

California Corridor EV Charging Infrastructure

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Director, Cleantech Institute
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US Green Vehicle Council

- ▶ A non-profit organization to foster the technological, business development and deployment of electric vehicles, while promoting a clean and healthy environment for our present and future generations.
- ▶ USGVC and partners, Cleantech Institute and EVRUS are building DC fast charging station infrastructure that support the fast and widespread usage of electric vehicles in the USA and worldwide. ([website: www.usgvc.com](http://www.usgvc.com))



Cleantech Institute



- ▶ Cleantech Institute is a leading research, consulting and training organization in emerging clean & renewable energy industry.
- ▶ To help make the world a better place by deploying clean and healthy transportation- while replacing the fossil fuel economy with the green and sustainable economy.
- ▶ Cleantech Institute and its sister company US Green Vehicle Council have been awarded multimillion dollars in government grants over the past years.



EVRUS Corporation



EVRUS' s business goal is to develop and deploy electric vehicle charging infrastructure everywhere in America, to build a clean and healthy transportation eco system for the benefits of the community

EVRUS develops and markets advanced DC Fast Charging Stations in the USA and around the world.

EVRUS also installs and manages electric vehicle charging stations through our network of licensed and certified EVSE installers across America. (website: www.evrus.net)



So ... Why the current interest in EVs ?



- The United States imports more than 50 percent of the petroleum needs of the country each day;
- In 2014, the net deficit of the United States in petroleum trade amounted to more than \$40 Billion, or nearly 40 percent of the total trade deficit;
- The US has no defense when events beyond our control interrupt the flow of oil. Securing the supply of oil is the main reason why USA got involved in the Oil War in the Middle East.
- Deployment of electric vehicles is the most practical and cost effective solution to replace gasoline powered vehicles on the road today.
- *Ref: Electric Drive Transportation Association*

Problems with Internal Combustion Engine

- Low efficiency: 15% efficiency, 85% loss in heat
- Exhaust fumes causes pollution and health problems
- CO₂, CO and NO gases causes respiratory diseases
- Expensive gasoline with limited resources
- Energy security: dependence on foreign oil suppliers
- Lead poisoning, leaking gasoline storage tanks.

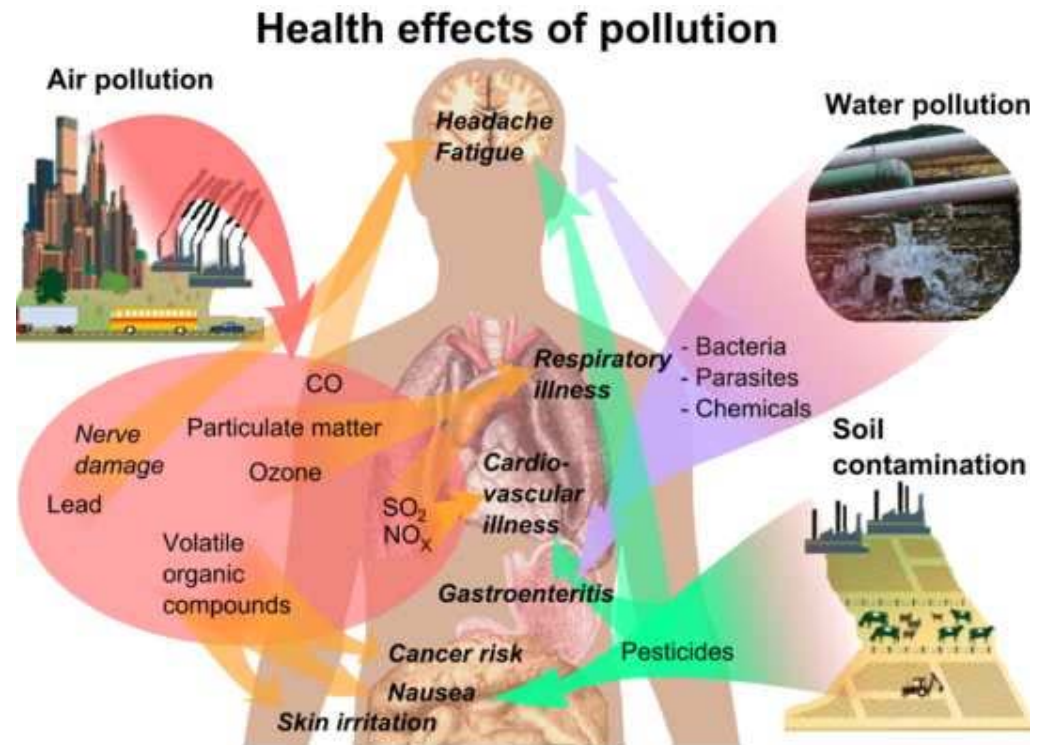


Health Effects of Air Pollution



Exhaust fumes contains CO_2 , CO , NO_2 and SO_2 cause:

