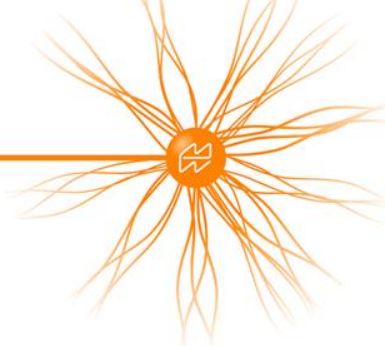




# Creating a \$Multi-Billion Energy Services Platform

# Problem: EV Charging is Broken Today



## For Drivers

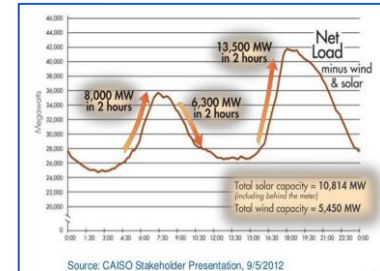
No controls  
No interfaces  
High cost



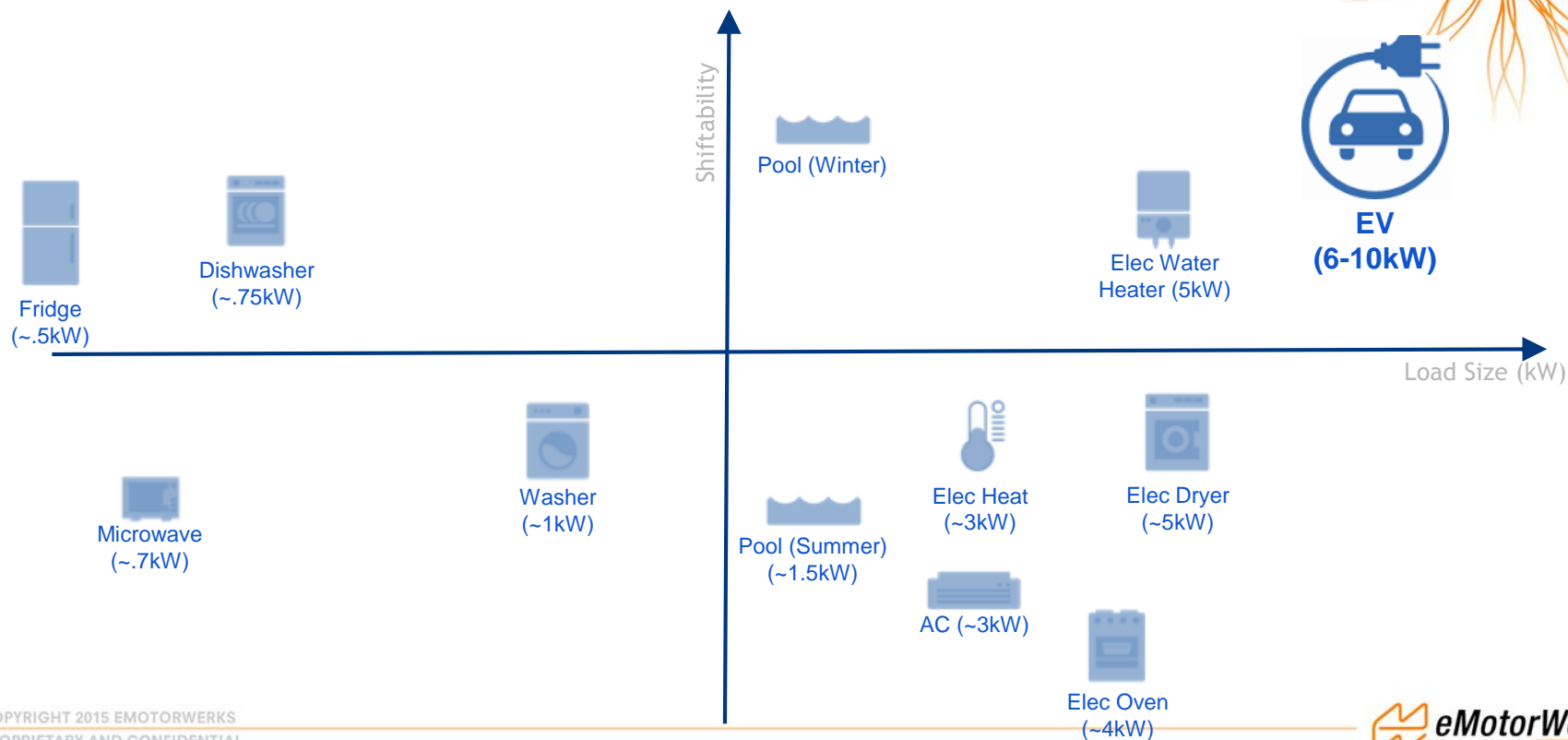
\$899  
48A

## For the Grid

Peaks at worst times  
Geo-Concentrated  
Uncontrollable



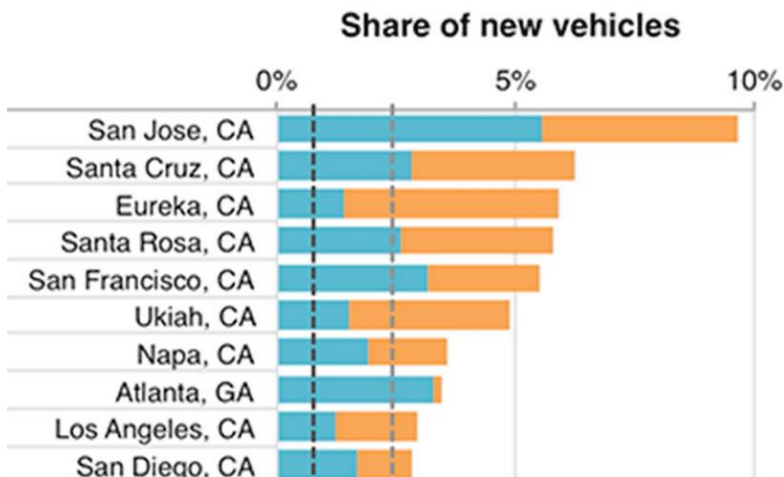
# EV Impacts Household Load




# EV Market is Exploding...

*"The electrification of the automobile is inevitable"*

-- Bob Lutz, GM Chairman --



Mass-market 200+ Mile EVs	
	
Annual Sales <sup>1</sup>	EVSE Installed <sup>2</sup>
3.8M+	12.7M+

2015

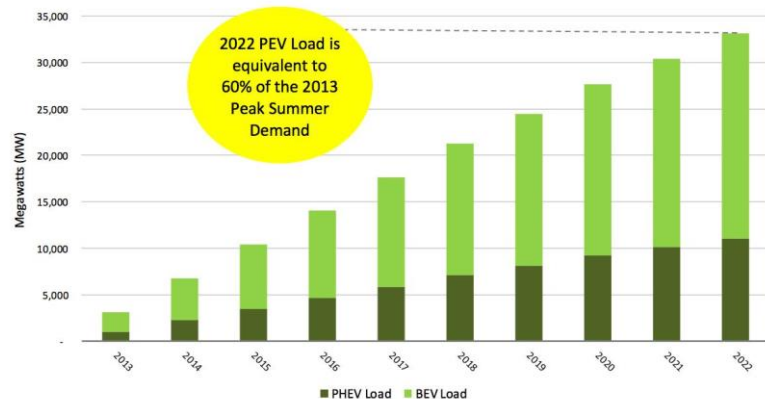
2020

# Advent of Renewable Portfolio Standards

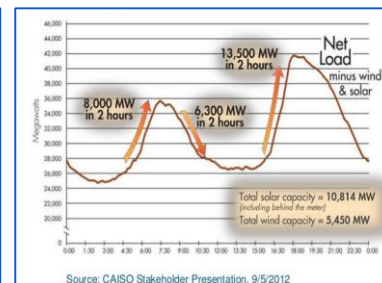
