SOUTHERN CALIFORNIA
EDISON®
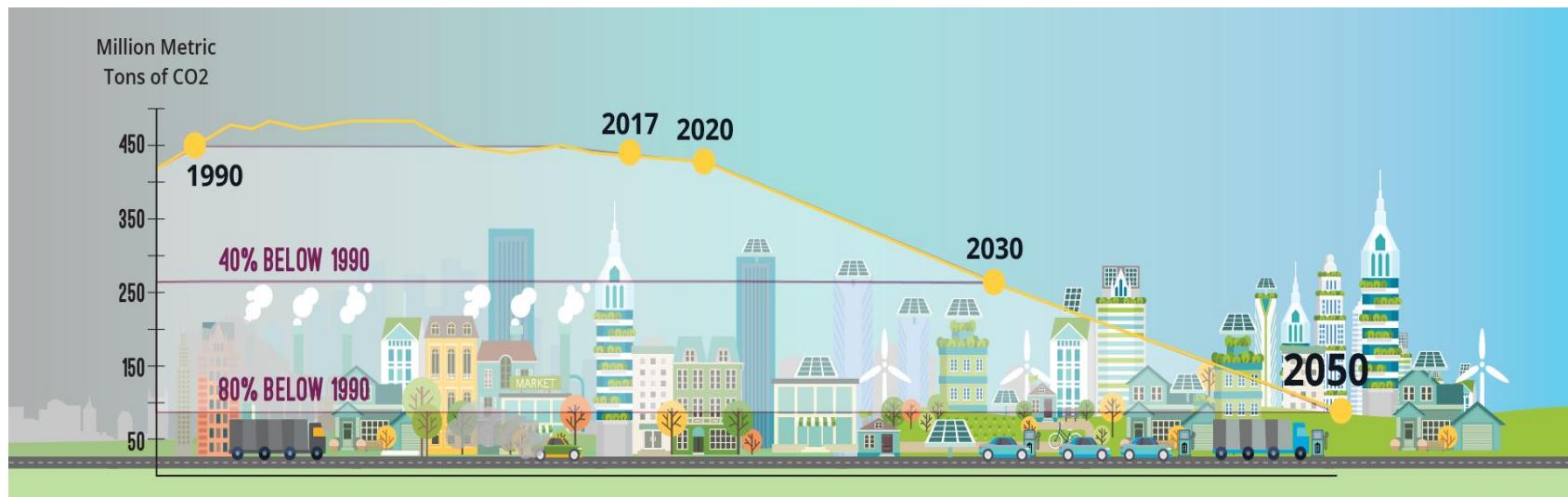Energy for What's Ahead℠

