Transition to electric cars

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The adoption of electric vehicles is a key part of the decarbonization of the economy. Kenneth Gillingham, professor of environmental and energy economics, says that easing range anxiety and helping drivers understand the advantages of electric can help accelerate the shift.

They can be crucial. While it varies by country, transportation is usually a third or more of total carbon dioxide emissions. And for a long time, people thought that transportation would be one of the two hardest sectors to decarbonize, alongside industry. Electric vehicles are changing the equation; the door suddenly is wide open to decarbonizing light-duty transportation. That"s a huge shift in how we think about pathways forward.

Operating and maintenance costs are a lot lower for electric vehicles. They are very quiet and because they have amazing low-speed torque, they"re really fun to drive. All of that"s exciting.

One of the biggest challenges is range anxiety. People feel uncomfortable getting an electric vehicle because they"re worried about finding charging stations and the time it takes to recharge.

There"s a technology piece. Typical charging stations take about 10 hours to fully charge long-range electric vehicles. Basically, the cars need to be plugged in overnight. But there are also DC fast-charging stations which draw at a higher voltage and fill up the battery much more quickly. In half an hour, some of the long-range electric vehicles will recharge to 75% or more. It"s not as quick as filling up your tank with gasoline, but it"s pretty fast. It allows you to get a cup of coffee, relax a little bit.

There aren"t that many DC fast chargers in the country yet because they are much more costly to put in, and they require dedicated infrastructure. A bank of chargers, say on I-95, will draw from the electric grid in a substantial way.

From an economics perspective what"s interesting is that this is a two-sided market with network effects. If you have more electric vehicles out there, more charging stations are going to be put in. If you have more charging stations, people are more likely to buy electric vehicles.

Tesla just went out and built charging infrastructure for their own cars. But if we really want to go from electric vehicles being 4% of the sales in the U.S. to 60%, we"re going to need a lot more charging stations.

That is a real challenge and it"s a challenge that the federal and state governments can play a role in facilitating, both through providing funding towards charging station infrastructure and by helping with permitting and expediting regulatory red tape.

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Many industry forecasts project that by 2035 to 2040, we are going to be at 60% given current regulations and technology trajectories. The Biden administration has a goal of 50% by 2030. And the state of California has a goal of phasing out new internal combustion engine vehicles entirely by 2035, which is pretty ambitious but other places have similar goals.

Q: Consumers don"t necessarily know whether the electricity coming into their homes is from renewable or fossil-fuel-based sources. Does that play into the value of electric vehicles?

In terms of carbon intensity, electricity is generally coming from cleaner sources than burning gasoline. And that"s only going to improve. Renewables are the largest new-generation sources coming on to replace sources that are being retired.

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