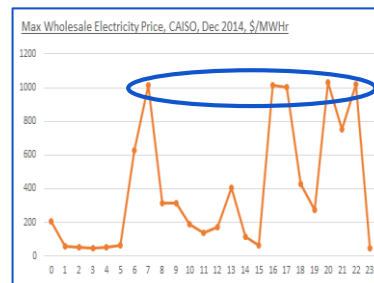
Intermittence requires more grid balancing more often



**Figure 1:** Cumulative statewide expectation for Battery and Plug-in Hybrid Electric Vehicle Capacity. (CEC California Energy Demand 2012-2022 Final Forecast.)



High peak energy costs  
Costly capacity upgrades  
High volatility & ramp rates



# ...Quickly Multiplying Scale of the Problem



**10M EVs in US  
by 2025**

**VS.**



**100 GW addl peak demand,  
representing  
15-25% of US load**

# JuiceNet Energy Services Platform



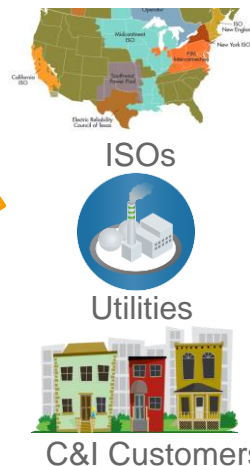
## JuiceBox™

Precise charge rate control  
3-second control latency  
Instant local grid response  
Remote control API  
Best-in-class UX & design



