

# Lessons learned from “Environmental Assessment of a Full Electric Transportation Portfolio”

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**SB350 Transportation Electrification  
Market and Policy Overview**

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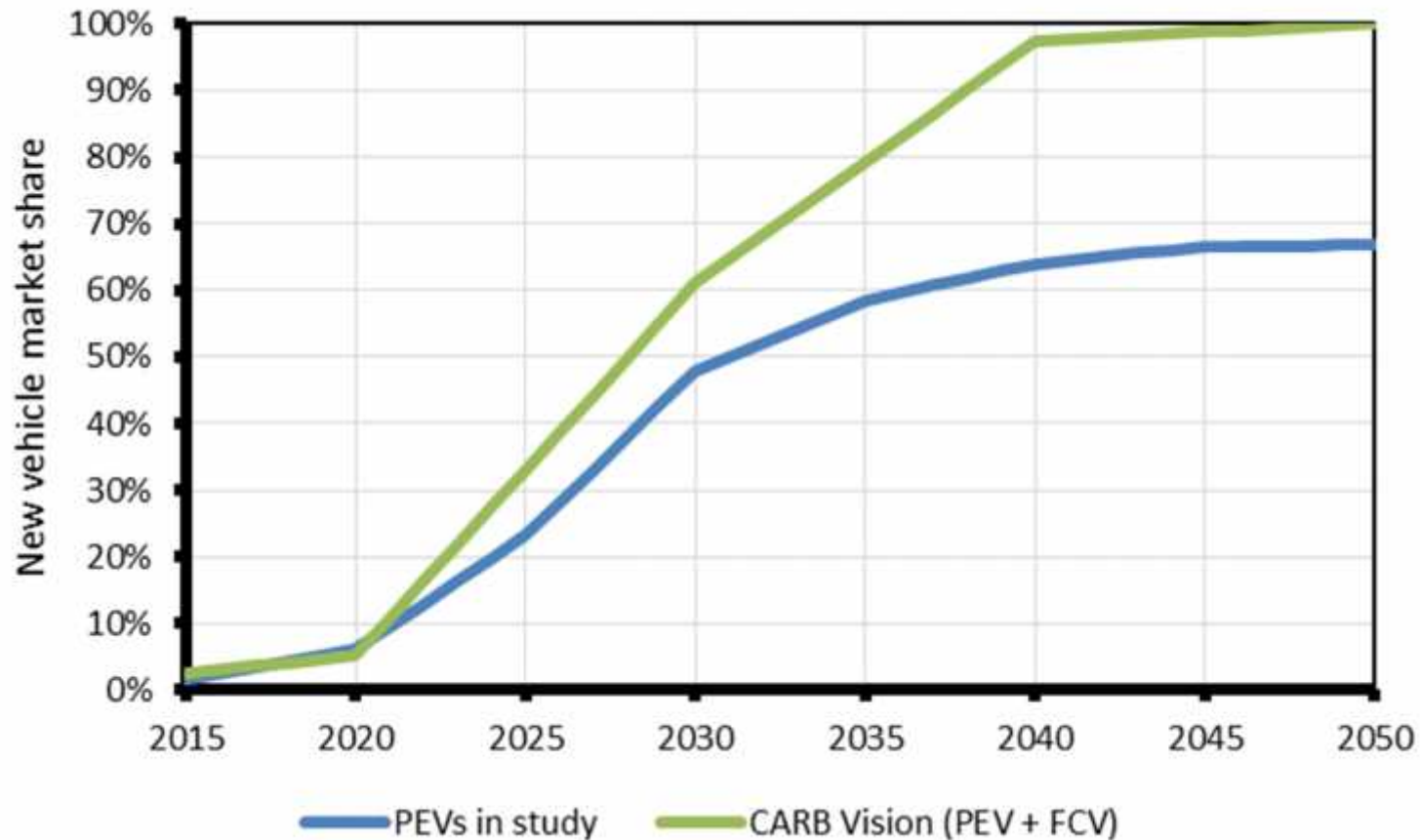
## Study overview

- The study was a collaboration between EPRI and NRDC, and is described in about 700 pages across three volumes
- It included analyses of greenhouse gas and air quality impacts
- It included many regional factors, but generally had a national focus – California's efforts should lead to faster improvements than the average
- What does it say about California's targets?

