Smart GRID

SDGE connected

A Sempra Energy utility℠

Lee Krevat , Director
Smart Grid, Clean Transportation and
Intellectual Capital

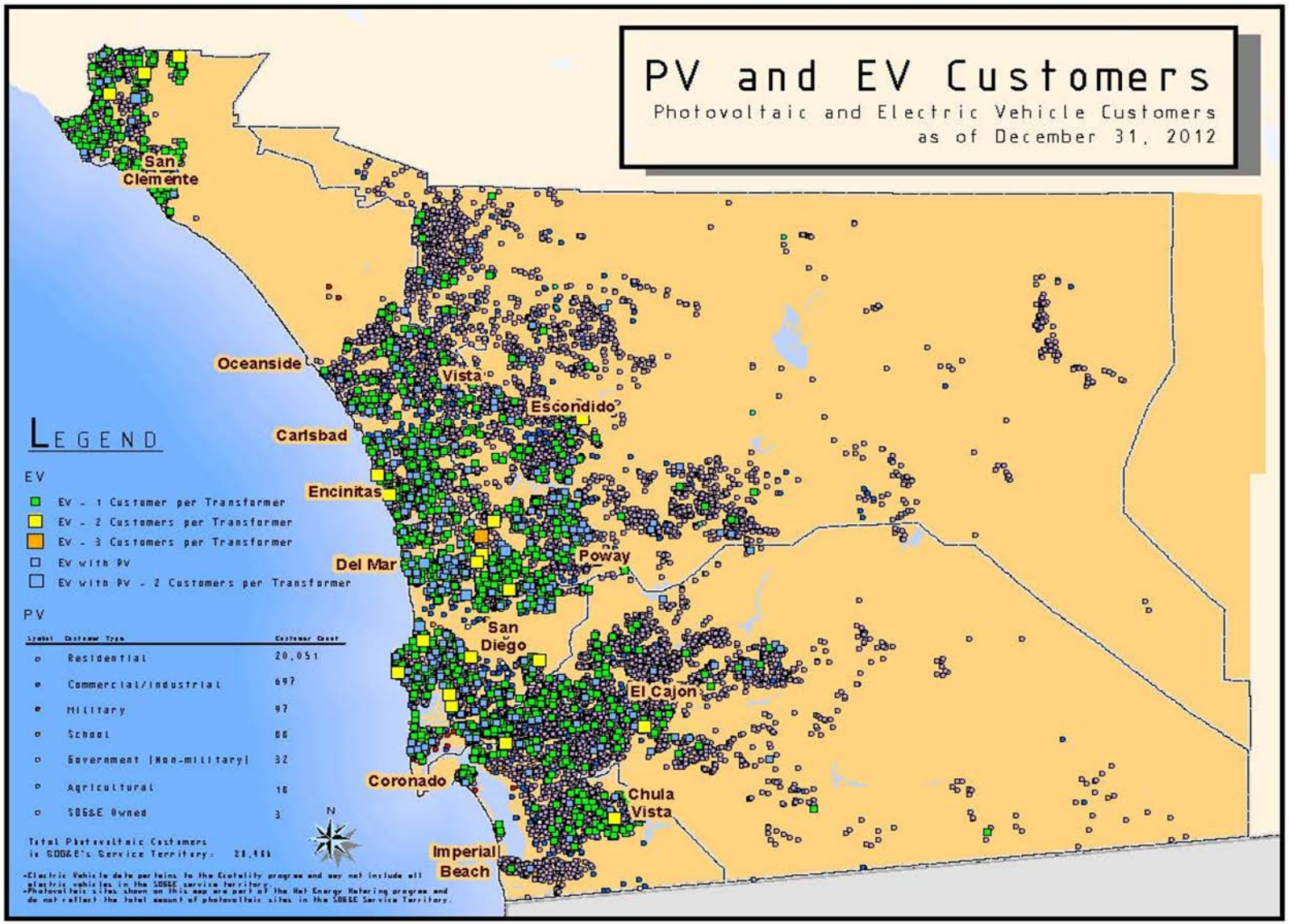


The National Town Hall Meeting

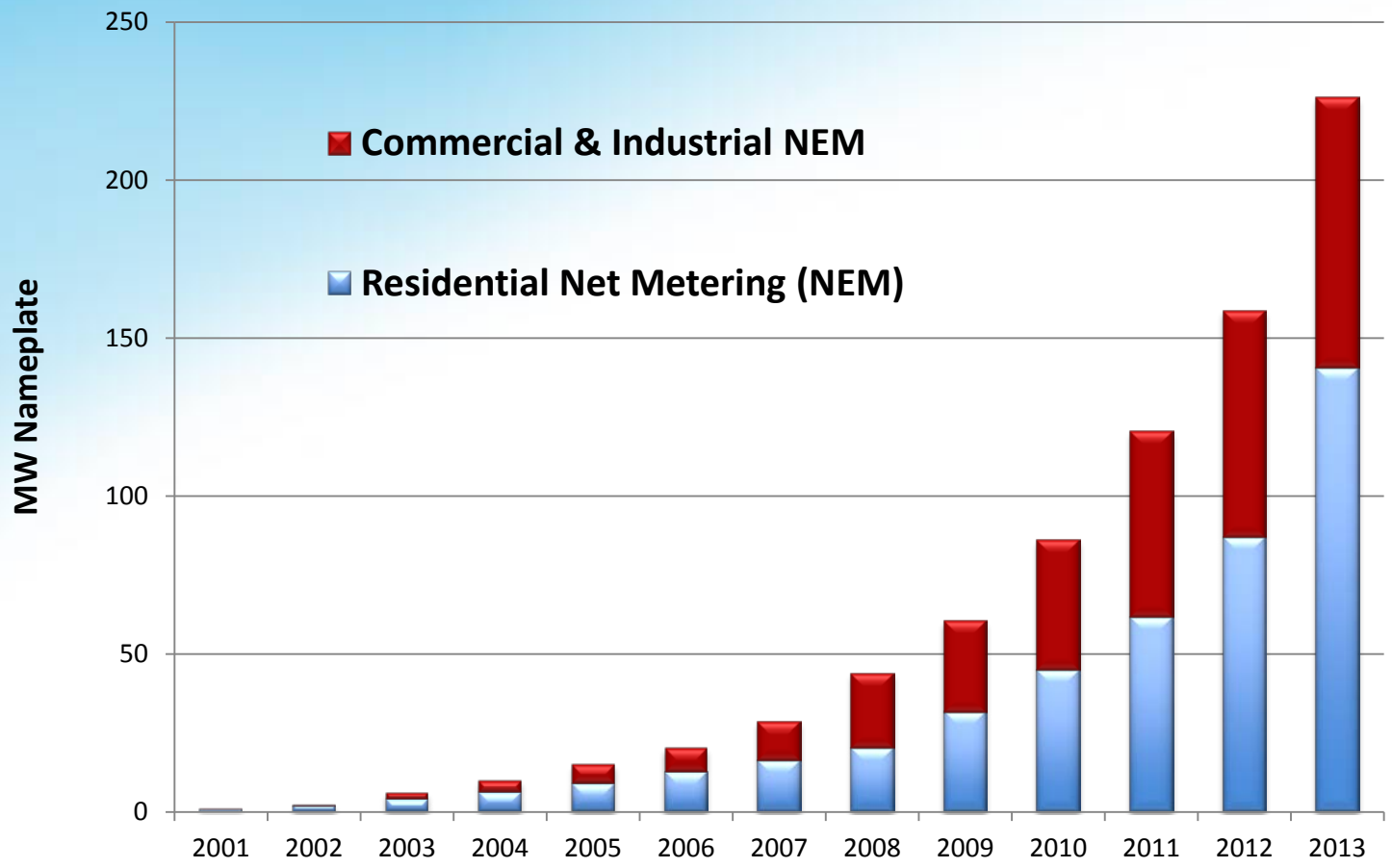
Making Room for the "Others"

