



Integration of Electric Vehicles by Distribution Utilities



2nd International Conference on Large-Scale Grid Integration of Renewable Energy in India

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Southern California Edison

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SOUTHERN CALIFORNIA
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Energy for What's Ahead[®]

Southern California Edison By the Numbers

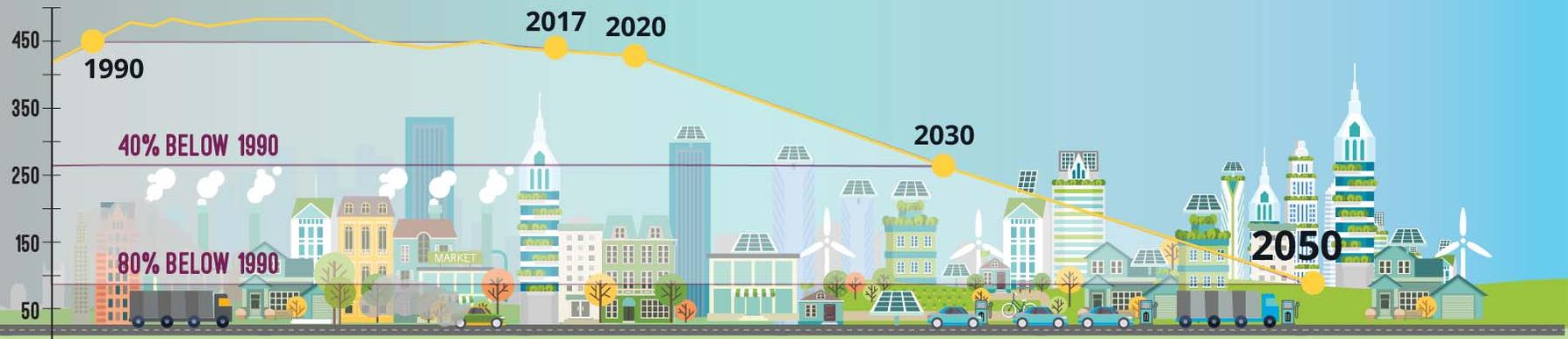


Source: SCE 2018 Sustainability Report
<https://www.edison.com/home/investors/sustainability.html>

California goals to improve emission levels

- California set a goal to **reduce emissions 40%** below 1990 levels **by 2030**, and 80% by 2050.
- Governor Brown's Executive Order B-48-18 increases the state target for zero-emission vehicles to 5 million by 2030.

Million Metric
Tons of CO₂



If we want to get to **zero emissions**, eventually we have to **replace** many of the things we rely on today that require combustion.

