

# Preparing the Grid for a Decarbonized and Electrified Future



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# SCE's Electric System is an interconnected network delivering electricity from generation stations to customers



**50k+ square-mile SCE service area** across southern, central and coastal California

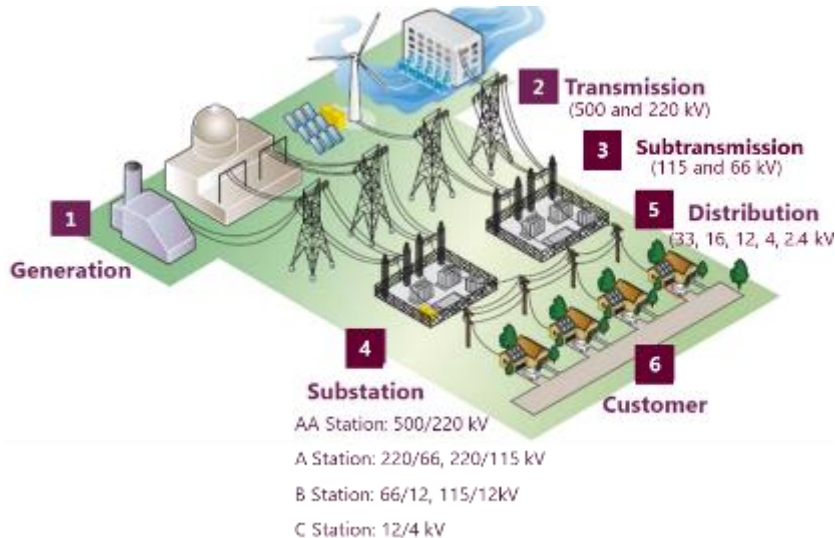
**15 million residents and 5 million customer accounts** in SCE service area

**125k+ miles of SCE electric lines** (distribution, subtransmission and transmission lines)

**~800 SCE substations**

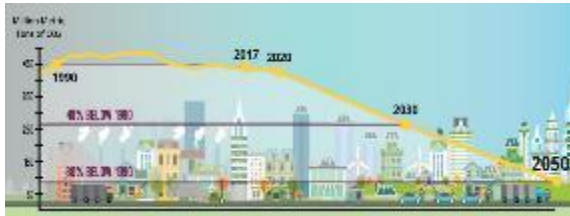
**SCE's Historical Peak Demand: 24,345 MW**  
(9/6/22)

**~\$6 billion capital investments annually** in a safe, reliable clean energy grid



# SCE's Vision for Achieving GHG goals and an Advanced Grid through Various Efforts

CA's climate goals include 40% reduction in greenhouse gas (GHG) emissions from 1990 levels by 2030, and 80% by 2050, and reach net-zero GHG emissions by 2045.



Required by law to meet following retail sales requirements for power it delivers:

- ✓ By 2020 – **33%** of power from Renewables Portfolio Standard (RPS)-eligible resources (*requirement met*)
- ❑ By 2030 – **60%** of power from RPS-eligible resources
- ❑ By 2045 – **100%** carbon-free power

## Whitepapers outlining cross-sector collaboration that is essential for achieving decarbonization goals:

### Pathway 2045 (2019)

SCE's 2019 data-driven analysis of steps that CA must take to meet 2045 goals to clean our electric grid and reach carbon neutrality.

### Reimagining the Grid (2020)

Assessment of grid changes needed to support GHG reduction goals, while adapting to evolving customer and climate-change driven needs.

### Mind the Gap (2021)

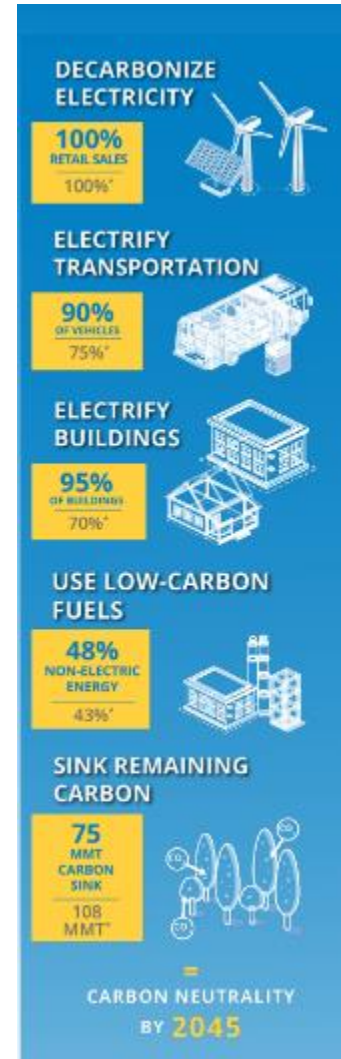
Assessment of policy changes and additions needed to ensure California meets its GHG goals by 2030 in anticipation of its goal to decarbonize by 2045.