May 21, 2014

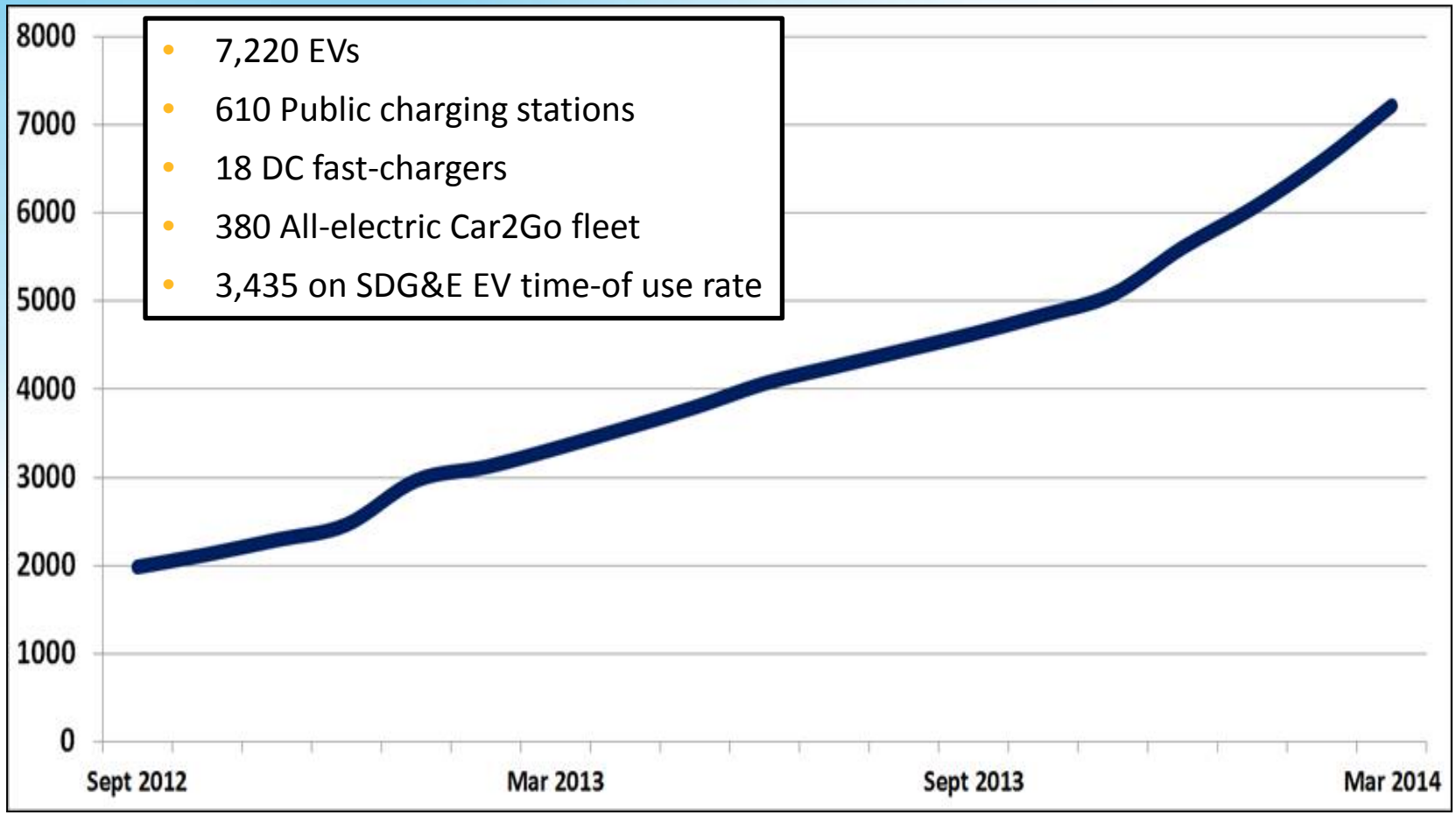
Integration of DER
Solar & Electric Vehicle Customers