## SB350 goals

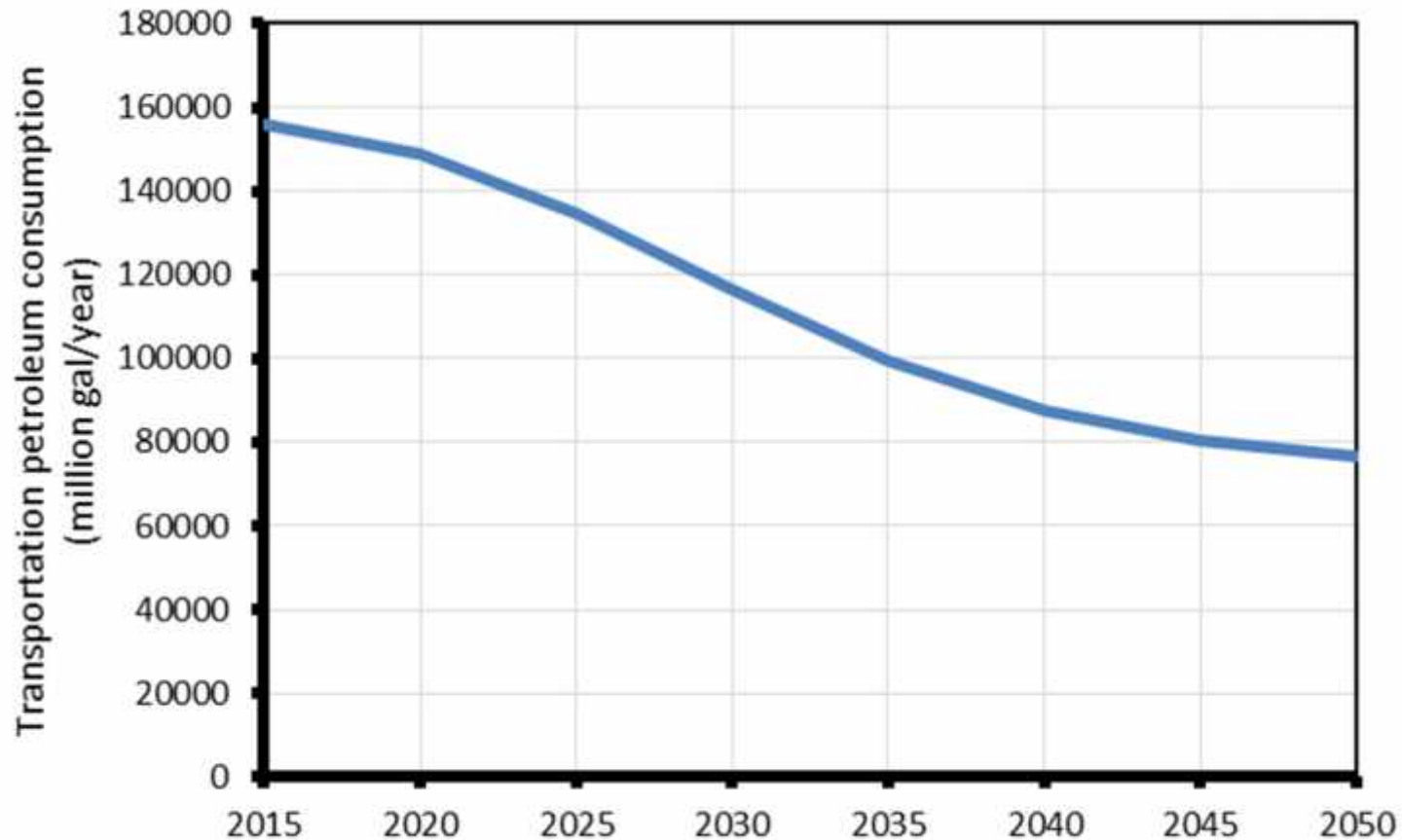
- Meet the Charge Ahead California Initiative goals of 1 million ZEVs by 2023 and increased access to ZEVs in disadvantaged communities
- Reduce dependence on petroleum
- Meet air quality standards
- Reduce greenhouse gas emissions to 40% below 1990 levels by 2030 and 80% below 1990 levels by 2050

## Assume PEV deployment



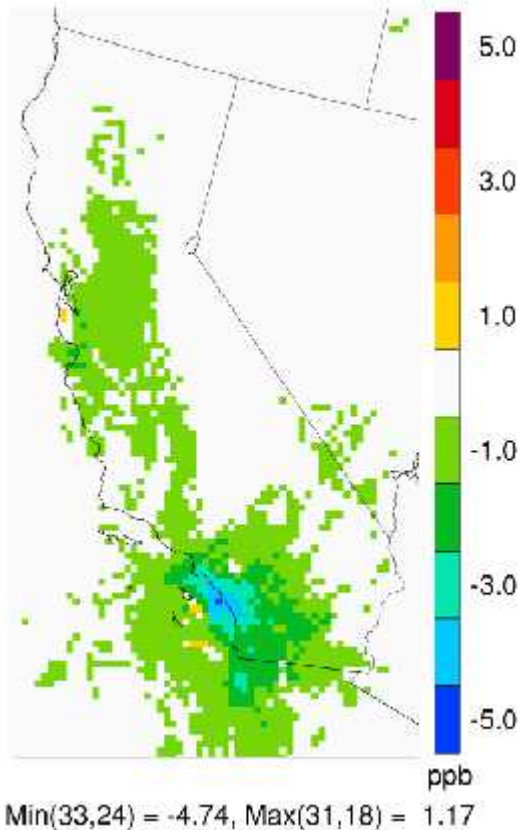
- Our national assumptions were similar to those in CARB's 2012 Vision draft in the medium term – both aggressive