- Headache
- Respiratory diseases
- Cardiovascular diseases
- Lung Cancer



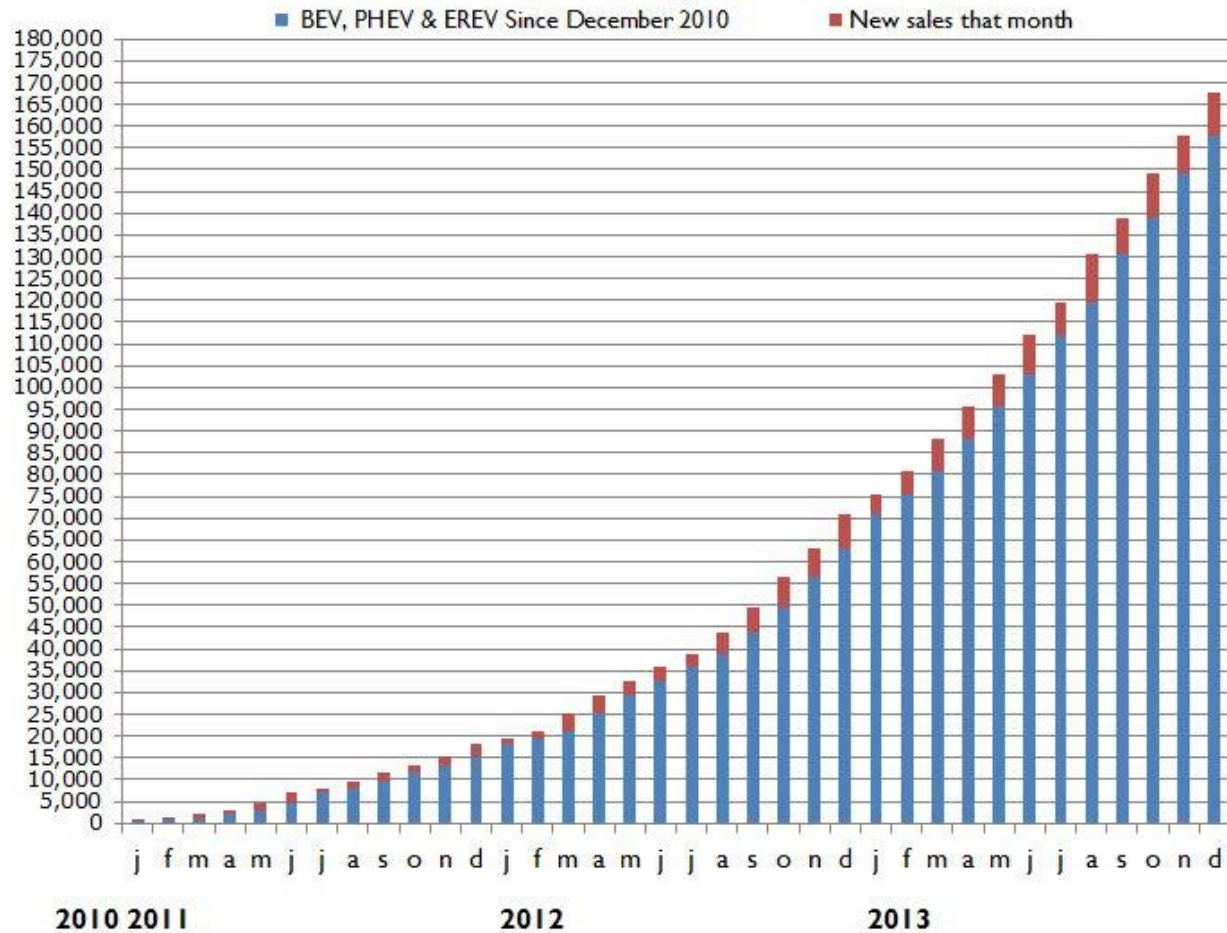
Benefits of Electric Vehicle Adoption

- ▶ Electric cars have no emission, no air pollution like gasoline cars
- ▶ Electric motor is very efficient, 95% vs. 15% internal combustion engine
- ▶ Electric car is quiet and fast with higher torque than ICE car
- ▶ Electric car gives you freedom to “refuel” at home, no gasoline needed
- ▶ Electric car requires little maintenance and repair
- ▶ Saving an average of \$2,500 in gasoline and maintenance per year