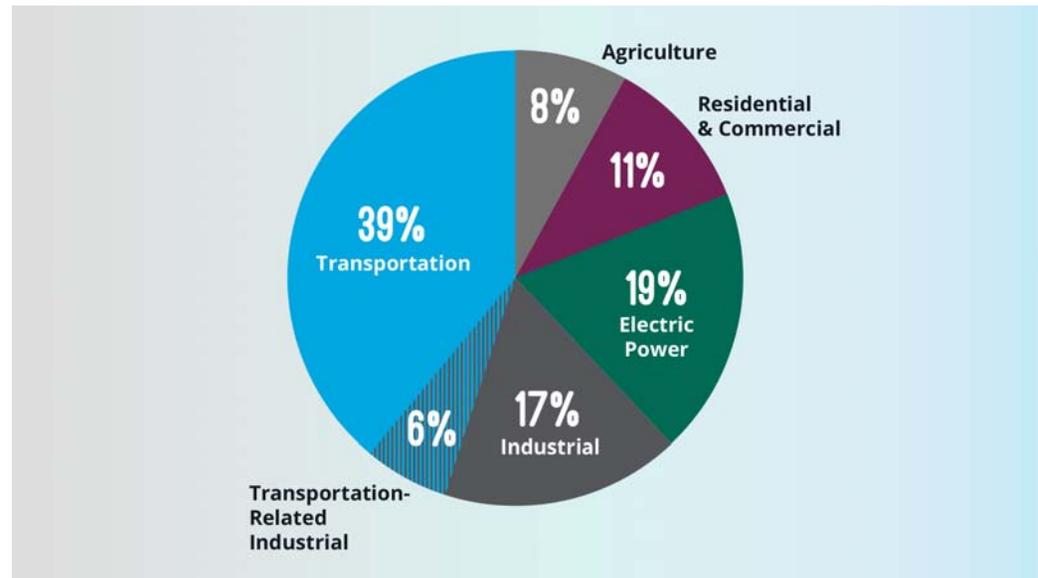


Emissions contributors

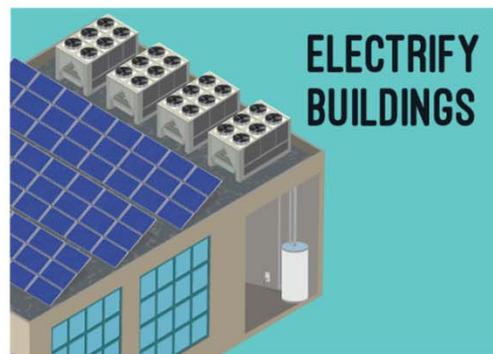
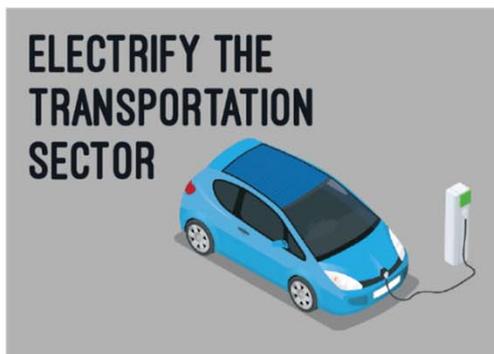
- The largest contributor is **transportation**, followed by the electric sector.

Industrial, and commercial and residential sectors trail not too far behind.

- The most **practical and economical** way to create real change is for sectors to **work together** to find an affordable alternative to fossil fuels.



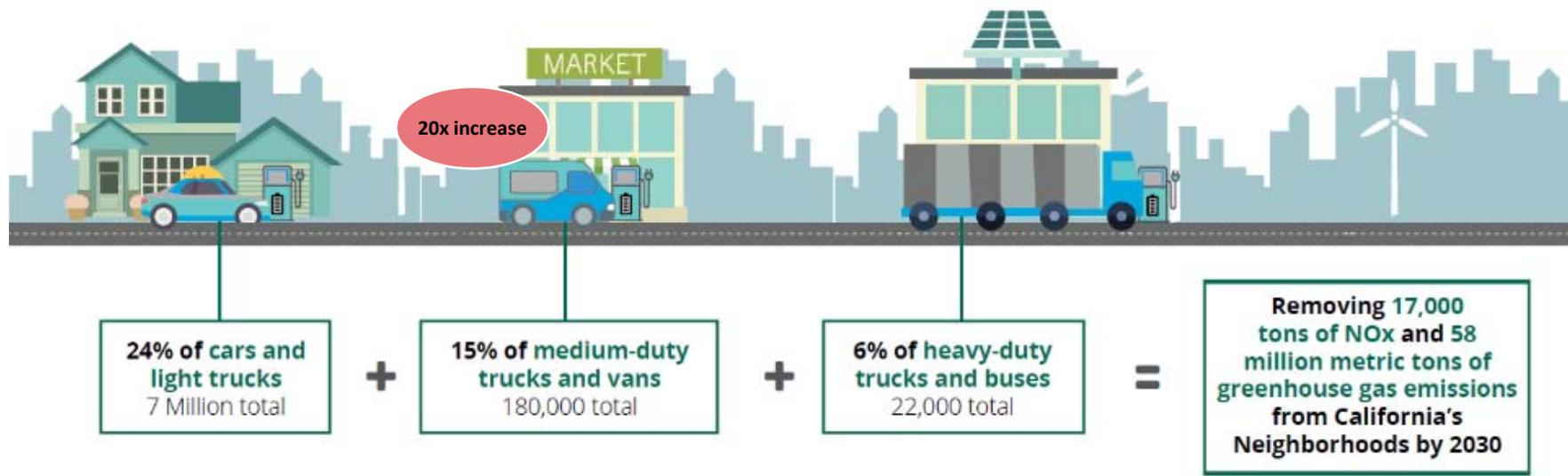
SCE's Clean Power & Electrification Pathway



Embrace disruption. And electrify.



