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Four years ago, the number of electric vehicles on California roads was pretty close to zero. At the end of this year, it will be about 50,000. OK, compared to the totals, that's not much. There are about 32 million vehicles in California (and 230 million in the U.S. and over 1 billion in the world). For you data lovers, cars generate about 5 tons of CO2 per year on average. About 40 percent of GHG emissions in California are from vehicles. That means we need to pay serious attention to the transportation sector if we are going to make progress on climate change.

The good news is that California is the world's third largest auto market (after the U.S. and China), and we can make a difference. The uptake of EVs is faster in California than it was for hybrids. Drivers in SoCal have started to figure out that the cost of an EV lease is really cheap when you don't have to pay for gas. NRG is installing 200 fast chargers and 10,000 "make-readies," and other companies are adding thousands of other charging stations around the state. Governor Brown signed an Executive Order calling for 1.5 million EVs by 2025. We certainly hope to get there sooner.

There are plenty of naysayers, pointing to concerns about cost, range, infrastructure, and consumer preference. These are real issues, but each is on the way to being solved. Tesla, a California company, has made life unpleasant for naysayers. It paid back a federal loan nine years early, produced a car with a range of 200 to 300 miles, received the highest car rating ever from Consumer Reports, and created buzz around a car that happens to be electric. And now it its opening charging and battery change stations around the state and the country. And by the way, Tesla likes to think of itself as much as a battery storage company as a car company. More on that in a later blog. Not every car company is Tesla, and not everyone can afford a Model S, but the success of Tesla means that the barriers can be overcome.

The price of EVs is dropping as new models hit the market. Range remains an issue, but not a big one for families with two cars and a constant commute (oh, and battery technology is making progress). Over the next couple of years, charging infrastructure will expand dramatically. It is also likely that charging stations will take credit cards and have transparent pricing, a lot like gas stations. And as the PUC looks at rates for EV charging, the cost should become easier to understand. Meanwhile, lots of smart finance people are looking carefully at the EV space, trying to figure out how best to attack the barrier that slowed rooftop solar for awhile: addressing the up front cost, which poses a problem even though the cost over the lifetime of the vehicle is cheaper. It is quite likely that all of this

change will come much faster than most people expect, and it will be California that will lead the way.

It won't just be cars. Buses get about four miles to the gallon and require on-going major maintenance. Electric buses get something comparable to 25 miles to the gallon and need much less maintenance because the electric drive systems are less complicated. Right now, the up front costs for electric buses are higher, but the industry believes that it is just a couple of years away from a sea change due to big cost reduction efforts that are paying off.

We will see more light rail along with electrification of existing rail systems and the creation of high speed rail over the next few years. Meanwhile, car sharing systems like ZipCar are changing the concept of car ownership. As people recognize that even the most used cars sit idle 80 to 90 percent of the time, use and ownership patterns are changing, and electric vehicles and transportation will become a greater portion of the mix. Watch carefully, and don't believe the naysayers.