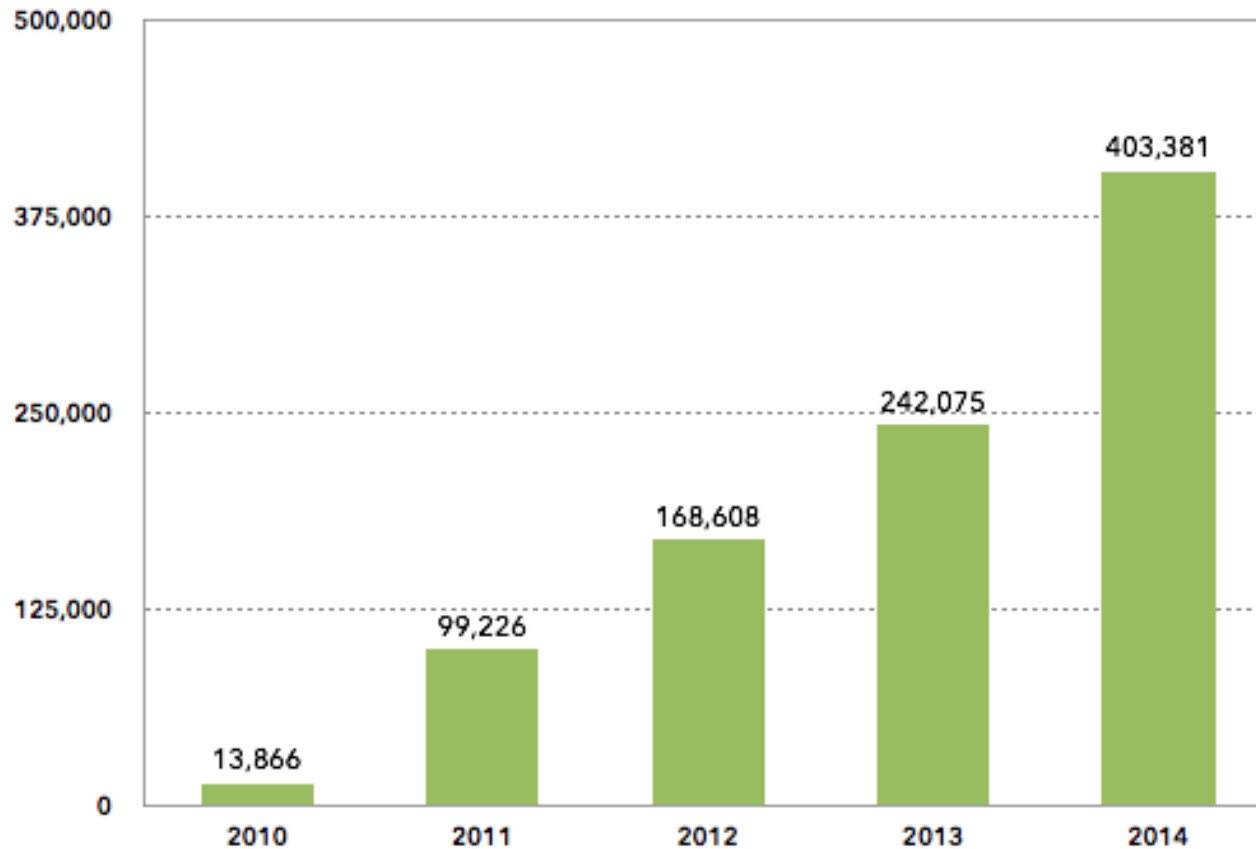
Fast Increase of EV sales

Cumulative U.S. Plug-In Vehicle Sales



Fast Increase of EV sales

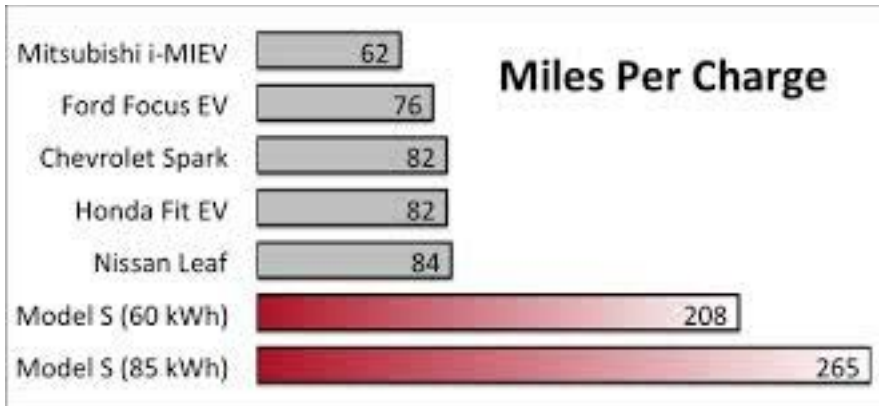
**Global Electric Vehicle Production Forecast
(Battery Electric Vehicles and Plug-in Hybrid Electric Cars)**



Barriers to Electric Vehicle Adoption



- ▶ Limited range or “range anxiety”
- ▶ Limited public charging infrastructure