Load Forecast for Meeting California's Decarbonization Goals Under SB32

Demand and DER Forecasting Group, SCE

August 01, 2019

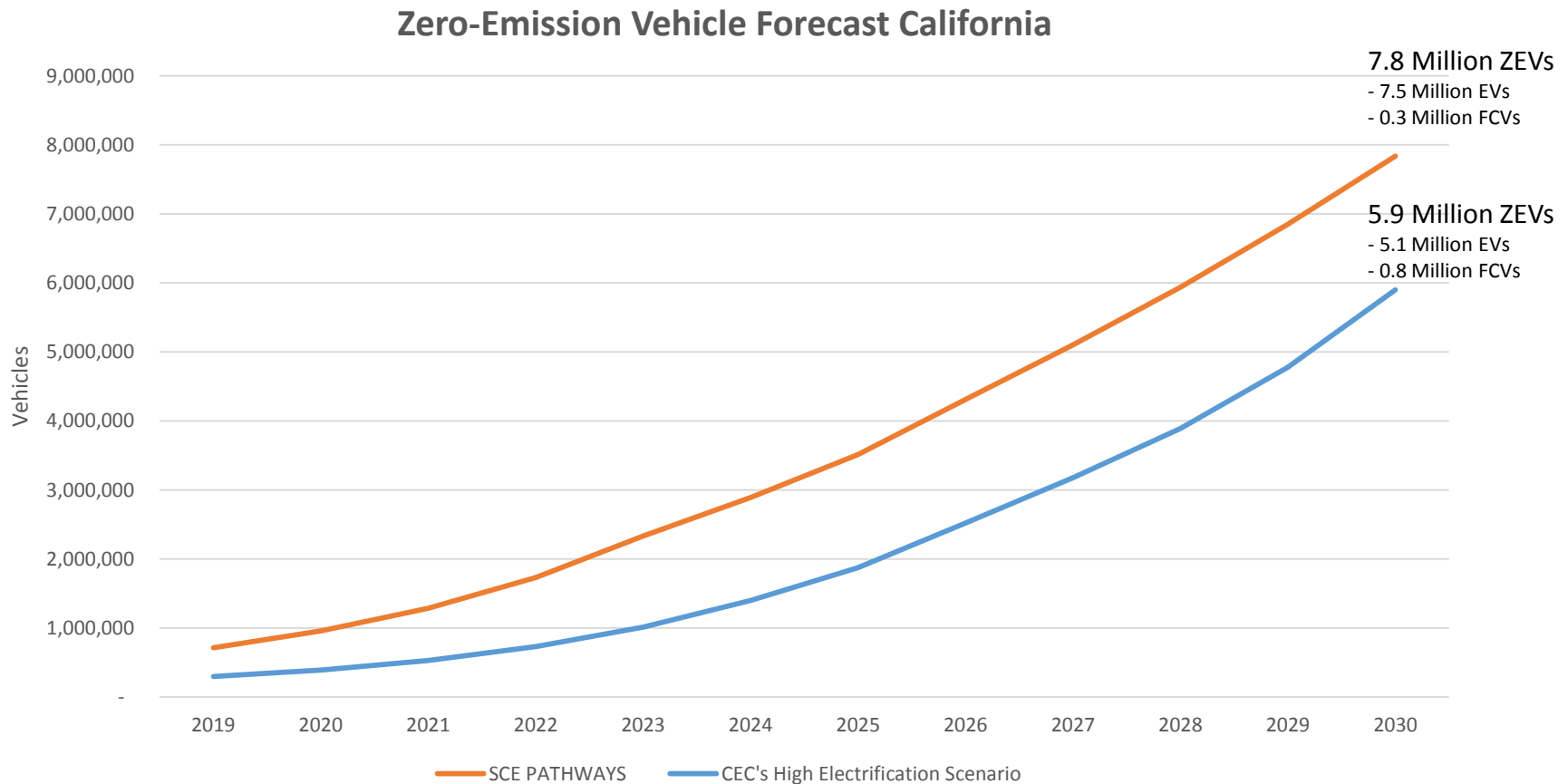# Aligning Demand Forecast to Support State's GHG Goals

- California targets **reduce GHG emissions 40%** below 1990 levels by 2030, and Carbon Neutrality by 2045.
- Affordably reaching the 2030 goals and beyond will require **significant electrification of the transportation and building sectors** among other measures.
- Assessing the electric sector impacts of meeting these goals occurs through the **CPUC's Integrated Resource Planning (IRP) process, which utilizes IEPR demand forecast** scenarios to develop various scenarios that comprise the Reference System Plan
- To assess the impacts of more stringent 2030 GHG targets for the electric sector (i.e. 30 MMT), **IRP process would benefit from a CEC IEPR demand forecast scenario that includes electrification levels needed to meet the economy-wide targets.**

