

<b>DOCKETED</b>	
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<b>Project Title:</b>	Vehicle Grid Integration Roadmap Update
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*Comment Received From: David Schlosberg*  
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**VGI Policy & Planning Panel Presentation**

*Additional submitted attachment is included below.*

# CEC Vehicle-Grid Integration Roadmap Workshop

David Schlosberg, VP, Energy Market Operations

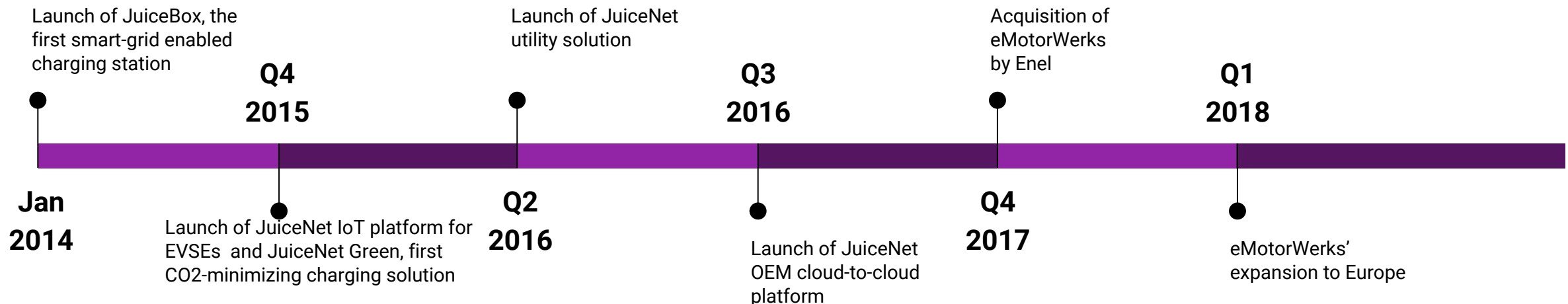
October 29, 2018



# eMotorWerks Overview



- eMotorWerks manufactures and sells smart EV chargers for homes, businesses and fleets
  - 35,000+ EV charging stations sold globally
  - Acquired by Enel Group in October 2017, part of Enel X
  - eMotorWerks' chargers operate with the express purpose of reducing greenhouse gas emissions, by working with individuals, businesses, utilities, CCAs and grid operators, to time charging when the electric grid is cheapest and cleanest.



# Enel X: Customer Innovation & Digitalization



- Transformation of the energy sector through sustainability, innovation, digitalization, and customer choice:
  - **E-Mobility** - EV charging infrastructure and services
  - **E-Industries** - “off-grid,” “limited grid” & distributed generation systems
  - **E-Home** - consumer solutions, focusing on smart home solutions
  - **E-City** - fiber optic, lighting, signaling and security solutions



# How Far Off on the Horizon?



- Carbon-free electric grid by 2045 (SB 100)
- Decarbonized California economy by 2045 (EO B-55-18)
- 5 million ZEVs by 2030 & 250,000 charge ports by 2025 (EO B-48-18)

**Integrating 100% Clean Energy  
with Smart EV Charging**





# How Do We Get There?



- Teach 'em ... young
- Grid-Integrated: “Off The Lot”
- Going Electric is Going VGI



# Smart EV Charging (aka “V1G”)



- Reducing / shifting EV charging to provide economic, reliability and environmental benefits
- Does not require discharge of EV battery back into the grid
- Key Attributes:
  - **Reliable:** Highly predictable, automated and fast responding
  - **Efficient:** Integrate more renewables into the grid & increase utilization of existing infrastructure, reducing average costs for all
  - **Cost Effective:** 1.5M Smart Charging EVs<sup>1</sup> can save \$1.3 - 1.6B in renewables integration costs (LBNL Study, 2018)<sup>2</sup>

