CARB RESEARCH SYNTHESIS

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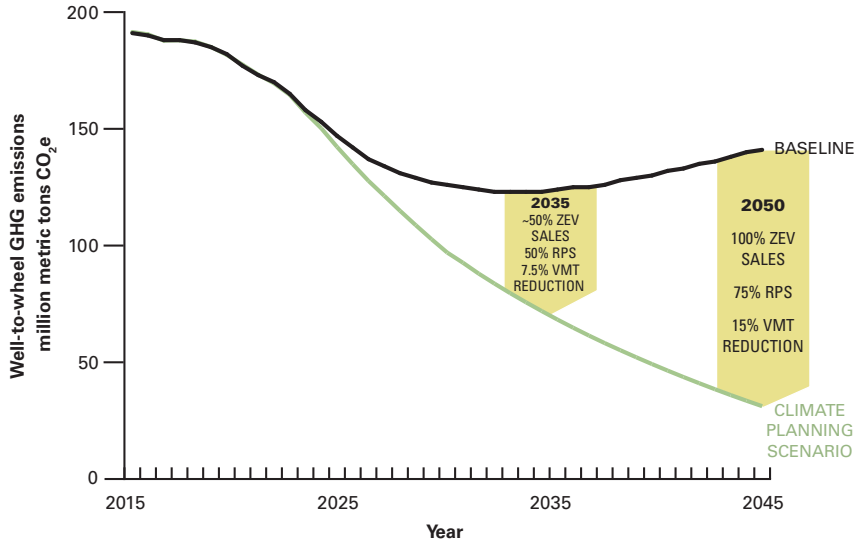
As electric car sales gain momentum, public incentive programs and extended all-electric range models are attracting new-car buyers and driving down air pollution.

Electric Cars Move Up the Learning Curve

New car buyers and makers are discovering a mutual affinity for quiet, clean, reliable electric cars.



Large cuts to greenhouse gases from transportation are needed to meet statewide climate goals, spanning different fuels and vehicle technologies, and reducing people's need to drive. The graph shows the total reduction in "well-to-wheel" greenhouse gas emissions that are needed through 2035 and out to 2050. The "baseline" shows what emissions would be without California's efforts to mitigate climate change. Reductions are expected to come from vehicle miles traveled (VMT), renewable portfolio standards (RPS), and zero emission vehicles (ZEVs).

What should you know about clean cars?

California's smog used to be legendary, but today the Golden State's air is much cleaner than it was just a few decades ago. Still, air pollution continues to cause negative health effects, and cars and trucks remain the largest contributors. California is counting on electric, plug-in hybrid (which can run on either gasoline or electricity), and hydrogen cars to meet our air quality and climate goals, and Governor Brown has set a target to have 1.5 million of these cars on the road by 2025. Electric cars (and other advanced technology vehicles) are much cleaner than their predecessors, but their real-world air quality benefits depend on how quickly they replace dirtier cars, the way that they're driven, and whether the electricity used to power them is "clean." ARB-funded research is yielding insights into what motivates drivers to purchase, drive, and plug in their cars, and seeks to understand and address barriers that prevent low- and moderate-income drivers from purchasing these cars. As these cars become more widespread, there will be an increasing need to manage the demand that charging them places on the electrical grid, to develop policies and pricing structures that encourage plug-in hybrid drivers to plug in instead of relying on gasoline, and to provide more drivers with the opportunity to experience these vehicles, such as through "ride and drive" events and car-sharing programs, and innovative financing and incentive programs.

Results

- Two-thirds of respondents to a *survey of new car buyers* knew very little (if anything) about electric, plug-in hybrid, or hydrogen-powered cars. But more information seems to lead to more interest: 38% of respondents expressed a preference for these cars when provided with minimal information about them, and drivers who have experience with these cars are more likely to consider buying one.
- Carpool lane access and new vehicle purchase rebates appear to be helping to *expand the early electric car market*, with an estimated 2.6% increase in sales for every 20% increase in miles of nearby carpool lanes, and an estimated 7% increase in plug-in vehicles sales as a result of rebates.
- In 2015, used plug-in hybrid cars (that can be driven on either gasoline or electricity) were *holding their value better* than electric-only cars, typically selling for about 10% more than electric cars (compared to initial purchase prices). And in the same time period, used electric cars with carpool stickers sold for an average of $1,430 more than similar cars without the sticker.

Ongoing Research: Hydrogen Cars, Equity, and Plenty of Plugs

- CARB research is continuing to examine the market for, and air pollution benefits of, the *newest clean cars*, including electric cars that can travel over 200 miles on a single charge, and hydrogen cars.
- CARB research is *investigating barriers* that prevent low-income households from driving advanced technology cars, to help ensure that State rebates and policies continue to improve equitable access to clean transportation.
- Research funded by the California Energy Commission is investigating how many electric car-charging locations and hydrogen-fueling stations will be needed to serve 1.5 million plug-in and hydrogen-powered cars by 2025, and where they should be located. This research is also exploring the effects that electric cars will have on the electrical grid, and if the batteries in these cars can serve as a resource to store and provide electricity back to the grid when it is needed.

Ongoing Efforts to Clean Up Car Pollution

- CARB's *clean car rules* and incentives are helping California meet our air pollution and climate goals, respond to the Governor's 2016 Zero Emission Vehicle Action Plan, and support Senate Bill (SB) 350, which promotes transportation electrification and low-income access to clean transportation options.
- The *California Green Building code* now requires new homes and most new parking lots to be "EV-capable" (meaning that an electric car charger can easily be installed).
- California's pioneering efforts to reduce air pollution and greenhouse gases from cars have inspired similar efforts in other states and countries.

For More Information

CARB's Low Carbon Transportation Research: *http://bit.ly/2gWevnI*
Advanced Clean Cars Program: *http://bit.ly/2yEUkV8*
Clean Vehicle Rebate Project: *http://bit.ly/2yWAtIs*
Enhanced Fleet Modernization Program Plus Up Pilots: *http://bit.ly/2yVKH5i*
California's 2016 ZEV Action Plan: *http://bit.ly/2ep0Gzj*
Senate Bill 350: *http://bit.ly/1Wm5cbZ*