

Driving California's Transportation Emissions to Zero: Synthesis Report

Austin L. Brown,¹ Kelly L. Fleming¹, Timothy Lipman², Lew Fulton¹, Jean Daniel Saphores⁴, Gil Tal¹, Colin Murphy¹, Susan Shaheen², Bernadette Austin¹, Juan Carlos Garcia Sanchez¹, Elliot Martin², Marshall Miller¹, Michael Hyland⁴, Susan Handy¹, Mark A Delucchi^{1,2}, Daniel Coffee³, JR DeShazo³

UC Campus: ¹UC Davis, ²UC Berkeley, ³UCLA, ⁴UC Irvine

Executive Summary

The purpose of this study overall is to explore the policy pathways to achieve a zero carbon transportation system in California by 2045. The purpose of this synthesis report is to describe the existing state of knowledge and policy related to energy use and greenhouse gas (GHG) emissions in the transportation sector, especially in California. It is an interim product of the larger study, which will use this report as the baseline and policy context sections. The report comprises four sections. Section 1 provides an overview of the major components of transportation systems and how those components interact. Section 2 explores key underlying concepts in transportation, including equity, health, employment, and environmental justice (EJ). Section 3 discusses California's current transportation-policy landscape. Section 4 analyzes projected social, environmental, and economic outcomes of transportation under a "business as usual (BAU)" scenario—i.e., a scenario with no significant transportation-policy changes.

Some key takeaways of this report are:

- Transportation emits more GHGs than any other sector, and is a significant contributor to air pollution.
- Transportation is an essential component of the economy, both as a source of employment and as a system that supports all economic sectors.
- The current transportation system contributes to multiple negative EJ outcomes, including unequal access to transportation services, unbalanced ability of communities to influence transportation policies and decisions, and a much higher pollution burden on communities of color. These injustices are perpetuated as these communities also lack equitable access to quality jobs, critical services, and goods.
- Many options based on available technology exist for decarbonizing transportation. These include:
 - Options for decarbonizing light-duty vehicles (LDVs), including through plug-in electric and fuel-cell personal vehicles.
 - Options for decarbonizing heavy-duty vehicle (HDV) options, including through electric and fuel-cell HDVs.
 - Factors that reduce vehicle miles traveled (VMT) while improving accessibility and choice.
 - Lower-carbon fuels that can replace petroleum fuels (gasoline, diesel, and jet fuel).
- Each of these options faces a specific set of barriers to widespread adoption.
- California has a significant suite of policies, many administered by the California Air Resources Board to address these barriers and reduce emissions in the transportation sector, including at least one major policy in each of the subsectors examined in this report.
- It is important for each of these policies to consider the equity impacts, and California is increasingly designing transportation policy explicitly to help improve the equity of outcomes.
- Under a BAU scenario, California is extremely unlikely to meet emissions-reductions goals in the transportation sector. In particular, expected progress in electrification and lower-carbon fuels will likely be insufficient to offset growth in travel, absent significant policy changes.