### Countdown to 2045 (2023)

Data-driven analysis of steps that CA must take to meet 2045 goals, which identified 5 key actions for affordably achieving carbon neutrality.

### Reaching Net Zero (2024)

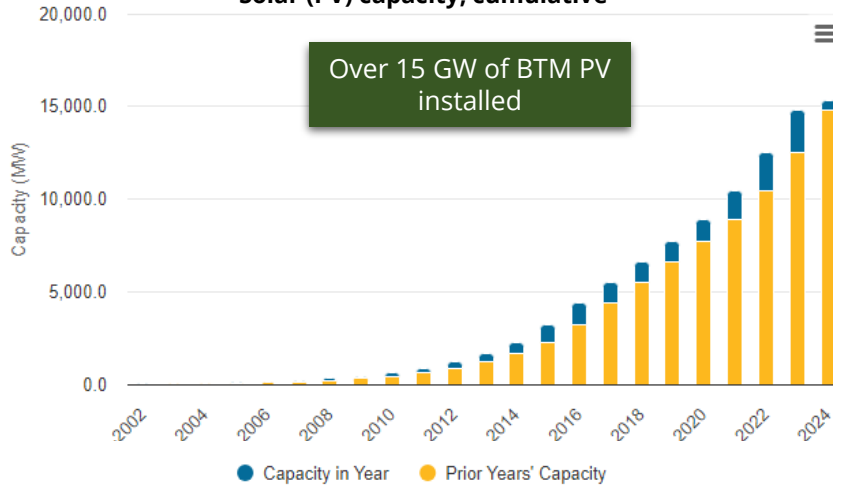
Identifies risks and opportunities for California's electric sector transformation and outlines our ongoing actions to ensure a safe, reliable and affordable clean energy transition