Commercial & Residential Generation

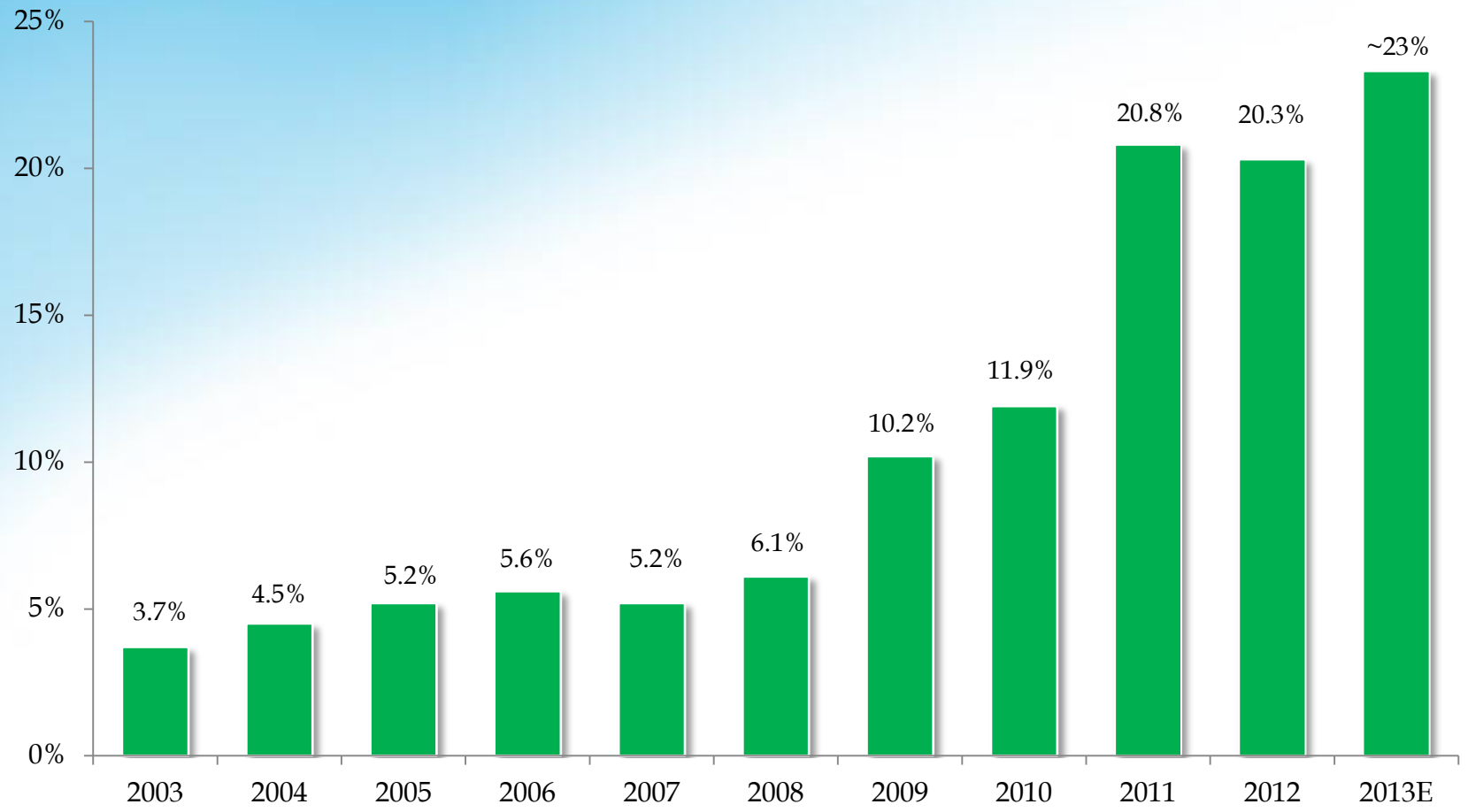


San Diego EV Growth