Part I:
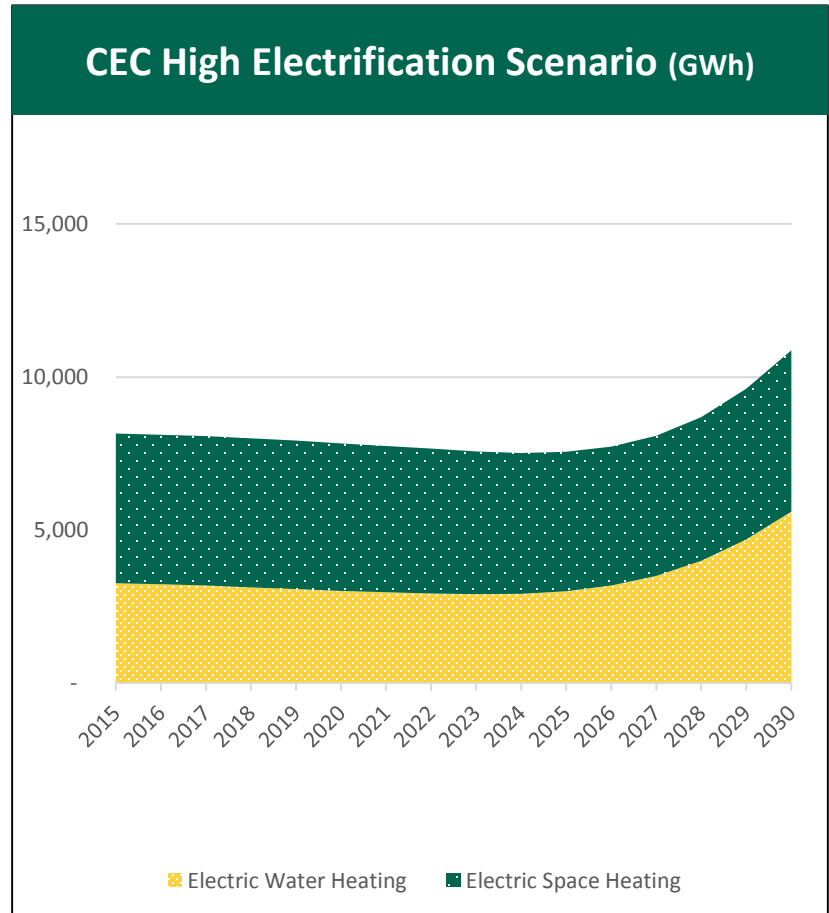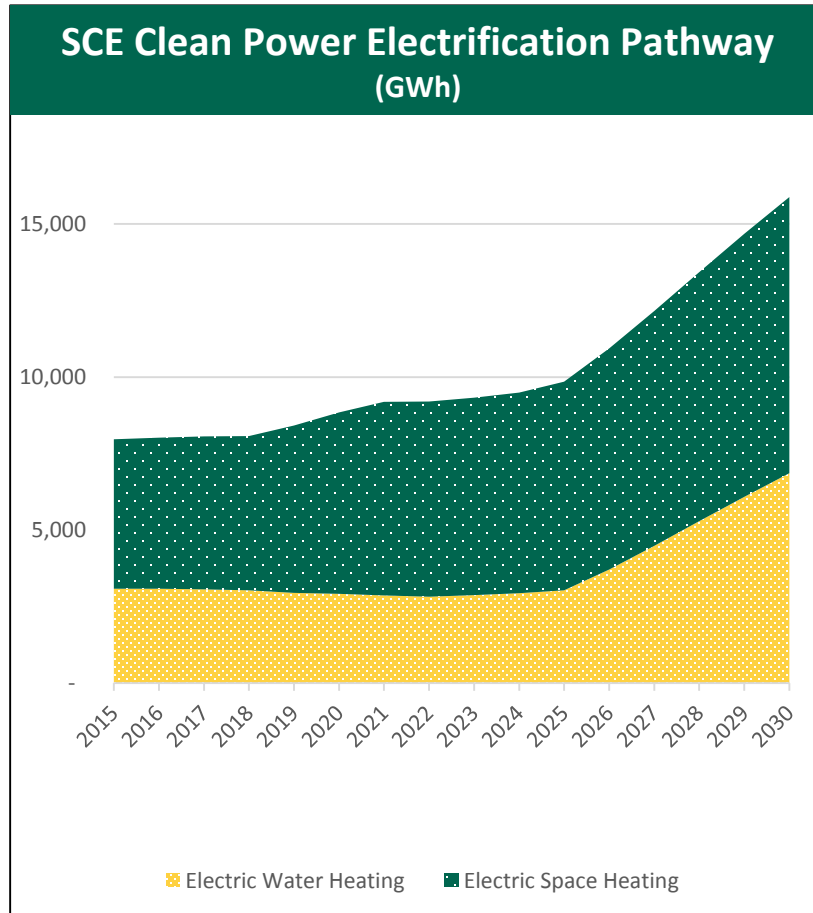## SCE's Perspectives on "High Electrification" Scenario Forecast

Light Duty ZEV Forecast for California

SCE found that in the transportation sector, approximately 7.8 million light-duty ZEVs are needed statewide by 2030 to meet California's GHG emission targets.