## Reduce dependence on petroleum



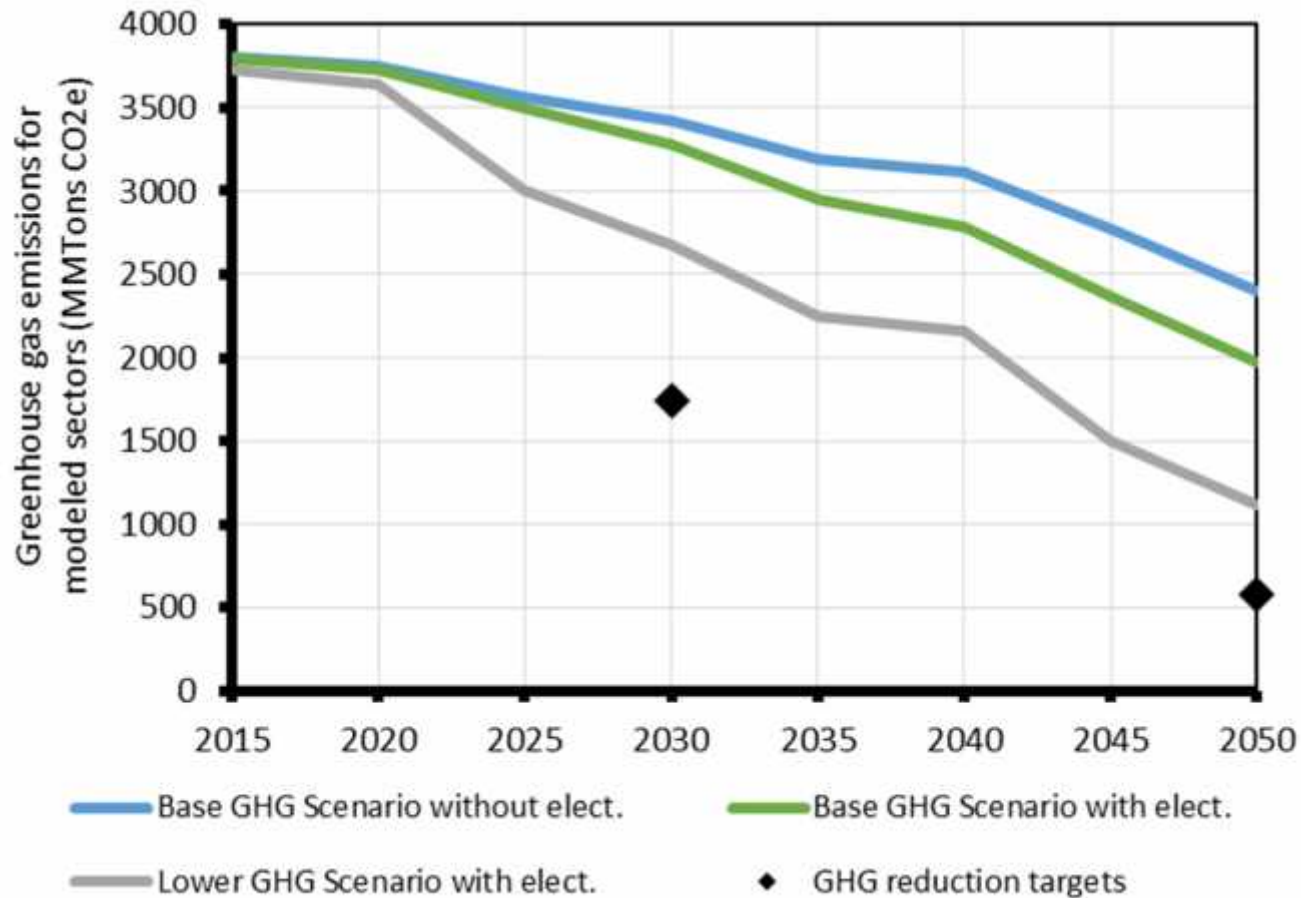
- Reductions in petroleum use are possible, but the existing stock makes dramatic reductions quite difficult

# Meet air quality standards



- The study found that air quality reductions could be achieved, but that further reductions would likely be necessary to meet new standards

# Reduce greenhouse gas emissions



- In our more aggressive scenario the electricity sector and transportation sector can approach California's targets, but there is still a significant gap

