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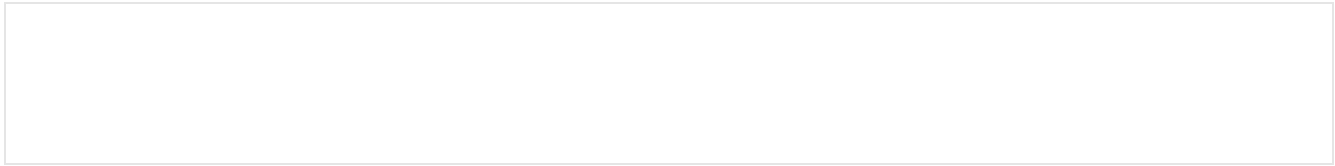
Can California Eliminate Gas Cars?

State leaders are discussing banning the sale of cars that run on gasoline or diesel

By Anne C. Mulkern, ClimateWire on November 8, 2017



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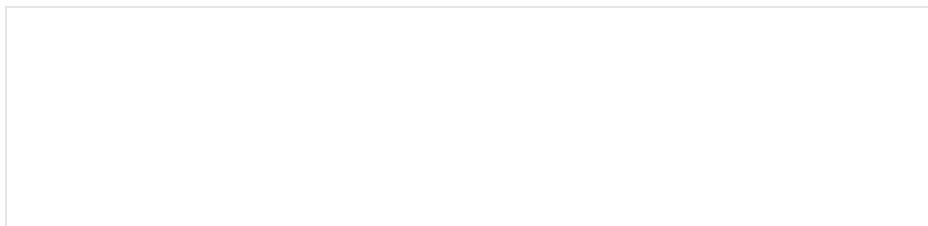


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More than 25 million cars cruise the roads in California, a testament to the state's love affair with driving. A tiny slice of those vehicles are electric or plug-in hybrid models.

That's not nearly enough for state leaders who want to wage a fierce battle against climate change. They're discussing a move that some consider radical: banning the sale of cars that run on gasoline or diesel.

Gov. Jerry Brown (D) recently asked Mary Nichols, chairwoman of the state Air Resources Board, "Why haven't we done something already?" The message, first reported by Bloomberg, came after China made an announcement to restrict internal combustion engines.



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"Given the existential challenge we face, the administration is looking at many, many possible measures—including additional action on electric vehicles—to help rapidly decarbonize the economy

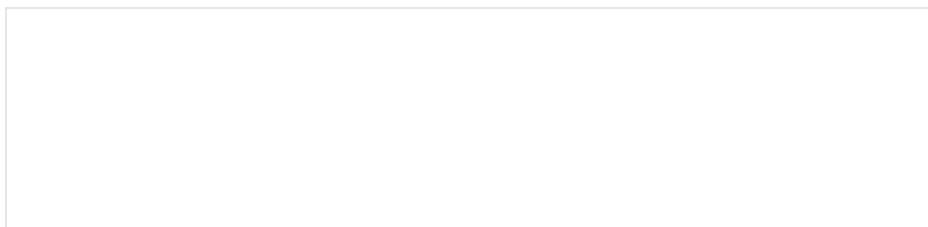
and protect the health of our citizens," the Brown administration said in a statement to E&E News.

Switching to all clean cars would require a herculean transformation in the Golden State. They accounted for less than 5 percent of car sales in the first six months of this year, even as the state offers plum incentives to motorists. Challenges include concerns about how far clean cars can travel and a lack of charging stations.

Lawmakers are also targeting gas and diesel cars. Assemblymember Phil Ting (D) plans to offer a bill phasing them out, introducing it when the Legislature convenes in January. The measure he'll draft would ban dealers from selling them starting in 2040. The move is designed to increase the use of zero-emissions vehicles, or ZEVs: plug-in electrics, hybrid plug-ins and hydrogen fuel cell cars.

Ting said it's needed if California hopes to cut its greenhouse gas emissions 80 percent by 2050. Transportation accounts for about 37 percent of state emissions.

"If we don't do something very aggressively on changing people's habits in regards to passenger vehicles, we're not going to be able to come close to meeting our greenhouse gas reduction goals," Ting said in an interview.