Zero-Emission Vehicle Forecast California

7.8 Million ZEVs
- 7.5 Million EVs
- 0.3 Million FCVs

5.9 Million ZEVs
- 5.1 Million EVs
- 0.8 Million FCVs

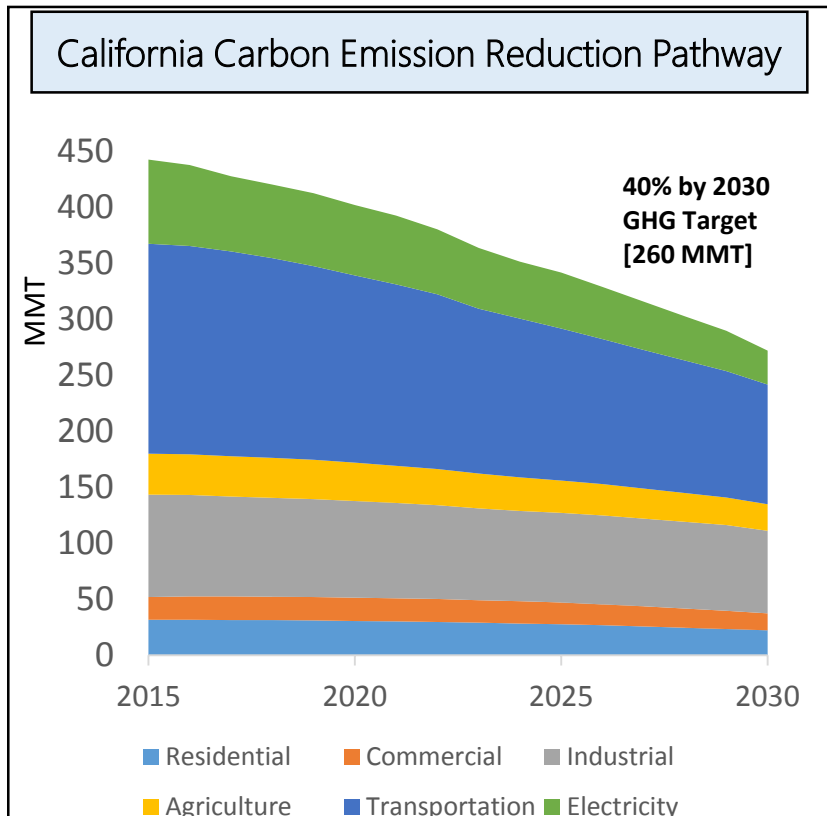Legend: SCE PATHWAYS — CEC's High Electrification Scenario

Building Electrification - Electric Water and Space Heating

- SCE found that in the building electrification sector, approximately 30% electrification of water and space heating by 2030 represents cost-effective and feasible pathways for California to meet its 2030 GHG targets.

SCE Clean Power Electrification Pathway (GWh)

Legend: Electric Water Heating, Electric Space Heating

CEC High Electrification Scenario (GWh)

Legend: Electric Water Heating, Electric Space Heating

CA's carbon goals will require widespread electrification

SCE recommends development of "high electrification*" IEPR load forecast scenario for future use in CPUC's IRP process

California Carbon Emission Reduction Pathway

40% by 2030 GHG Target [260 MMT]

Select 2030 Measures	SCE Pathway	E3/CEC High Elec.
GHG-Free Electricity	80%	74%
Energy Efficiency	SB 350 Compliant	SB 350 Compliant
EV Transportation	~7.5MM	~5.1MM
Building Elect. [% of Res. space and water heating]	~30%	~20%

*E3/CEC High Electrification Scenario in "Deep Decarbonization in a High Renewables Future" study is a useful guide for developing demand forecast scenario that reflects decarbonization of other sectors.

Part II:
SCE's BTM Energy Storage Forecast

SCE Total Energy Storage, Up to July 2019

SCE has observed significant growth in BTM energy storage adoptions in recent years.

