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Docket Number:	18-IEPR-06
Project Title:	Integrating Renewable Energy
TN #:	223870
Document Title:	Residential Controlled Charging and 15118 Integration
Description:	Presentation by Shana Patadia at the June 20, 2018 IEPR Workshop on Renewable Integration and Electric System Flexibility
Filer:	Stephanie Bailey
Organization:	ChargePoint
Submitter Role:	Public
Submission Date:	6/19/2018 2:17:00 PM
Docketed Date:	6/19/2018



Residential Controlled Charging & 15118 Integration (ChargePoint EPC 14-078)

IEPR workshop: Renewables Integration & System Flexibility

Shana Patadia, Business Development Manager, ChargePoint

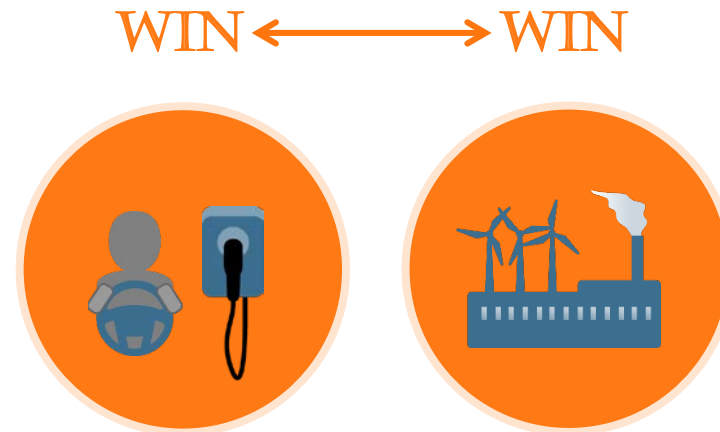
Load Management Pilot

- + Provided 30 ChargePoint Home stations to residential customers in SDG&E territory
- + SDG&E daily pricing schedule used by ChargePoint as input to algorithm

	Phase 1: Baseline Load Assessment	Phase 2: Aggregator-Controlled Schedule
Time Frame	July 2017	August & September 2017
Goal	Collect data to understand driver behavior to establish baseline and help with optimization	Send modified charging schedule to homeowner to minimize impact to driver, study impact of participation and opt out rate
Home-Owner Action	No Action	No action needed unless opt out is desired
ChargePoint Action	Collect charging behavior data	Provide optimized schedules to station and driver

Pilot Premise

Charge EVs overnight in a way that is highly responsive to SDG&E price signal while the individual driver experience is kept effectively unchanged, except for possible cost savings.



Driver Interaction



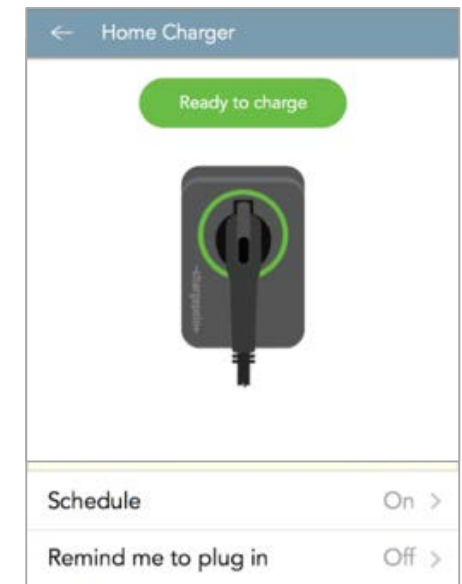
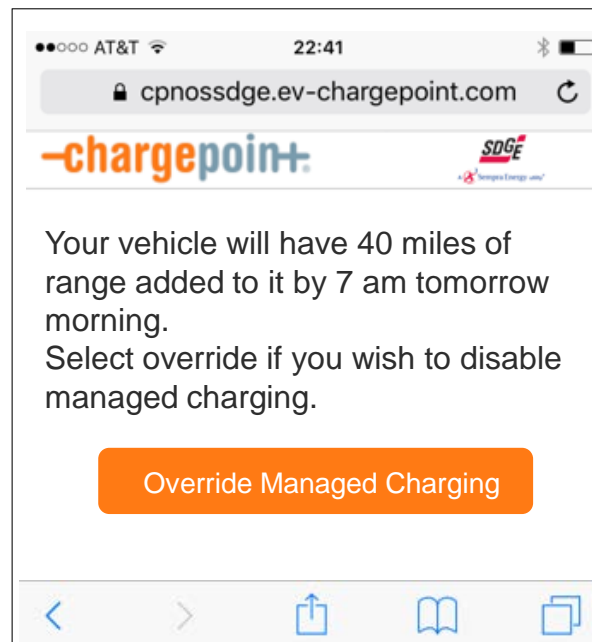
An email or text notification is sent to the driver once the vehicle is plugged in



The user can opt-out of event participation
If no action: optimized schedule is applied
If opt-out: driver can self-schedule charging for that evening



After the notification, the user can also go to the Home Charger page to opt-in, opt-out or self-schedule



Cost Savings from Controlled Program

	Without Charge Scheduling	With Charge Scheduling	All Charge Sessions
Number of sessions	421	584	1005
Energy (kWh)	3423 kWh	4672 kWh	8095 kWh
Unit Price (¢/kWh)	28.62 ¢/kWh	15.64 ¢/kWh	21.14 ¢/kWh

Using the controlled program, given 300 kWh/month of charging from a home charger:

- Monthly electricity bill reduction: \$39
- Annual bill reduction: \$467.