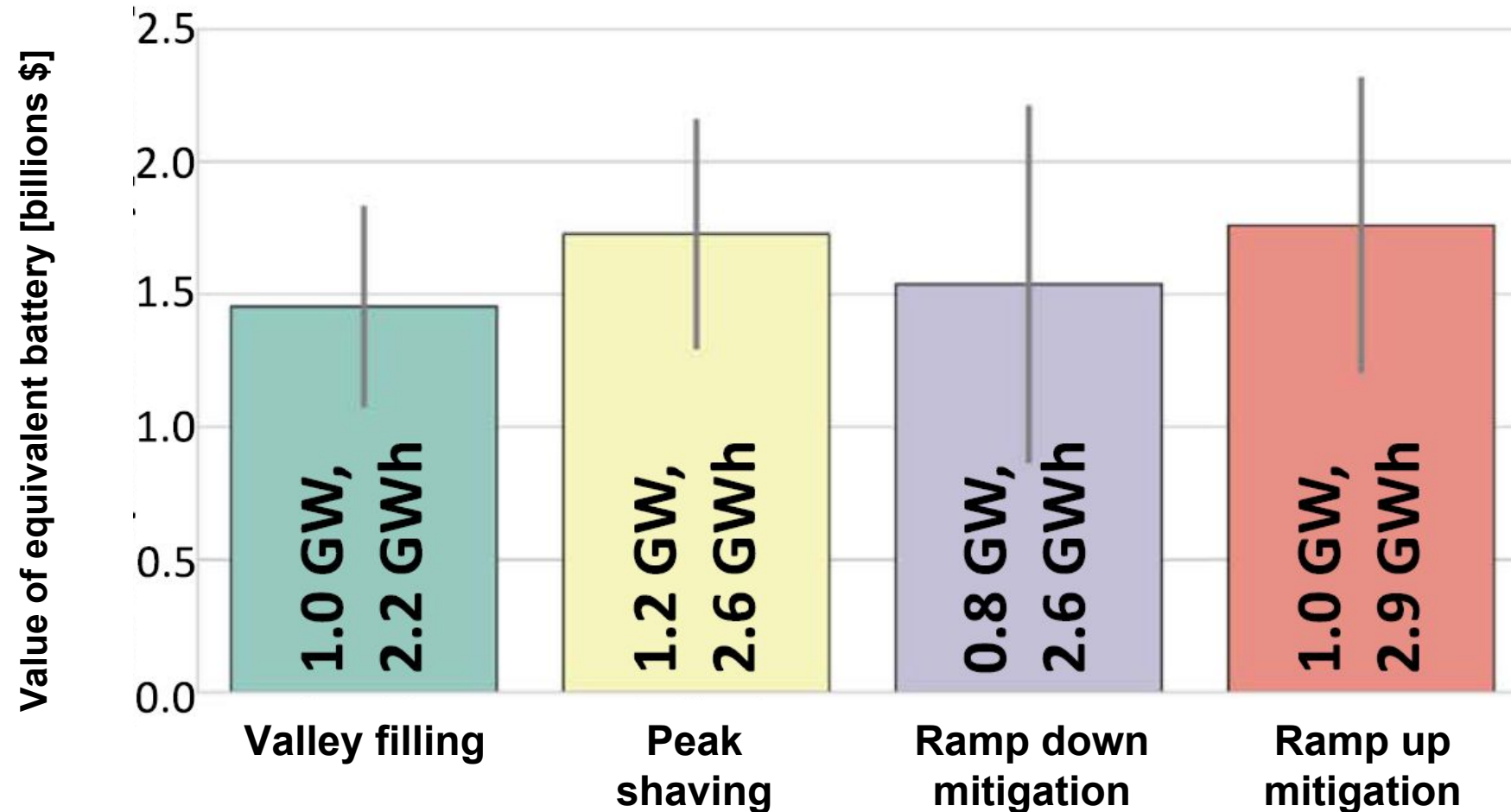
<sup>1</sup> Governor Brown Executive Order B-16-2012 - 1.5 million ZEVs by 2025