- ▶ Long charge times



California Corridor Charging EV Infrastructure

Cleantech Institute plans to build the first corridor Electric Vehicle Fast Charging Infrastructure along the Interstate 5 from the border with Oregon to the border with Mexico over 1,000 mile range.

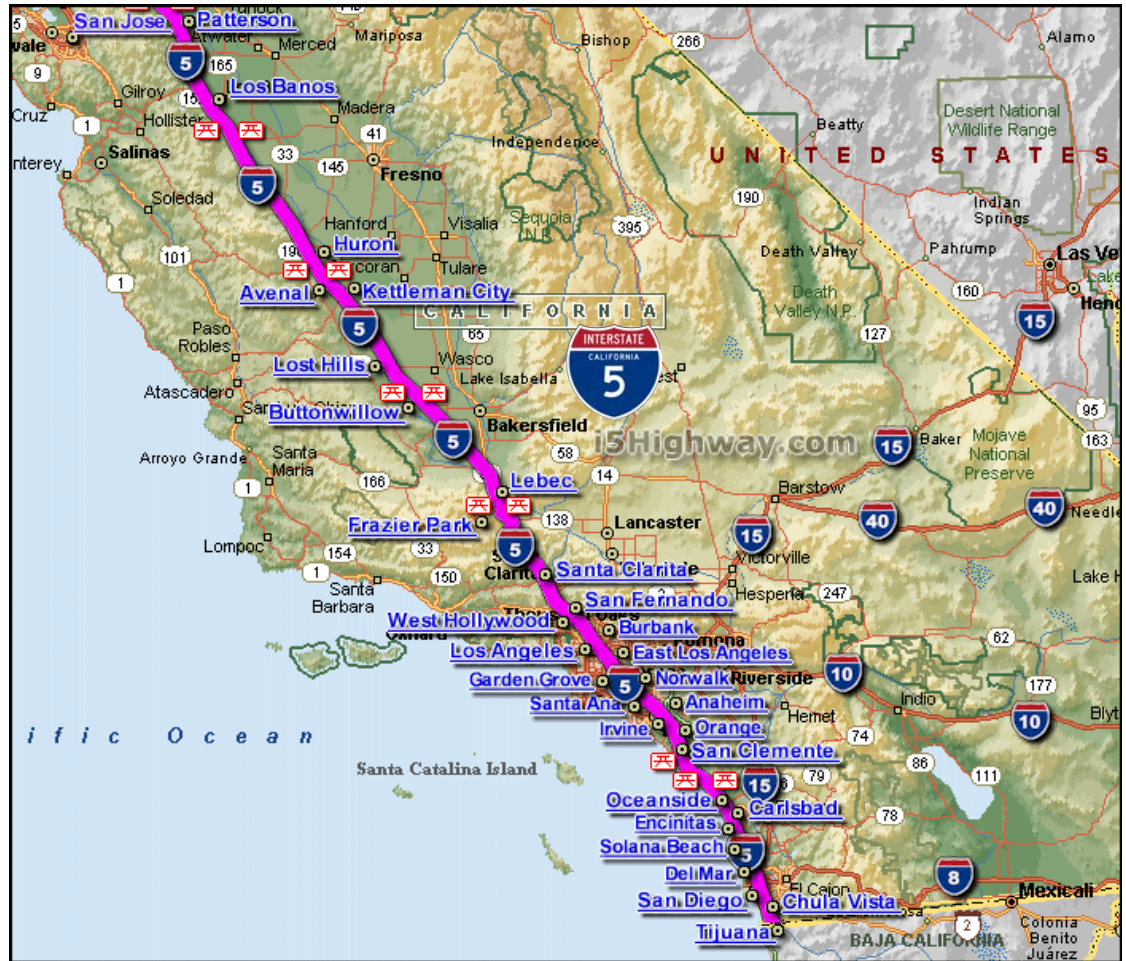
The project will enable electric vehicles to travel from Yreka to San Diego.