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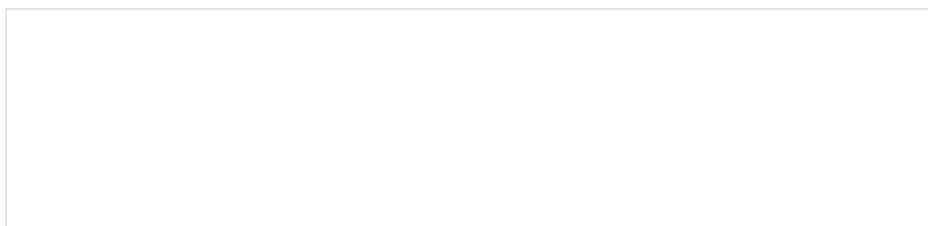
In addition to China, officials in France and the United Kingdom have said they're considering banning internal combustion engine vehicles. Neither has approved policies to do that, but Ting said their pledges factored into his thinking.

Right now, California motorists own roughly 334,000 cars that qualify as ZEVs.

That raises the question, is it even possible to get rid of gasoline-powered cars? Experts said it depends on how much you believe technology could advance, how much battery costs might fall, and how the marketplace responds to a world with cheaper clean cars and more charging stations. For now, those are theoretical conditions. There are just 14,000 EV charging stations in the state currently.

Whether it can work "depends on what you're willing to give up," said Jeremy Michalek, director of the Vehicle Electrification Group at Carnegie Mellon University. "Right now, we don't have good, affordable alternative solutions for all uses of automobiles."

Some drivers commute long distances for work, and forcing them to drop gasoline is "a bit of a challenge," he said.



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"The electric technology doesn't offer the range to accomplish that," Michalek added. Light-duty trucks would burn through an electric charge by hauling cargo. Fuel-cell vehicles could offer needed range, he said, but the refueling infrastructure doesn't exist.

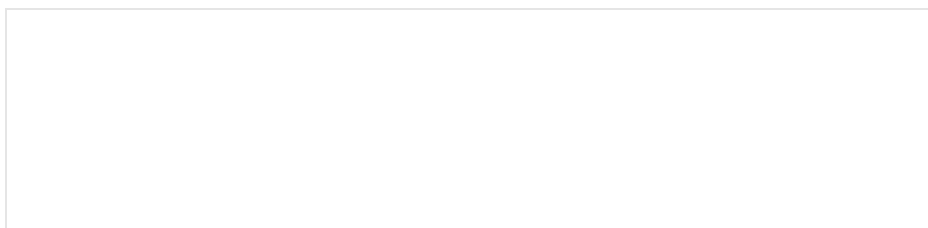
"Setting a date by which we will ban that technology, with the assumption that other technologies will have closed the gap for all those applications, I'm not sure anybody knows what the state of the technology will be in 2040 and whether that will be something that we can do without other significant trade-offs," Michalek said.

MORE EVS COMING SOON

The car industry is starting to shift toward more clean cars. General Motors Co. and Volvo are among the automakers saying they plan to embrace electrification.

In the next 18 months, GM will introduce two all-electric vehicles. Those models are among 20 electric cars the company plans to launch by 2023, according to GM spokeswoman Elizabeth Winter.

"We believe in a vision of a world of zero emissions and that this is the right time to show how the company aims to get there," she said.



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Volvo President and CEO Håkan Samuelsson said his company was taking "a bold step forward, heralding the end of the internal combustion engine." Starting in 2019, all gas-fueled cars will be supplemented with electrification, he said in a [video](#) posted on YouTube.

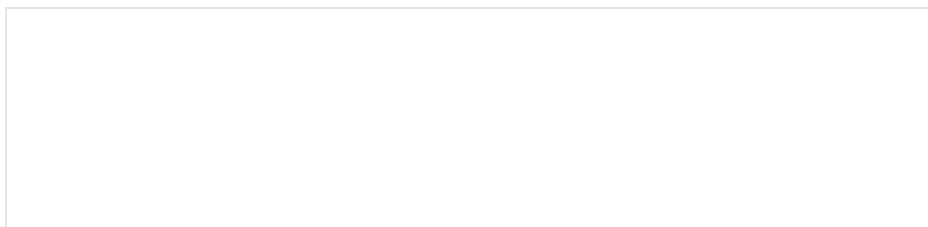
"We are determined to be the first premium carmaker to move our entire portfolio of vehicles into electrification," he said.

Still, it's "a tall order" getting to 100 percent new car sales of ZEVs by 2040, said Brian Maas, president of the California New Car Dealers Association, a trade group.

"We've got lots of questions about how such a mandate would work," Maas said. "We're all for ambitious goals, but moving from a goal to a mandate is orders of magnitude more difficult."

WILL EVS BE PRICE COMPETITIVE IN 2025?