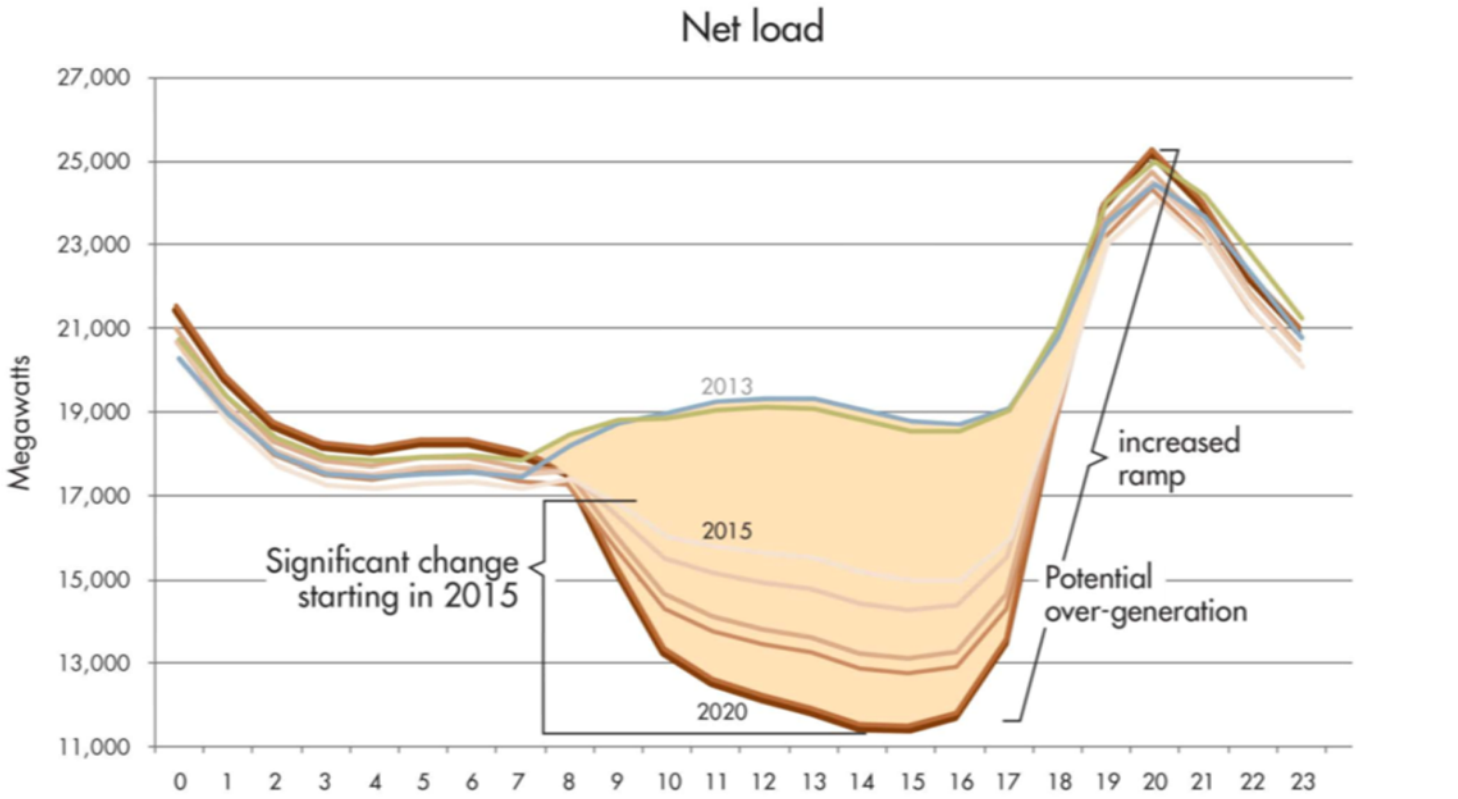


As of March 2014

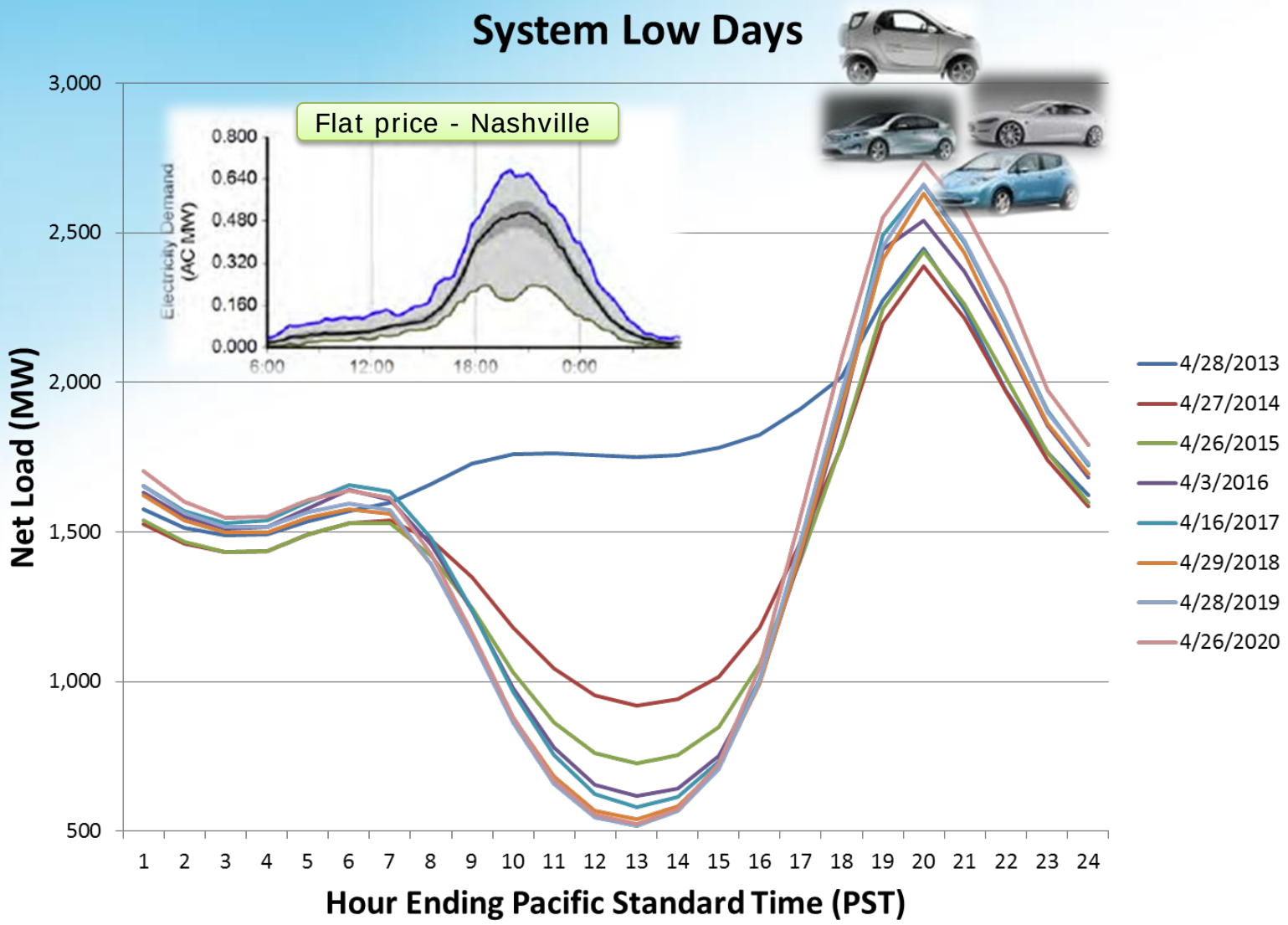
