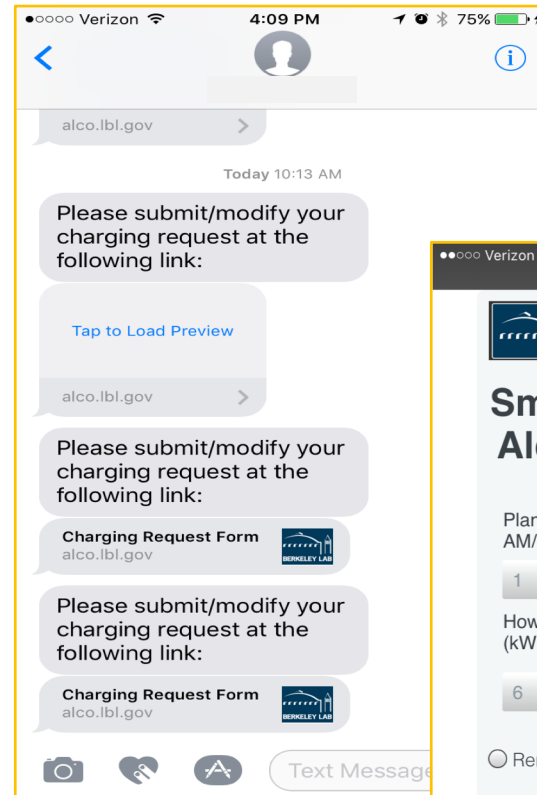
Approach for Public EV Smart Charging

- Flexibility to shift charging is constrained to operating hours 7 AM to 7 PM
 - Peak period is 12p-6p so shifting out of peak is limited
- Optimization algorithm “smoothed” peak period charging demand
- Minimized risk to public charging station users by delivering charge energy equal to that of unmanaged charging



Smart Control of Public Charging Stations

- Smart Charging participant starts a session at an AlCoPark charging station and receives a text with a link to web-site that requests estimated departure time and charge needed.
- Charging optimization code uses the user provided information along with current demand of all other AlCoPark charging sessions, and forecast of non-charging demand to create charging plans for all Smart Charging participants.



Verizon 4:30 PM 90%
alco.lbl.gov

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Smart Charging at Alco Park Garage

Planned Departure Time: (HH:mm AM/PM)
1 0 PM

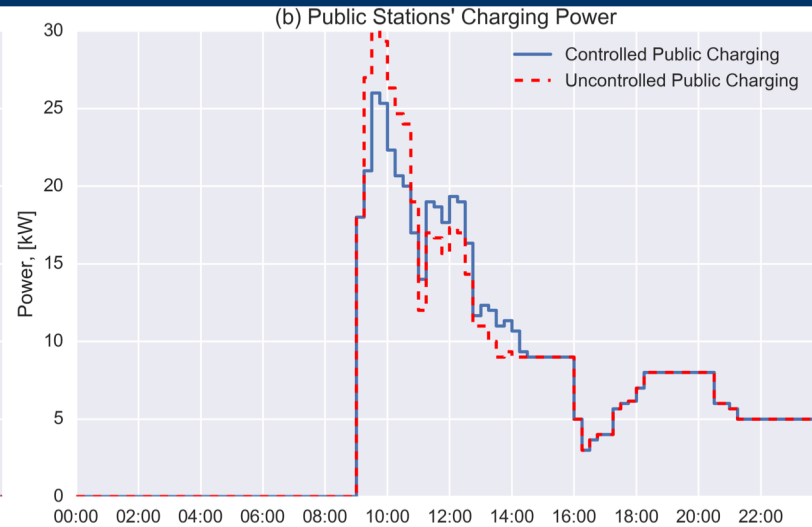
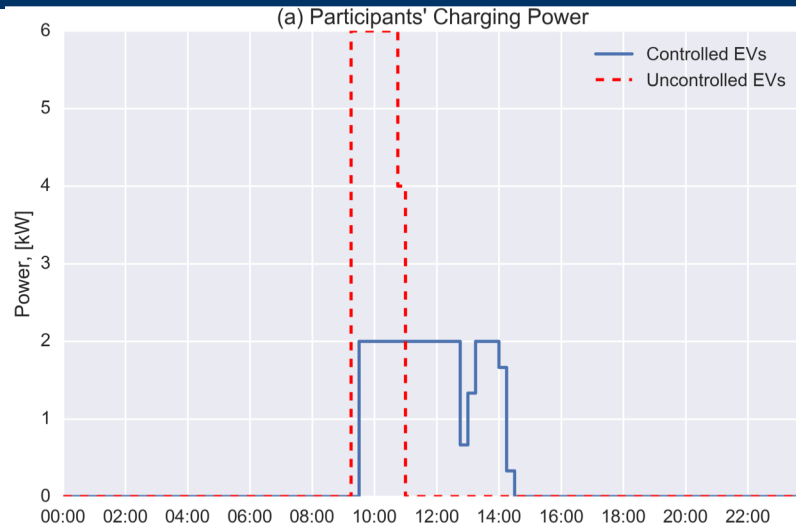
How much charge do you need? (kWh or miles)
6 Or miles