Transportation Electrification Pathway to 2030



SCE's role: availability, affordability, & awareness

Affordability Low cost in comparison to traditional vehicles	Availability Infrastructure necessary to fuel EVs	Awareness Customer understanding of benefits of EVs
<ul style="list-style-type: none"><input type="checkbox"/> Provide charging station rebates for commercial & residential<input type="checkbox"/> Provide new and used vehicle rebates (Low Carbon Fuel Standard)<input type="checkbox"/> Invest in customer-side infrastructure<input type="checkbox"/> Offer special rates for EV charging	<ul style="list-style-type: none"><input type="checkbox"/> Build out capitalized charging infrastructure for:<ul style="list-style-type: none">• Passenger vehicles at workplaces, apartments, and public locations• Commercial freight vehicles• Transit buses	<ul style="list-style-type: none"><input type="checkbox"/> Provide market education and outreach programs<input type="checkbox"/> Run broad and targeted advertising<input type="checkbox"/> Provide fleet customer support and advisory services



Electrifying Vehicles: Across Vehicle Types

Passenger Vehicles



588,000 EVs registered in CA, 48% of US total as of June 2019.

SCE provides up to \$1,000 rebate per vehicle purchased including used EVs, distributed 63,000 rebates to customers as of May 2019 totaling \$29 Million.

Charging Stations



1,250 Level 2 ports installed by SCE through Charge Ready at 78 sites, \$22 Million thru 2018.

Up to 25 DC fast chargers underway in urban areas, \$4 Million.

Transit Vehicles



At least 30 charge ports being installed by SCE at several transit agency sites for all electric buses, \$4 Million.