SDG&E's Renewable Progress



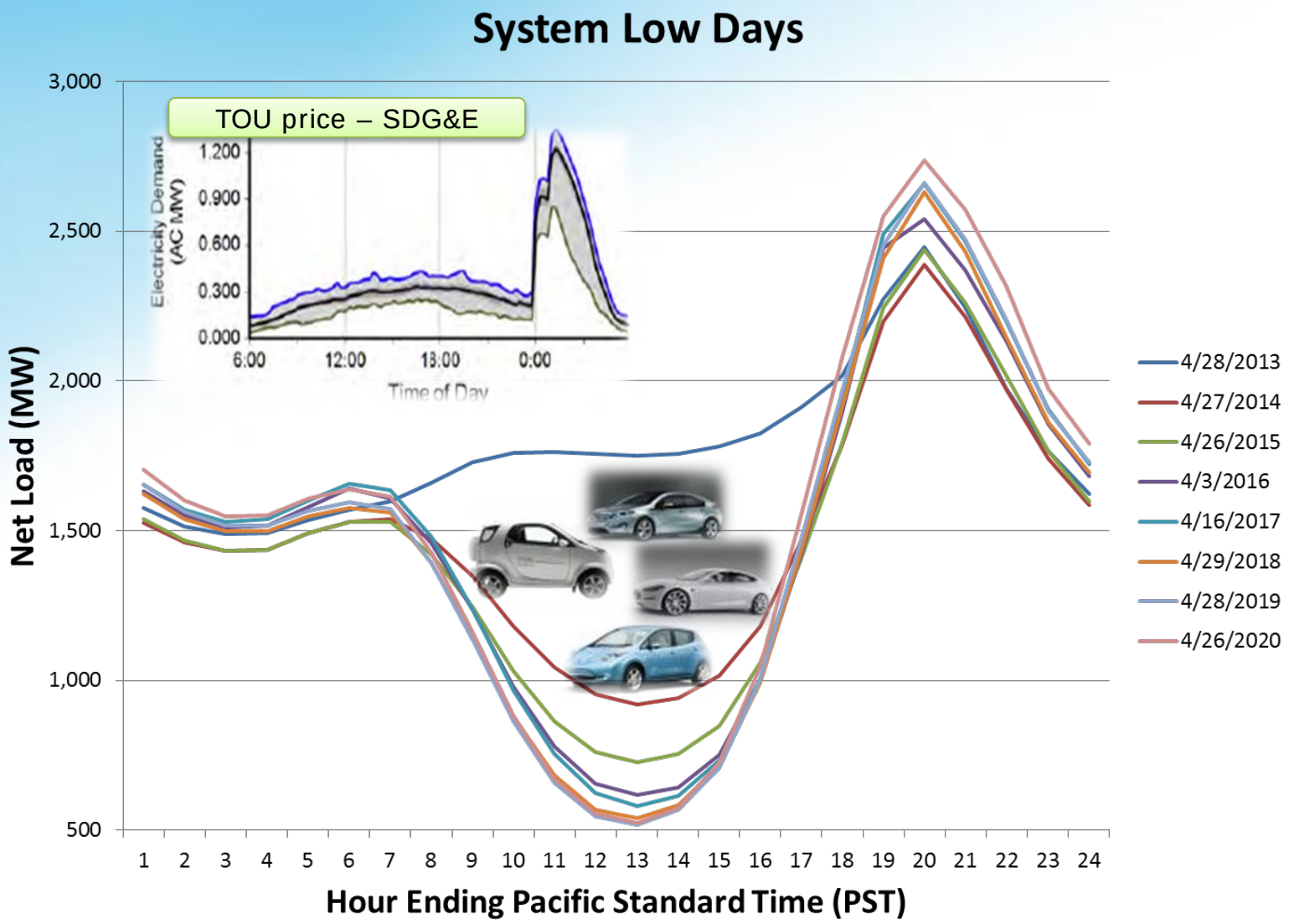
California's Growing Need for Flexibility