The top range of an all-electric car right now is slightly more than 300 miles per charge. That's for the highest-end Tesla Model S, which costs more than \$100,000. The 2017 Chevrolet Bolt gets 238 miles per charge. It costs about \$37,000. New EVs are generally more expensive than a comparable gas-fueled car.



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Bloomberg New Energy Finance has projected that EVs will be price equivalent with gasoline vehicles around 2025, though ARB member Dan Sperling said it's a complicated equation.

"When people talk about cost competitive, they really mean over the life of the vehicle, meaning that it will be more expensive up front, but eventually (in this case, by 2025) the lower energy and maintenance costs will offset the higher purchase cost," Sperling said in an email.

"In this sense, 2025 is possible, especially for small cars—but this does NOT mean the purchase cost is the same and definitely doesn't mean larger cars, pickups, and SUVs will be competitive," he said.

The cost equation for buying an EV or plug-in hybrid could change dramatically if congressional Republicans pass tax reform. The current plan would revoke a \$7,500 federal tax credit, meant for buyers of the first 200,000 qualifying vehicles from each automaker.

Another challenge is time. It takes longer to charge an electric car than to fill up a gas tank. Maas said it can take between 30 minutes and two hours to top off a charge, compared with spending five minutes at a gas station.

"That's a significant change in behavior," he said.

TECHNOLOGY ADVANCING RAPIDLY

Supporters say it's possible to phase out gas cars, while conceding that changes are needed to make it work. Advances in technology are

essential, battery prices must continue to fall, and a surge in charging stations are all required.

Technology moves quickly, said Simon Mui, director of the California Vehicles and Fuels, Energy & Transportation program at the Natural Resources Defense Council.

"Twenty years ago, nobody was predicting renewables being cheaper than fossil fuel, or having Amazon deliver meals to us, or that self-driving robots were going to be on the road," he said.

Mui said EV battery costs are now \$270 per kilowatt-hour, down from \$1,000 per kWh in 2010. It's a major cost component of the cars, he said.

"You'll start seeing much more rapid deployment once cost parity [with gas cars] is reached," he said. Lower costs will also allow bigger batteries, which means the car can go farther on a charge.

"There is a line of sight to get to 2040, 2050," where all new vehicles will be mostly electric or fully electric, Mui said.

Ting has other legislation, A.B. 1184, that proposes a \$3 billion incentive program through 2030 to encourage consumers to buy more EVs. Incentives include larger rebates for buying clean cars. He said his other bill, on phasing out gas cars, "would be the perfect companion to that incentive package."

Tim O'Connor, director of the California oil and gas program at the Environmental Defense Fund, said eliminating gas-fueled cars is an

important goal. The fact that it's not clear how to get there shouldn't stop the effort, he said.

"Like many of our environmental challenges that we've faced in the past, you don't always have to know exactly how to solve it without starting the process," O'Connor said. "Unless you sort of force the issue, you don't realize what sort of solutions might be staring you in the face."

He compared it to action to combat acid rain, which came in the 1990s through amendments to the U.S. Clean Air Act. People initially thought it would require developing and installing new scrubbers at power plants at a cost of billions of dollars. Instead, with the imposition of a cap-and-trade program, O'Connor said, people looked at the sources of coal and realized they could obtain it from different parts of the country with lower sulfur, cutting emissions at less cost.

In terms of switching from internal combustion engines, "the pathway probably is going to include something we haven't yet realized is going to be a fundamental part of the solution," O'Connor said.

TAILPIPE EMISSIONS RULE A TOOL?

The goal of switching to 100 percent clean cars is "very aggressive," said Sperling with ARB. The policy that could drive it, he said, is U.S. EPA's rule on vehicle greenhouse gas emissions, which California agreed to in a deal with the Obama administration. It's in place through 2025, though the Trump administration is considering

eliminating standards that require new cars sold between 2021 and 2025 to cut emissions by about one-third.

As the rule exists now, "it will start putting a lot of pressure on the auto industry to start using more electrification," Sperling said.

There's a risk for unintended consequences should California move to eliminate gas-fueled cars and the EPA standard stays in place, said Michalek with Carnegie Mellon. The federal standard covers all states and is an average. If California is the only state that eliminates gasoline vehicles, that could allow other states to actually increase their emissions.

"If one state exceeds those standards, it allows other states to become more lax," he said, and there's the possibility "the net effect is zero."

Ting is optimistic technology will make eliminating gas cars feasible. He said the internal combustion engine, at 100 years old, is a dated technology that's "ripe for disruption."

"Driving a gas car is almost like performing heavy accounting with a very efficient abacus," Ting said. "It doesn't make a whole lot of sense."

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