<sup>2</sup> <http://iopscience.iop.org/article/10.1088/1748-9326/aabe97/meta>



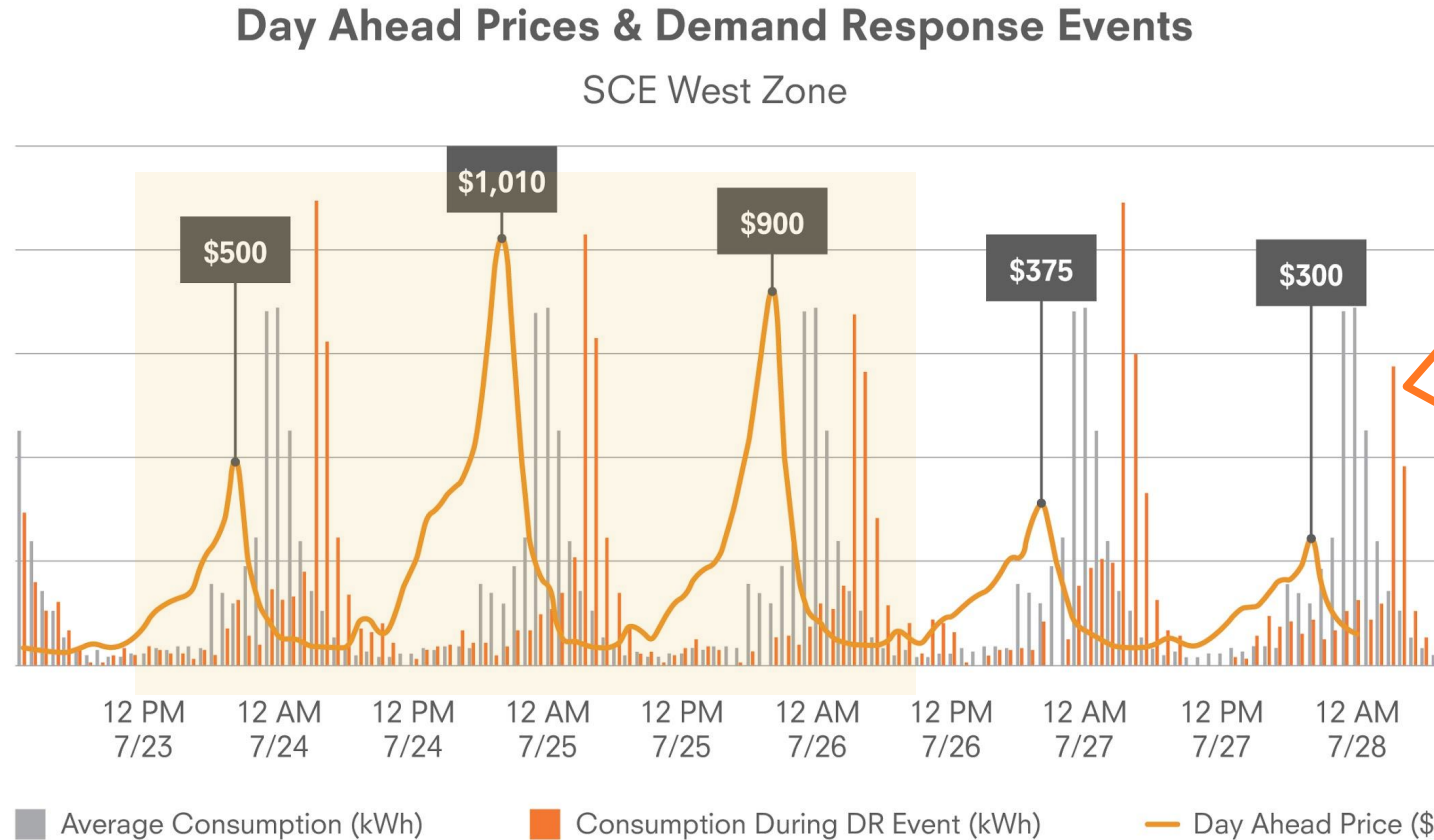
# “Clean vehicles as an enabler for a clean electricity grid<sup>1</sup>”

## Equivalent battery for V1G-only vehicles



<sup>1</sup> <http://iopscience.iop.org/article/10.1088/1748-9326/aabe97/meta>

# Day Ahead Prices & Demand Response Events



Data based on five-day period, July 2018

- 3 CAISO Flex Alert Days, plus No Maintenance Days
- Day Ahead prices @ Price Cap
- All eMotorWerks' CAISO Resources dispatched for multiple hours
- Dispatched EVSE network to shift demand to lowest cost intervals

# Next-Gen Vehicle-Grid Integration



Need for a concerted Statewide effort toward a **VGI Services Market Transformation**

- CA needs to learn:
  - **What** - the reliability & economic products to be procured (including wholesale vs distribution level)
  - **How** - contracting / market mechanisms
  - **When** - vehicles are available to provide services
  - **Where** - vehicles will reside when providing the services

Thank you!