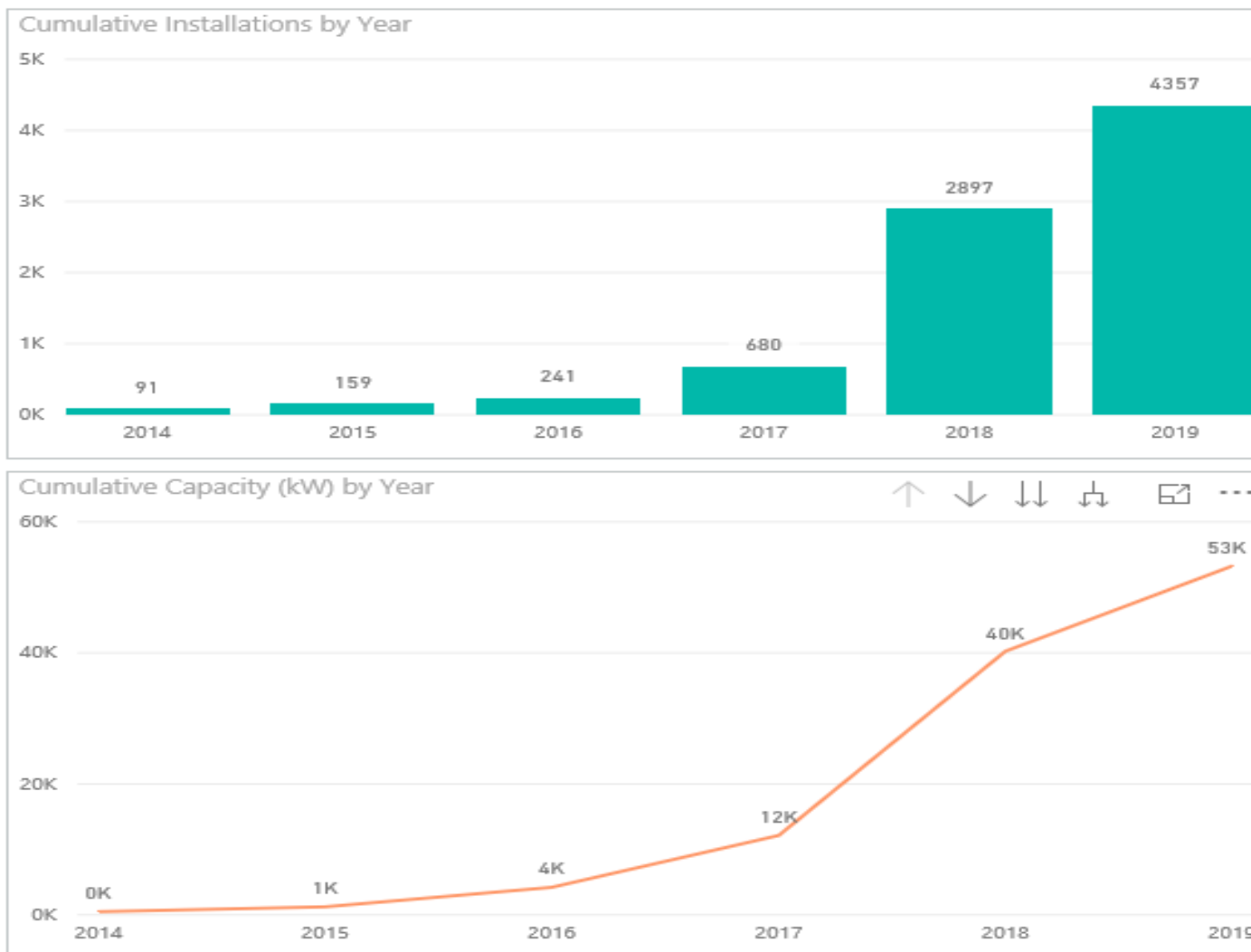### Cumulative Installations

Cumulative ES MW
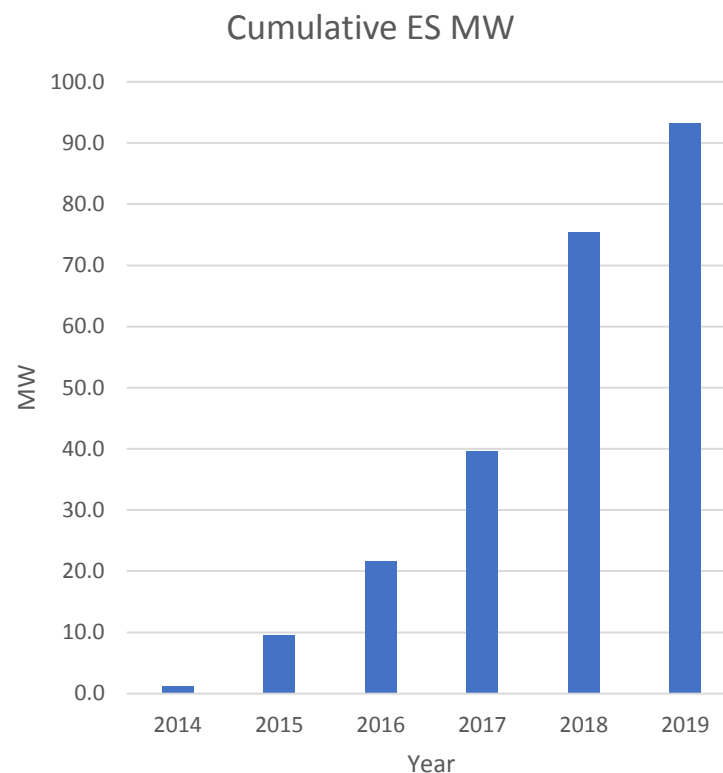