Demand, Net of Renewable Energy



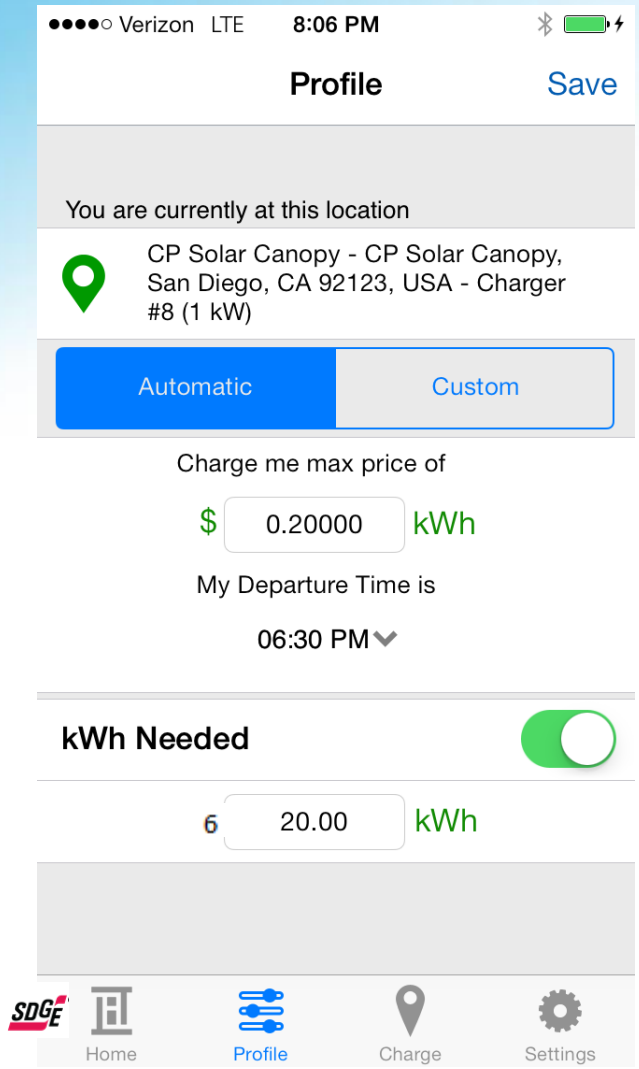
Demand, Net of Renewable Energy



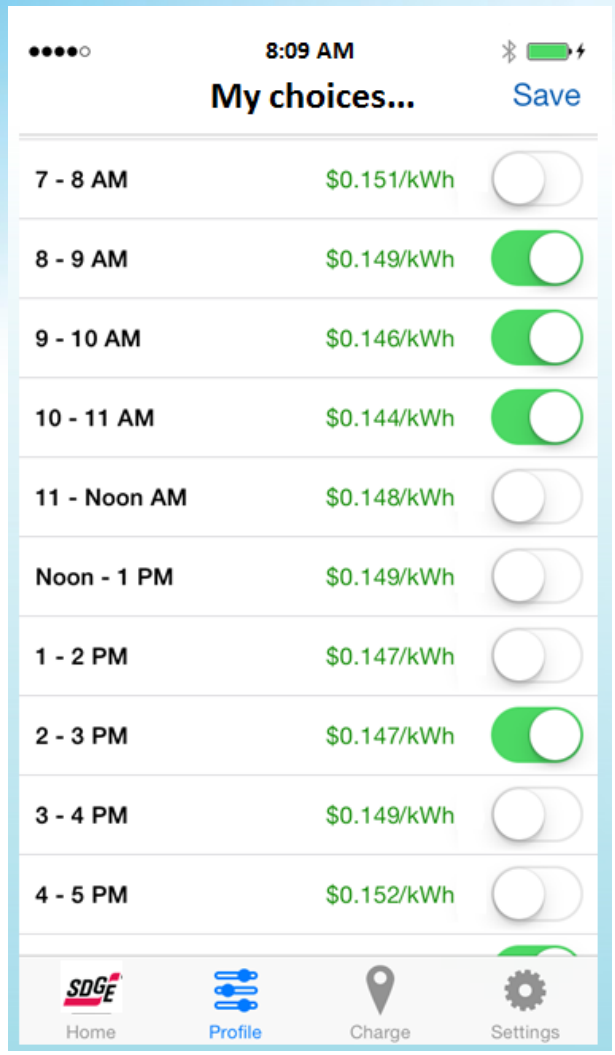
SDG&E Employee Charging System



Example of Automatic Phone App Setting



Example of Custom Phone App Setting



How to build the VGI Rate

- **Step 1:**
  - Start with the VGI Rate prior to the addition of the CAISO Day-Ahead Price. This rate includes the VGI Base Rate (Transmission, PPP, ND, CTC, RS, and the DWR-BC), the VGI Distribution Base Rate, and the VGI Commodity Base Rate. This results in a flat hourly rate.
- **Step 2:**
  - Add the CAISO Day-Ahead Price. The CAISO Day-Ahead Price varies by hour.
- **Step 3:**
  - The end result is a VGI Rate that reflects the hourly differences in the CAISO Day-Ahead Price.