# Customer Adoption Driving Electrification Growth

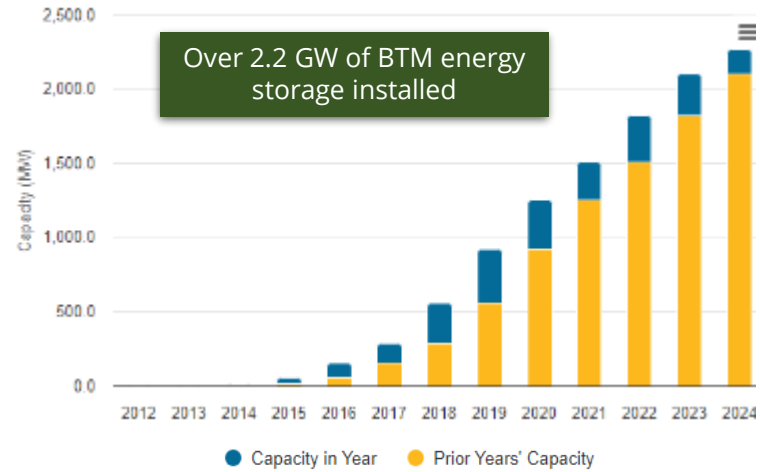
Distributed Energy Resources

**Installed Behind-the-Meter Solar (PV) capacity, cumulative**



<https://www.californiadgstats.ca.gov/charts/>

**Installed Behind-the-Meter Energy Storage (batteries) capacity, cumulative**



<https://www.californiadgstats.ca.gov/charts/>

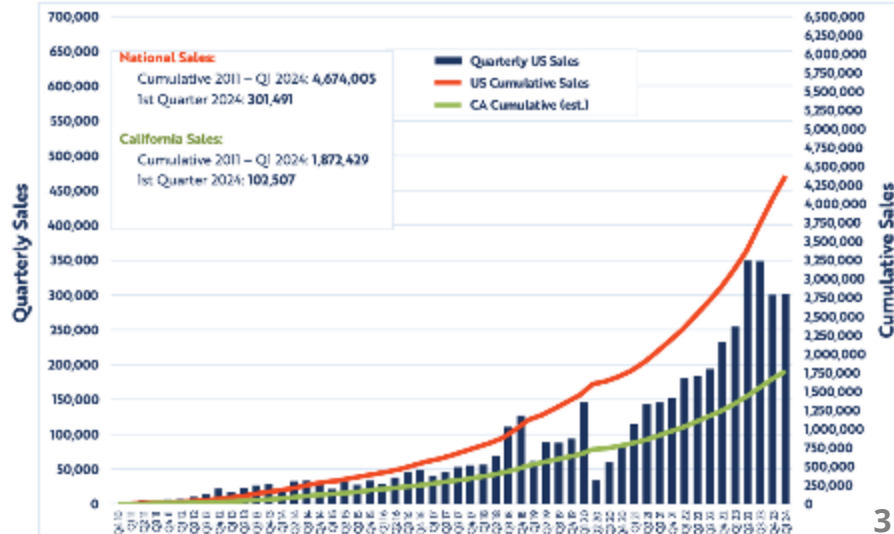
Transportation Electrification

## VELOZ ELECTRIC VEHICLE MARKET REPORT



<https://www.veloz.org/ev-market-report/>

## VELOZ Electric Vehicle Sales in California and the U.S.



[https://www.veloz.org/wp-content/uploads/2024/05/Q1-2024\\_EV-Sales-in-CA-and-USA-1.png](https://www.veloz.org/wp-content/uploads/2024/05/Q1-2024_EV-Sales-in-CA-and-USA-1.png)

# SCE has one of the strongest electrification profiles in the industry

## **EVs and CA Target**

7.5 million light-duty EVs are needed by 2030 to meet its decarbonization target

## **Accelerating Adoption**

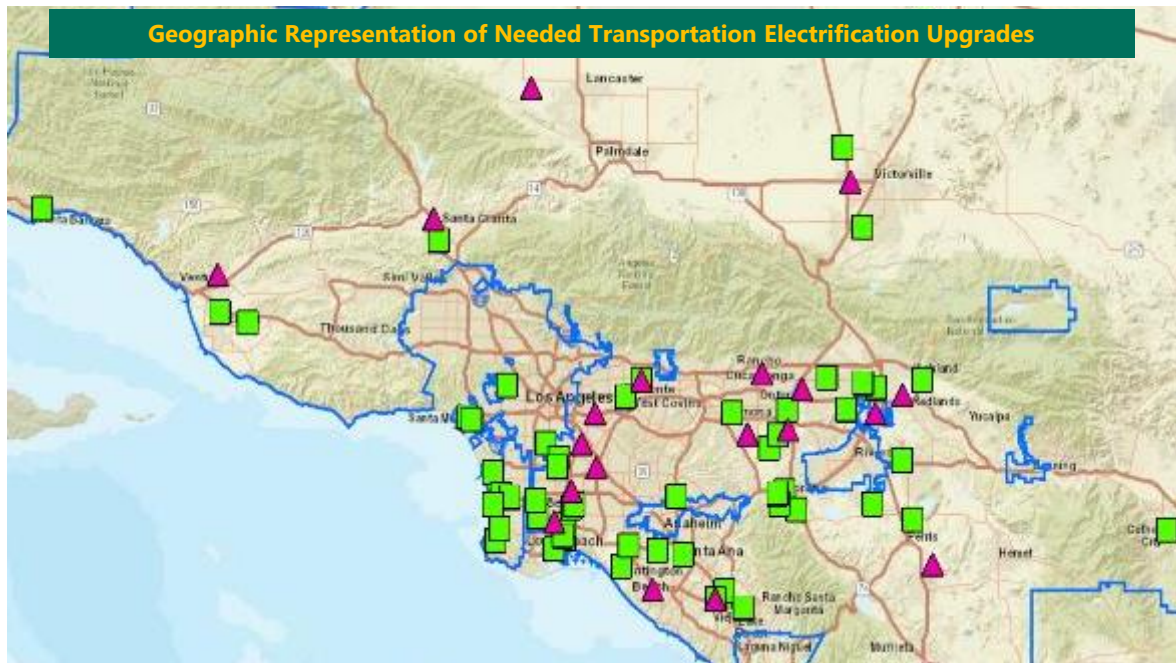
Largest U.S. IOU EV charging programs with over \$800 million of approved funding