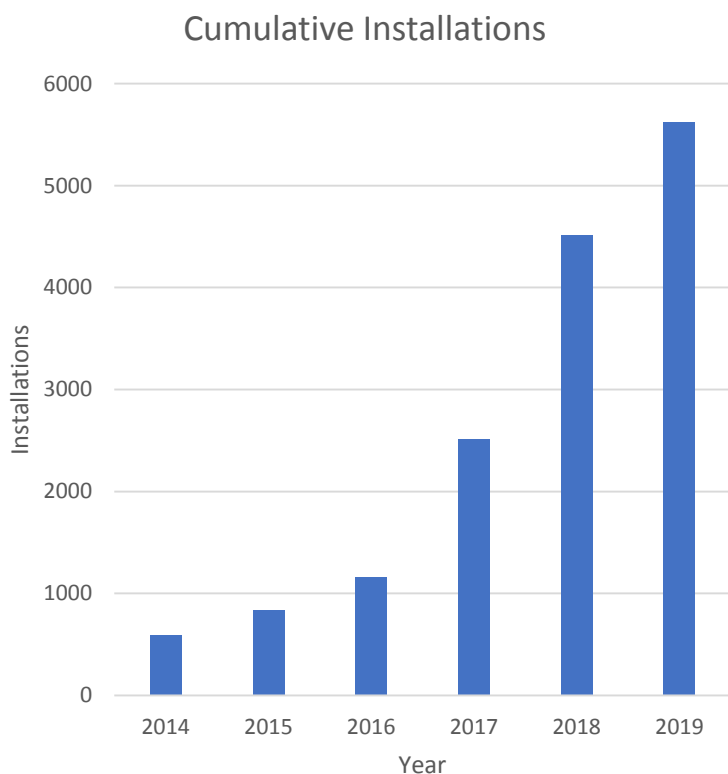
*SGIP weekly report data
** 2019 is prorated.