☐ Remember my request info

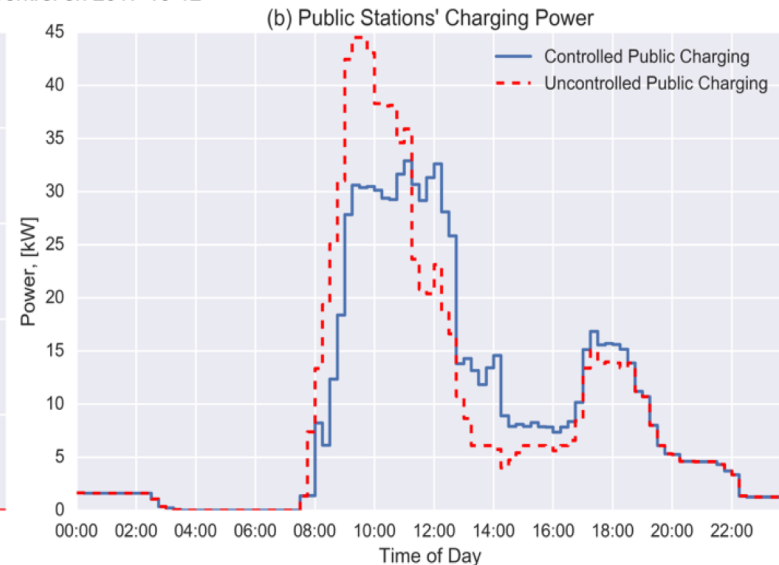
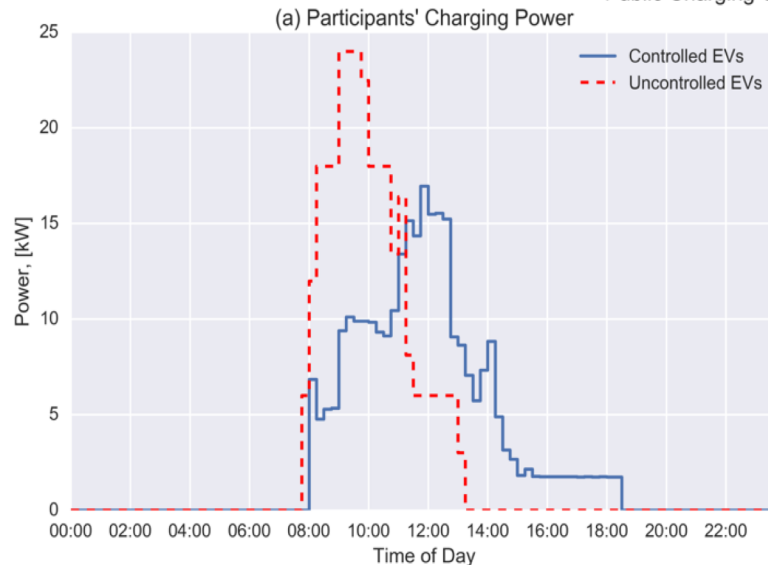
If your planned departure time changes, please use the same link to complete another smart charging form and we will re-adjust charge schedule.