The DC Fast Charging Stations will be capable of charge a typical electric car i.e. Nissan Leaf from 10% to 90% of battery capacity over 30 minutes



Charging EV on I-5 from North to South CA

US Green Vehicle Council and Cleantech Institute has been awarded a contract by the California Energy Commission to design and build Electric Vehicle Fast Charging along the main North-South freeway corridors I-5 from Stockton to San Diego and also along CA-99 from Merced to Bakersfield. The project is due to complete by end of 2015.



Charging EV on CA-99 in Central Valley



State Highway 99 (CA-99) is a major north-south highway in California's Central Valley, traversing 274 miles as it links seven of the eight counties in the San Joaquin Valley.

Major cities on CA-99 include: Stockton, Modesto, Merced, Fresno, Tulare and Bakersfield



Electric Vehicle Service Equipment (EVSE)

Level 1



- 8-12 hours
- Overnight recharging
- Residential use
- Some work-place use

Level 2



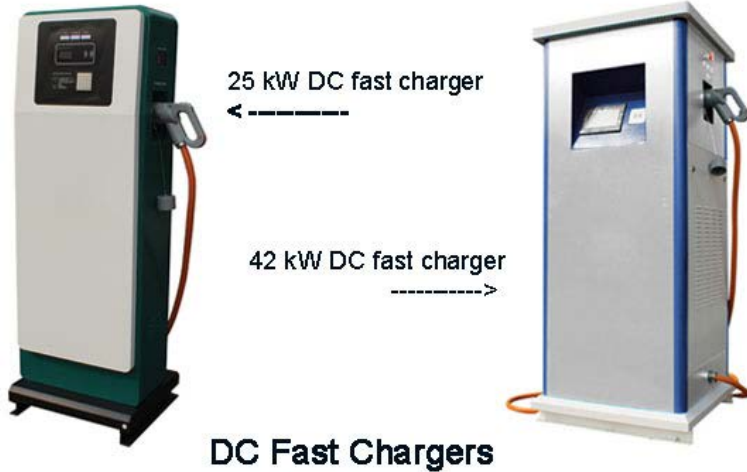
- 4-6 hours
- Destination recharging
- Residential use
- Work-place and public

Level 3



- 30 minutes
- Quick recharge and long trip
- Commercial location only
- Additional siting criteria

EV Express™ Fast Chargers



- ▶ Charging an EV within 30 minutes
- ▶ Paying with credit cards
- ▶ Can be installed at any place with available electricity
- ▶ Financially self-sustainable
- ▶ Wireless monitoring and assistance
- ▶ Flexible protocol: CHAdeMo or CCS
- ▶ Distributed by EVRUS in US, Canada and Mexico

Business Model: EV fast charger at a commercial site



- ▶ EV fast charger offers a new marketing advantage
- ▶ EV fast charger enable charging over 30 minutes
- ▶ EV fast charger can be financially self-sustained
- ▶ EV drivers will pay electricity via credit cards
- ▶ No costs to hosting business: all installation costs, equipment and maintenance will be undertaken by Cleantech Institute and its partners

EV Charging Stations at Your Hotel



Benefits of Installing EV Charging Stations at Your Hotel

- Giving your hotel a green, cutting-edge image
- Bringing in an additional revenue stream
- Making your hotel more attractive to EV drivers and eco-tourists
- Establishing your hotel as a hub on the EV charging network

Thank you !

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Never doubt that a small group of committed people can change the world. Indeed, it is the only thing that ever has. (Margaret Mead)