SCE Paired ES, Up to June 2019

Most of the recent storage growth comes from paired PV/Storage system adoptions.

Cumulative Installations by Year

Year	Installations
2014	91
2015	159
2016	241
2017	680
2018	2897
2019	4357

Cumulative Capacity (kW) by Year

Year	Capacity
2014	0K
2015	1K
2016	4K
2017	12K
2018	40K
2019	53K

*SCE NEM data

SCE Paired ES, Add on vs. New Pair

Prior to 2018, majority of paired storage systems were added to existing buildings with PV systems installed already. Since 2018, SCE has observed more installations of the combo systems.

Percentage of Add-on and New Pair ES
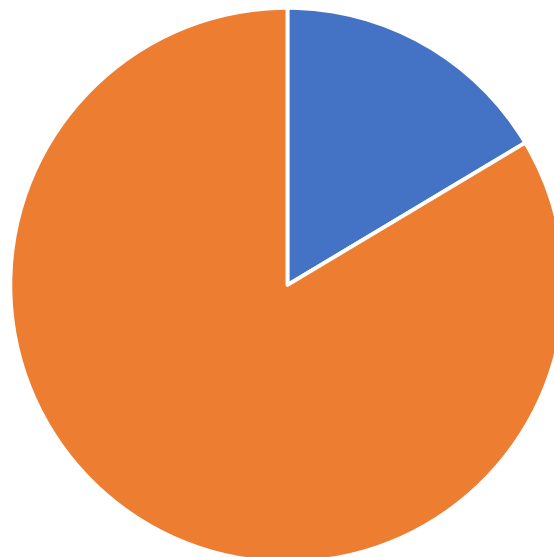
*SCE NEM data
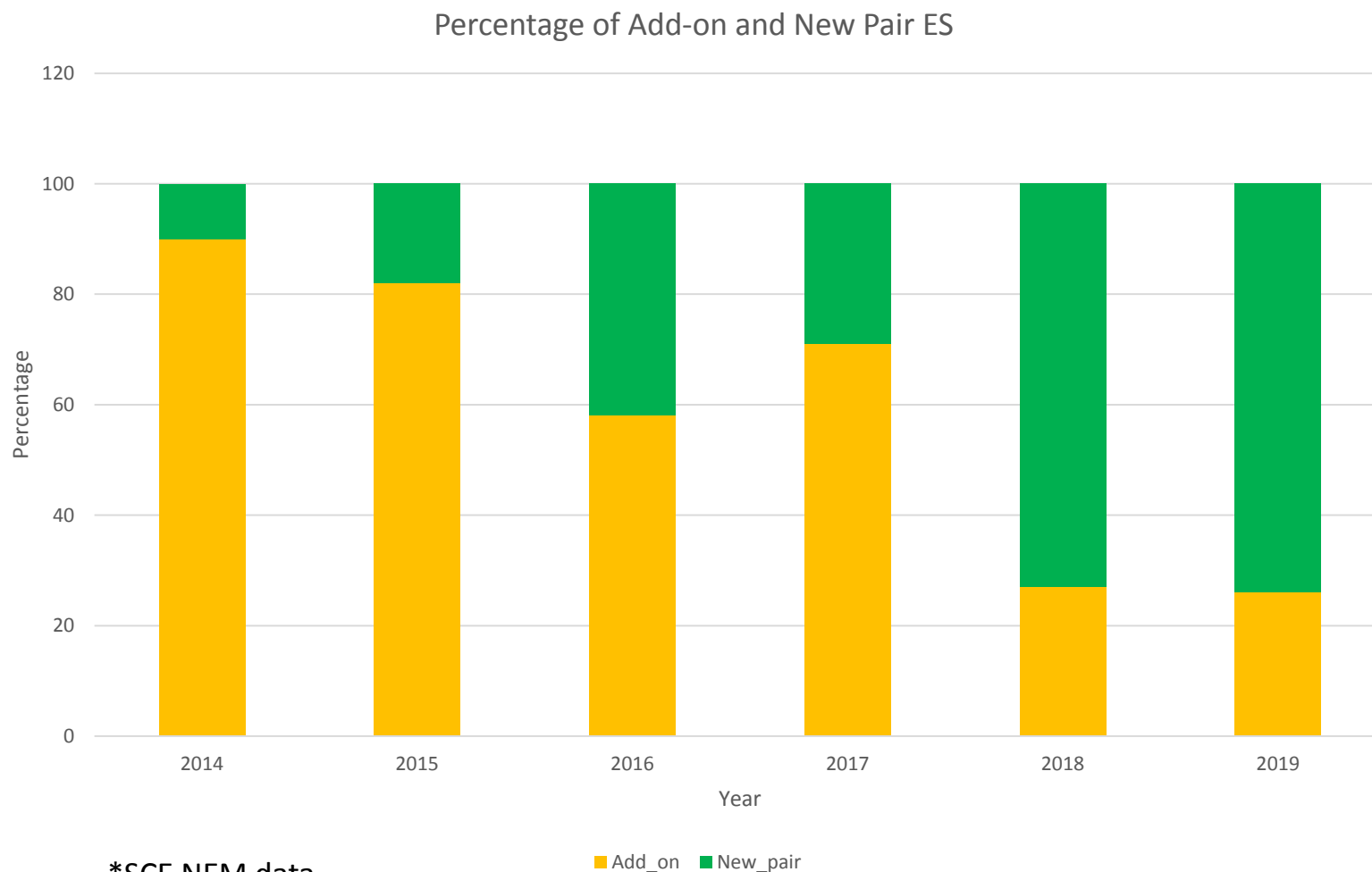
SCE ES Breakdown by Sectors