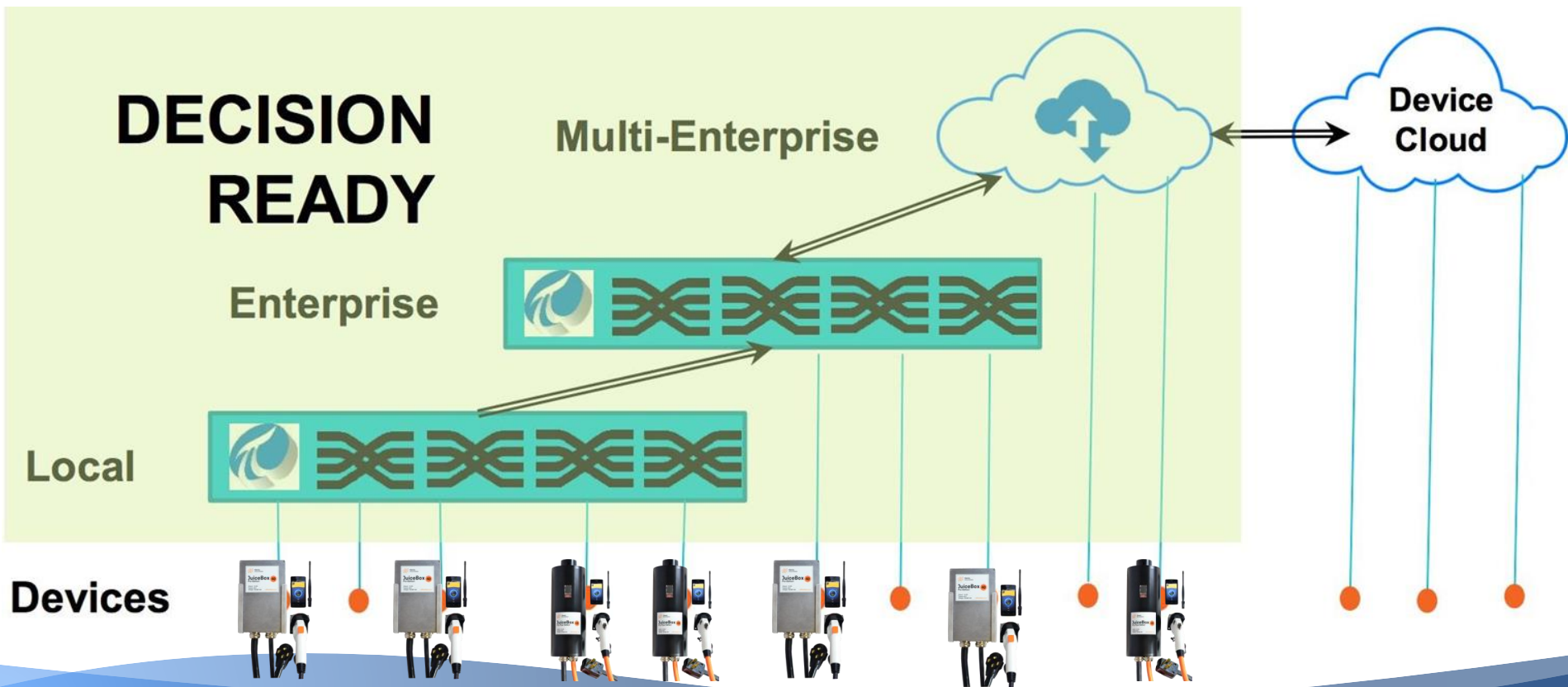
## JuiceNet™

Predictive grid model  
Cloud-based load management & dispatch  
Cloud-based market engine  
Predictive, self-learning driver behavior model



Control of any Smart[Grid] appliance → EV, Water Heater, Pumps, etc.

# PI Infrastructure for Demand Flexibility



# Ready To Scale with PI



- 5,000+ JuiceBox in use, stable platform (V12)
- Great grid model unit economics  
→ Charging with an ROI
- High-profile deployments with key energy players



*Pacific Gas and Electric Company*



# EMW and Pi



- 100% of the ISOs/RTOs in the USA use the PI System
- Juice Boxes further enable ISO's to address grid imbalances
- OSIsoft will enable DER markets and Demand Flexibility



# Call to Action



1. How can your Utility, ISO, or RTO turn EVs from Challenge into Opportunity?
1. How can your EV OEM provide free EVSE's & infrastructure to its drivers?
1. How can we help you make this happen with PI?



# Thank You!

Alan White, [alan@emotorwerks.com](mailto:alan@emotorwerks.com)