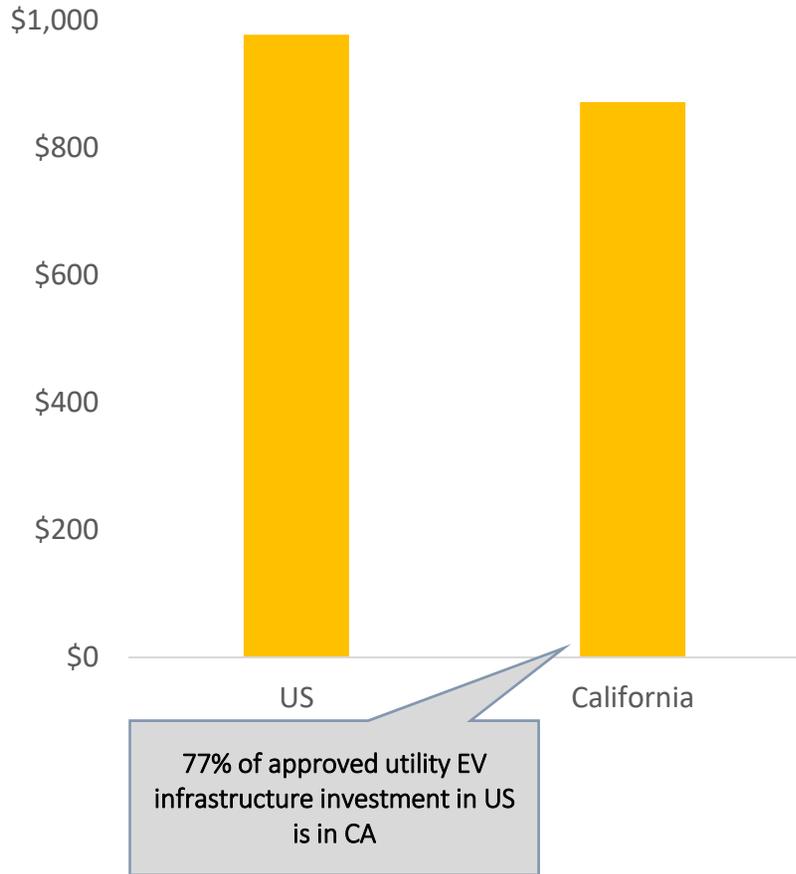
Port Transportation



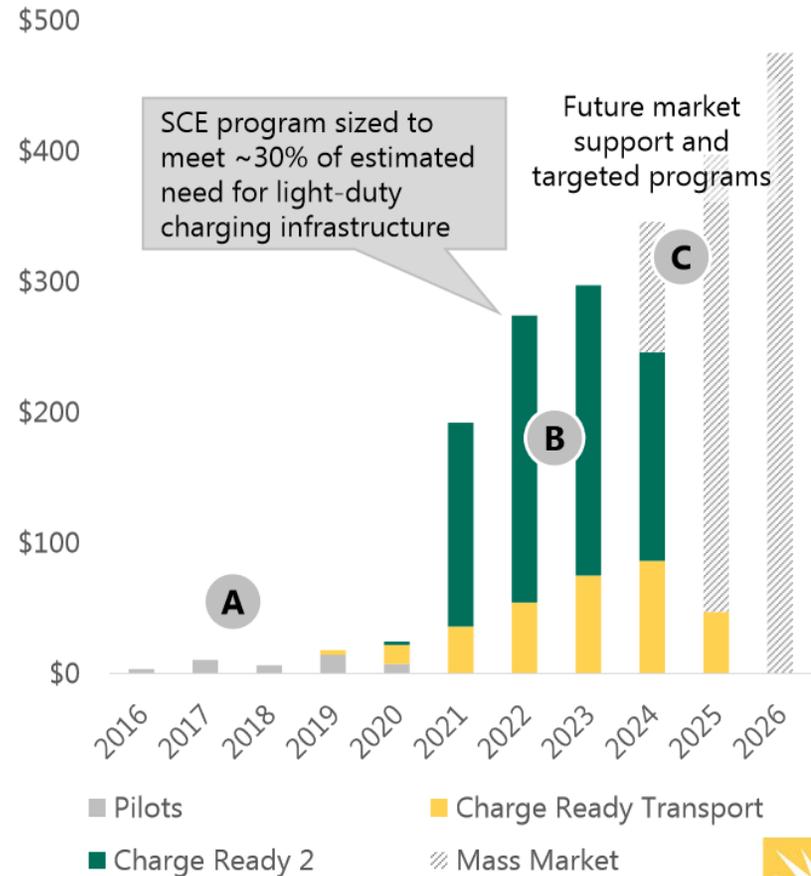
Nine rubber tire gantry cranes will be electrified and 20 charging stations for yard haulers will be installed. Construction is underway.

Electrifying Vehicles: Moving from Pilot to Scale

US Utility Investment in L2 Chargers
(\$ millions)



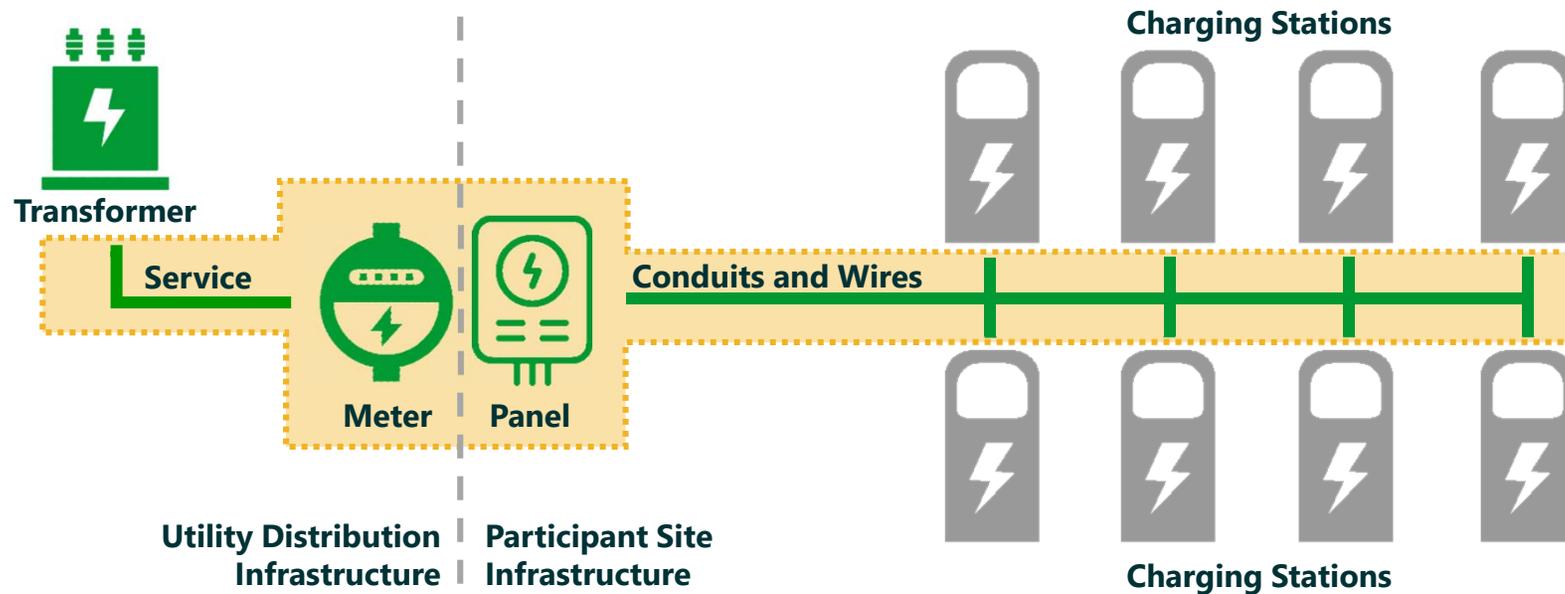
SCE EV Charging Infrastructure Programs
(\$ millions)