Influence of the Controlled Program on Drivers

Price Signal from SDG&E Power Your Drive program used

Observations from Residential Charging Pilot

- + Drivers wanted to see their SOC in the app, or total miles of charge, rather than just miles added
- + Drivers communicated an interest in charging the vehicle to only 80% SOC so they could use their regen braking capabilities
- + Some drivers regularly opted out, indicating that such a program may need to be optional as it does not work for all driver profiles

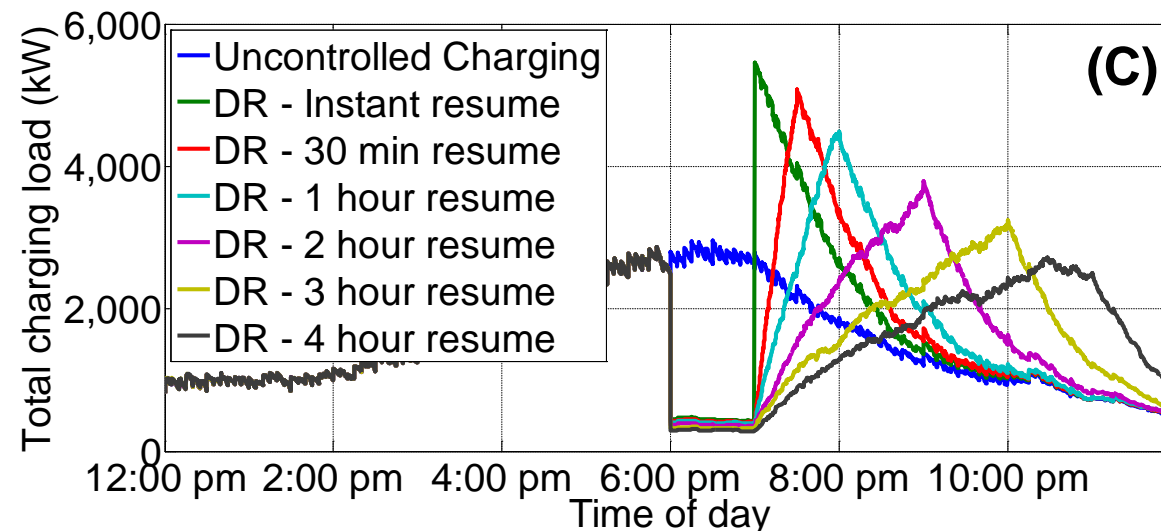
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Providing additional information to the driver may be a valuable tool in influencing public and workplace charging behavior as well.

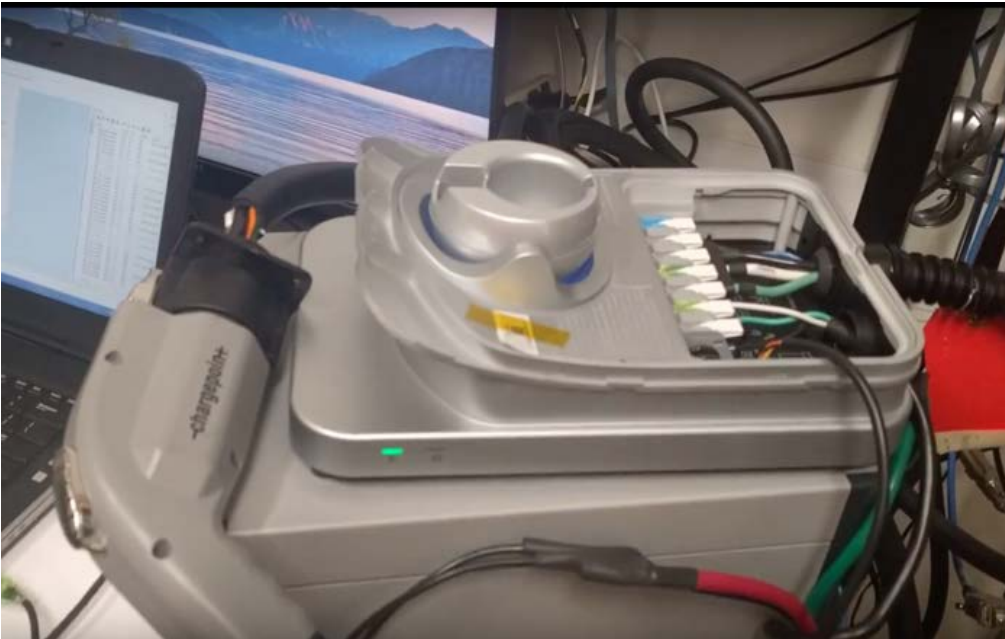
Simulation Results from LBNL V2G Sim

- + For DR events up to 4 hour in duration, 75%-95% of charging loads can be shifted forward without hurting individual driver mobility needs.
- + The post-DR demand peak can be mitigated by staggering the restart of EV charging



- + Load reduction potential increases with an understanding of a vehicle's future travel
- + Even with uncertainty in travel itineraries, over 65% of EV charging load can be shed during DR events.

15118 Integration on a ChargePoint Home Station



15118-enabled Home station atop the Vector system. This shows the SAE J1772 charging station connector coupled to an inlet, connected to the Vector test system.



Prototype Home station and Smart ED ready for testing in ChargePoint's lab

Laboratory Demonstration Goals

- + Integrate 15118 power line transceiver hardware into ChargePoint Home product
- + Establish connectivity with Daimler Smart Electric Drive vehicle
- + Demonstrate energy management capabilities using 15118 protocol
 - Pass-Through Pricing
 - Calculated Charging Schedule

Thank you!

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