SCE's residential sector has picked majority of the storage system installations while the commercial sector still accounts for most of the MWs installed so far due to the large system sizes.

Installations by Sectors
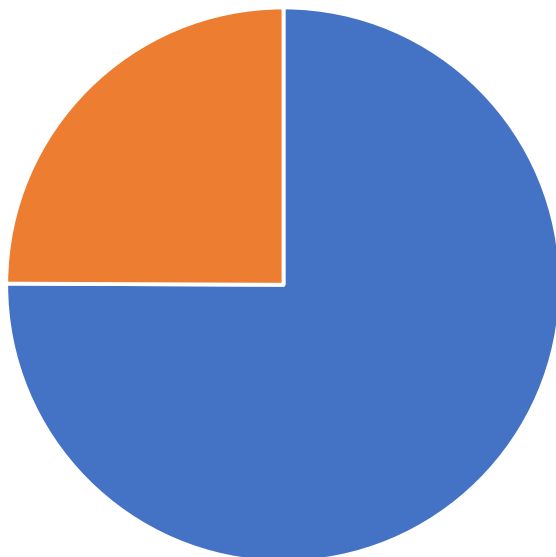
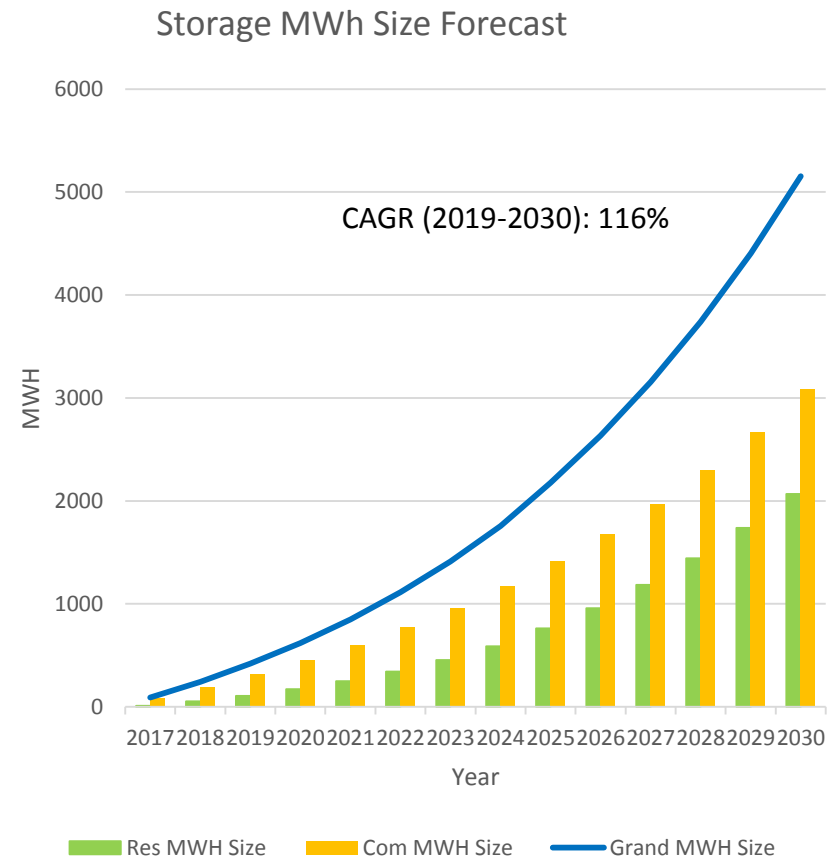- Residential
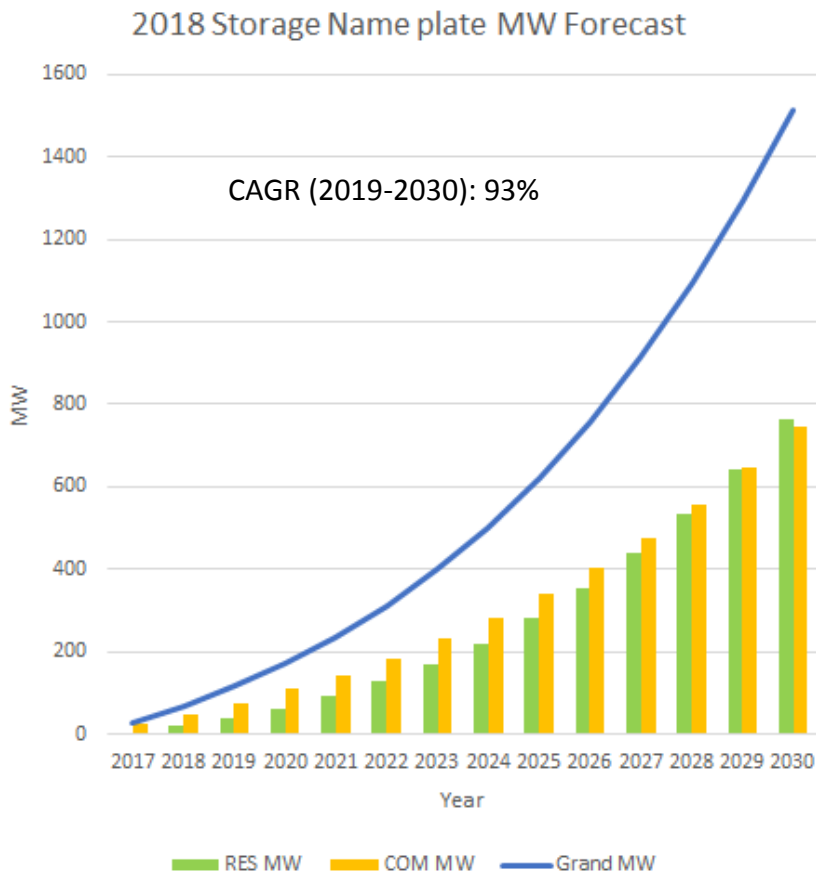- Commercial

MW by Sectors

- Residential
- Commercial

* SGIP weekly report, up to July 2019

SCE BTM Storage Cumulative Capacity Forecast

BTM energy storage system is forecast to pick up tremendous growth in the next decade (more than 1500 MW by 2030) in SCE's service territory. This is primary driven by the projected declines in storage system costs including SGIP incentives and future TOU rates.

2018 Storage Name plate MW Forecast

CAGR (2019-2030): 93%

RES MW | COM MW | Grand MW

Storage MWh Size Forecast

CAGR (2019-2030): 116%

Res MWH Size | Com MWH Size | Grand MWH Size

BTM Storage Systems Impact on SCE Peak Day Profiles

Projected residential paired PV/storage systems will have the most hourly impact on changing (or flattening) SCE's peak day load profiles by 2030.

BTM Storage Impacts on 2030 SCE Annual Peak Day
(+ Charging and - Discharging)

Legend: Com_Stand alone, Com_Paired, RES_Paired, Forecast Peak, Impacted Shape