Submit

Public Station Smart Charging Performance



Public Charging Control on 2017-10-12

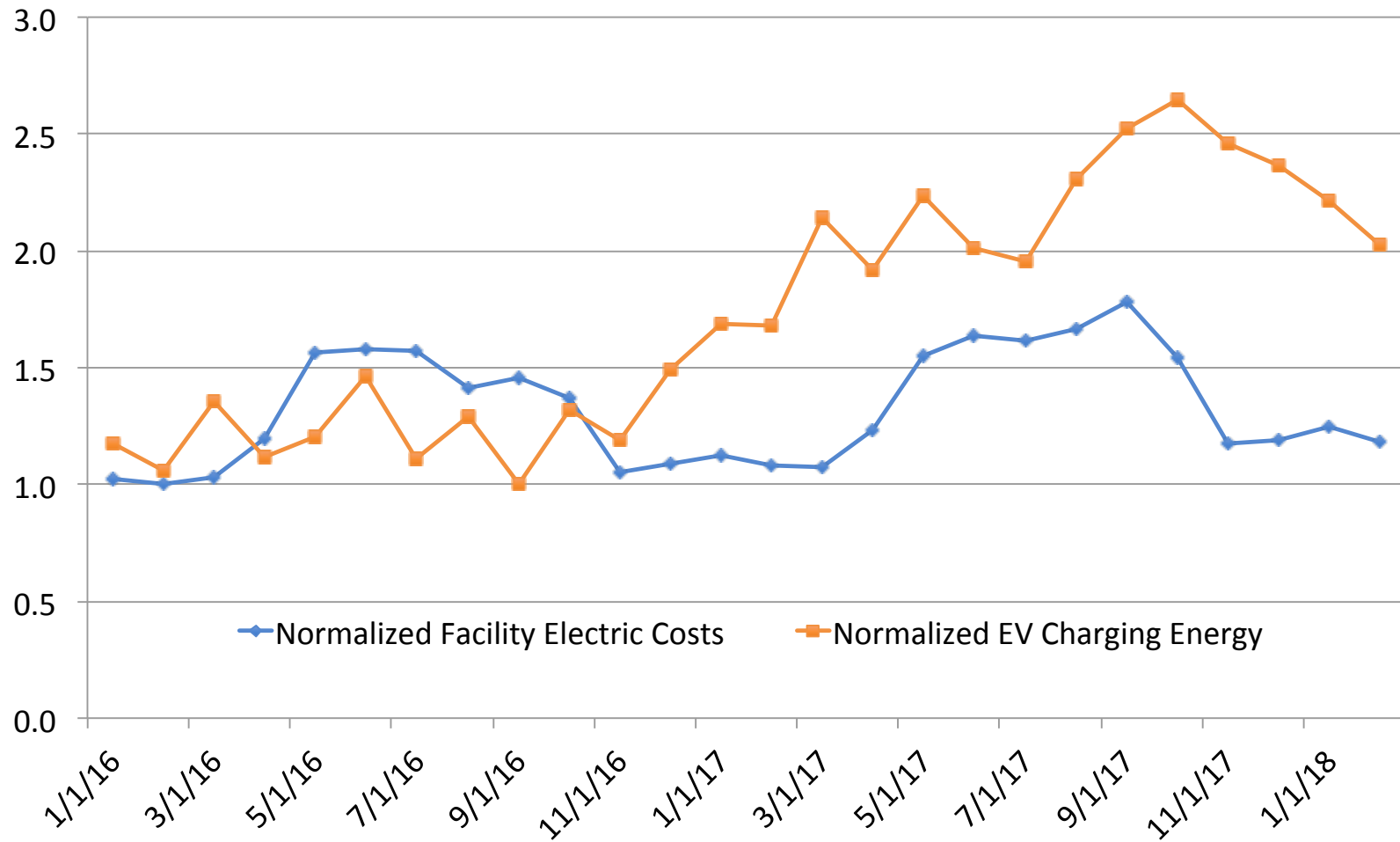


Summary of Public Smart Charging

- Pilot demonstrated that communicating with customers can be done with fairly simple and inexpensive text messaging
- Also demonstrated feasibility of remote optimization and control of public charging sessions; No stranded drivers!
- Providing incentives for large-scale participation needs further study
- Cost savings were relatively modest here due to public charging station configuration at ALCoPark Garage; level 2 stations limited to level 1 rate
- Total cost of public charging is reduced by 2% (Sep) to 16% (Nov) if only public smart charging sessions are considered



Charging Energy Increased Faster than Total Electricity Costs Thanks to Smart Charging!



Proposed TOU Peak and Mid-Peak Periods

- Peak period will change from 12p-6p to either 5p-10p (PG&E) or 4p-9p (SCE and SDG&E)
- Partial peak period will change to 3p-5p and 10p-12a for PG&E
- The new peak periods will require more sophisticated smart charging controls for vehicles parked overnight
 - Especially for EVSE constrained fleets and MUDs

Questions...

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