	Step 1		Step 2		Step 3
Hour Beginning	VGI Rate Pre-CAISO		CAISO Day-Ahead Price		VGI Rate (with CAISO)
	(cents/kWh)		(cents/kWh)		(cents/kWh)
0	12.7	+	3.3	=	16.1
1	12.7		3.2		15.9
2	12.7		3.0		15.7
3	12.7		2.9		15.6
4	12.7		2.8		15.6
5	12.7		2.9		15.6
6	12.7		3.1		15.8
7	12.7		3.1		15.9
8	12.7		3.3		16.0
9	12.7		3.3		16.0
10	12.7		3.3		16.0
11	12.7		2.9		15.7
12	12.7		2.9		15.6
13	12.7		2.9		15.6
14	12.7		2.9		15.7
15	12.7		3.1		15.8
16	12.7		3.3		16.1
17	12.7		4.3		17.1
18	12.7		4.9		17.6
19	12.7		4.6		17.3
20	12.7		4.5		17.2
21	12.7		4.0		16.8
22	12.7		3.7		16.5
23	12.7		3.2		15.9

Illustration of a Day with Top 150 System Peak Hours - Example 2

	Step 1	Step 2	Step 3	Step 4	Step 5
Hour Beginning	VGI Rate Pre-CAISO	CAISO Day-Ahead Price	Average	C-CPP	VGI Rate (CAISO and Hourly Adder)
	(cents/kWh)	(cents/kWh)	(cents/kWh)	(cents/kWh)	(cents/kWh)
0	12.7	3.3			16.1
1	12.7	3.2			16.0
2	12.7	3.1			15.8
3	12.7	3.1			15.8
4	12.7	3.2			15.9
5	12.7	3.3			16.0
6	12.7	3.6			16.4
7	12.7	3.7			16.5
8	12.7	3.8			16.6
9	12.7	4.3			17.0
10	12.7	4.9			17.7
11	12.7	5.0			17.7
12	12.7	5.0			17.7
13	12.7	5.4	6.1	62.2	81.1
14	12.7	5.8	6.1	62.2	81.1
15	12.7	6.7	6.1	62.2	81.1
16	12.7	6.4	6.1	62.2	81.1
17	12.7	5.5			18.3
18	12.7	5.2			18.0
19	12.7	5.3			18.0
20	12.7	5.2			17.9
21	12.7	4.5			17.3
22	12.7	4.0			16.8
23	12.7	3.8			16.5

Illustrative Day with Surplus Energy Occurrence

	Step 1		Step 2		Step 3		Step 4		Step 5
Hour Beginning	VGI Rate Pre-CAISO		CAISO Day-Ahead Price		VGI Rate (with CAISO Day-Ahead)		CAISO Day-of Price		VGI Rate (with CAISO)
	(cents/kWh)		(cents/kWh)		(cents/kWh)		(cents/kWh)		(cents/kWh)
0	12.7	+	3.3	=	16.1	=	3.4	=	16.1
1	12.7		3.2		15.9		3.3		15.9
2	12.7		3.0		15.7		3.0		15.7
3	12.7		3.0		15.7		2.4		15.7
4	12.7		2.9		15.6		1.7		14.5
5	12.7		3.0		15.7		3.2		15.7
6	12.7		2.9		15.6		3.3		15.6
7	12.7		2.7		15.4		3.4		15.4
8	12.7		2.9		15.6		2.3		15.6
9	12.7		3.1		15.8		(6.8)		5.9
10	12.7		3.3		16.0		(7.3)		5.4
11	12.7		3.5		16.2		0.7		13.5
12	12.7		3.5		16.3		(0.3)		12.4
13	12.7		3.7		16.4		1.7		14.4
14	12.7		3.7		16.5		1.8		14.5
15	12.7		3.8		16.5		1.0		13.7
16	12.7		3.8		16.5		2.8		15.5
17	12.7		4.3		17.0		3.2		15.9
18	12.7		4.6		17.3		3.4		16.1
19	12.7		5.5		18.2		7.5		18.2
20	12.7		4.8		17.6		3.8		16.6
21	12.7		4.4		17.2		4.5		17.2
22	12.7		3.7		16.4		3.5		16.4
23	12.7		3.5		16.2		3.2		16.2

Pilot Benefits to All Customers

- Reduces on-peak charging and the need to build power plants
- Doubles zero-emission miles for plug-in hybrids
- Use of energy storage capacity of EV to take energy when supply is plentiful (integrate renewable energy)
- Increase EV sales and reduces risk of market stalling
- Helps EV charging companies – RFP will attract multiple suppliers and advance Diverse Business Enterprise objectives
- Educates customers about dynamic pricing
- Provides data to guide CPUC policy
- Positions market for “Vehicle-to-Grid”
- Increases US energy independence
- Reduces harmful air emissions



Questions?

SDGE connected
A Sempra Energy utility℠

Thank You



Lee Krevat, Director
Smart Grid, Clean Transportation and Intellectual Capital

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