1. L2 Chargers provide charging at higher voltage and can charge cars about 5x faster than home charging;
2. DCFC: DC fast charging, provide an 80% charge to many BEVs within 30 minutes



Charge Ready: Light Duty Infrastructure Pilot



 Program covers costs associated with service drop, meter, panel, and circuit dedicated to EV charging. Make-ready ends at interconnection point with customer charging equipment providing AC service.

Over 1,000 ports installed at over 70 site; 50% in underserved communities



Charge Ready Pilot: Lessons Learned



Most customers require more than 30 calendar days to procure the EVSE.



The 10-charge-port minimum requirement was a challenge for many customers.



The “Base Cost” concept was challenging for customers to understand.



A few customers opted not to participate due to the Demand Response requirement for Level 2 charging stations.



MUDs have unique challenges for Charge Ready adoption.



Some market segments and specific customers require additional time to process and execute easement documents.



Charge Ready Transport provides infrastructure for fleet electrification



- ❑ Approved total program budget of **\$356.4M**
- ❑ Achieve minimum **870 sites** with **8,490 electric vehicles** procured or converted
- ❑ **Covers cost of all infrastructure** needed up to charging station
- ❑ **Charging station rebates** available for **transit/school buses** and **sites in disadvantaged communities**



SCE will advise customers throughout the process



Transportation Electrification Advisory Services

- Fleet Analysis Services
- Fueling calculation and Rate Analyses

Transportation Electrification Project Management

- Single Point of Contact for multi-site projects
- Dedicated project management group for EV charging projects

Plan for Charge Ready 2: Speed, Scope, and Scale



Proposal to deploy 32,000 level 2 ports at 3,200 workplaces, apartments, destination centers and fleets; Install an additional 200 DC Fast Chargers.



Up to \$3,500 rebate per port to exceed CalGREEN building code and install a minimum of 16,000 ports at new construction multi-unit dwellings.



Offer apartments and government customers a turnkey solution: SCE can install, own, and maintain up to 4,230 new charging ports.



Multi-prong marketing strategy:

- Mass media advertising of EVs and benefits;
- Targeted marketing on EV experience;
- Support businesses to convert fleets to electric;
- Program-specific marketing.

SCE will continue to develop new programs to spur EV adoption



AB1082 Schools

- No-cost or utility owned infrastructure** to serve level 1 or level 2 EV charging
- Available to **K-12 Schools**
- One-time rebate** (with the no-cost option) to offset the costs of charging stations



AB1083 Parks

- Utility owned** infrastructure (for existing or new construction) to serve level 2 or DCFC EV charging
- Available to **California State parks and beaches**

Claim your Clean Fuel Reward - \$1,000 Rebate on Your EV



- Available to **SCE residential customers** who drive electric vehicles (EV)
- Offers a **one-time \$1,000 rebate** (increased from \$450)
- Lease or purchase** qualifies
- New or used** vehicles - up to three different owners of the same EV can qualify
- For more information or **to apply for the Clean Fuel Rewards Program** visit www.scecleanfuel.com



Over 6 million internal combustion engine cars are sold in the US each year. Successfully decarbonizing the transportation sector will require all of us working together.

This is Our Clean Energy Future...

Imagine a world where the energy that powers our lives and propels us forward is provided by the Earth's clean resources.

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