## This will be challenging, so we need to move fast

- This shows the challenges, which are considerable
- However, the technologies involved are developing more quickly than many anticipated
- Power plant nitrogen oxide emissions are capped, so each electric vehicle almost completely eliminates criteria emissions compared to a conventional vehicle
- Per-mile greenhouse gas emissions for an electric vehicle are about  $\frac{1}{4}$  the emissions of a conventional vehicle, even with today's grid – and the grid is getting clean
- **The key challenge is deployment**



## Next research steps

- EPRI will be working on a CEC project to help develop detailed estimates of the effects of electrification in California
  - *We will soon begin looking for participants in our advisory board*
- This work will also consider electrification in other sectors

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NRDC Perspective

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# SB350 Requirements for Electrification

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## **Section 740.12 of the Public Utilities Code**

The commission, in consultation with the State Air Resources Board and the Energy Commission, shall direct electrical corporations to file applications for programs and investments to accelerate widespread transportation electrification to reduce dependence on petroleum, meet air quality standards, achieve the goals set forth in the Charge Ahead California Initiative (Chapter 8.5 (commencing with Section 44258) of Part 5 of Division 26 of the Health and Safety Code), and reduce emissions of greenhouse gases to 40 percent below 1990 levels by 2030 and to 80 percent below 1990 levels by 2050.

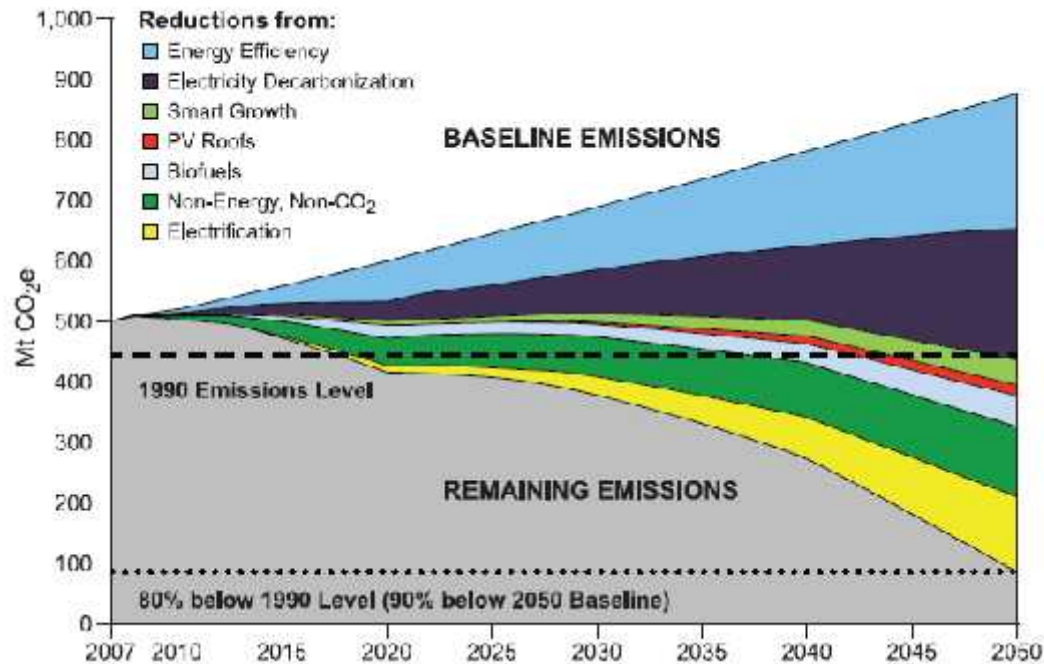
## **Section 237.5 of the Public Utilities Code**

“Transportation electrification” means the use of electricity from external sources of electrical power, including the electrical grid, for all or part of vehicles, vessels, trains, boats, or other equipment that are mobile sources of air pollution and greenhouse gases and the related programs and charging and propulsion infrastructure investments to enable and encourage this use of electricity.

## **Section 701.1 of the Public Utilities Code**

The Legislature finds and declares that, in addition to other ratepayer protection objectives, a principal goal of electric and natural gas utilities’ resource planning and investment shall be to minimize the cost to society of the reliable energy services that are provided by natural gas and electricity, and to improve the environment and to encourage the diversity of energy sources through improvements in energy efficiency, development of renewable energy resources, such as wind, solar, biomass, and geothermal energy, and widespread transportation electrification.

# Pivotal role of electrification in meeting CA's GHG goals



[Williams, J.](#), A. DeBenedictis, [R. Ghanadan](#), [A. Mahone](#), [J. Moore](#), [W. Morrow](#), [S. Price](#), M. Torn (2012) "The Technology Path to Deep Greenhouse Gas Emissions Cuts by 2050: The Pivotal Role of Electricity," *Science*, 335:6064, 53-59.