## **Grid Investments**

Grid investments will continue for decades to support EV adoption



# Readying the Grid for Electrification



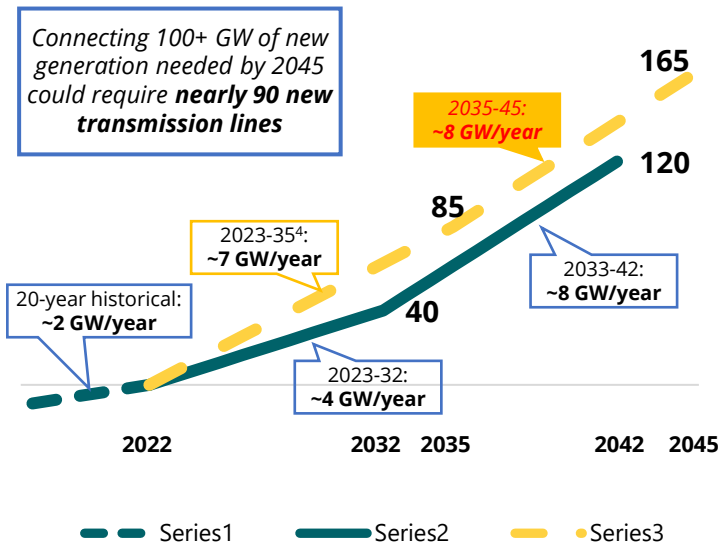
■ Distribution projects    ▲ Sub-transmission projects

- Leveraging customer insights and forecast adoption models to inform prediction of electrification growth
- Developed investment plan to prepare the grid for widespread Transportation Electrification
- More than 90% of SCE's selected locations are either along a major transportation corridor or have proximity to the ports, and close to 70% of the selected locations are in a disadvantaged community.

# Achieving Pathway 2045 vision will require unprecedented pace and scale of transmission and distribution buildout

## TRANSMISSION

### New CAISO transmission capacity needed



## DISTRIBUTION

### SCE Distribution Projects needed

	Planned in next 10 years (2023-2032)	Incremental for Countdown (2033-2045)	
New substations <sup>1</sup>	~10	~75	7.5x more
Substation expansions <sup>1</sup>	~45	~300	6.7x more
New circuits <sup>1</sup>	~130	~1300	10x more

*SCE Distribution in 2045...*

- 7.5x to 10x increase in new substations/circuits
- ~25% larger distribution system
- ~90% average circuit utilization



SOUTHERN CALIFORNIA  
**EDISON**

# TRANSFORMING GRID ARCHITECTURE



**ULTRA HIGH-CAPACITY SUBTRANSMISSION AND TRANSMISSION SYSTEM**

**HIGH CAPACITY, FLEXIBLE DISTRIBUTION SYSTEM WITH INCREASED AUTOMATION**

**AUTONOMOUS AND ADAPTIVE GRID**  
A software enabled grid using a coordinated network of sensors, smart devices, distributed computers, and AI to manage growing grid complexity incorporating AMI, GICs, automation, storage, and digital substations.

**INTEGRATED PLANNING AND DESIGN AT LONG BEACH**

**ENERGY STORAGE ACROSS THE SYSTEM AT GRID EDGE, COMMUNITY, DISTRIBUTION AND SUBSTATION LEVELS**

**COMPACT MODULAR DISTRIBUTION SUBSTATION**

**INTELLIGENT SERVICE POINT AND GRID EDGE KIT INCLUDING AMI 2.0**

Community Energy Storage  
Compact Substation

Superconducting Cable  
Compact Substation

Mobile Battery Energy Storage System

Data Center

Control/Switching Center

Substation Level Energy Storage

Electrified Warehouse

Distribution Level Energy Storage

Compact Substation

Advanced Conductors

Advanced Conductors



# Appendix

# Available Load Capacity Heatmap

