

CALIFORNIA ENERGY COMMISSION

A TRANSFORMATION TO ZERO AND NEAR-ZERO EMISSION TECHNOLOGIES AND FUELS

2014 INTEGRATED ENERGY POLICY REPORT UPDATE

The California Energy Commission's *2014 Integrated Energy Policy Report Update* focuses on transportation in light of California's energy and climate goals. The following is a summary of information on the Energy Commission's investments to help spur transformation to a clean, low-carbon transportation energy future.

A Transformation of the Transportation System to Zero and Near-Zero Emission Technologies and Fuels Is Needed

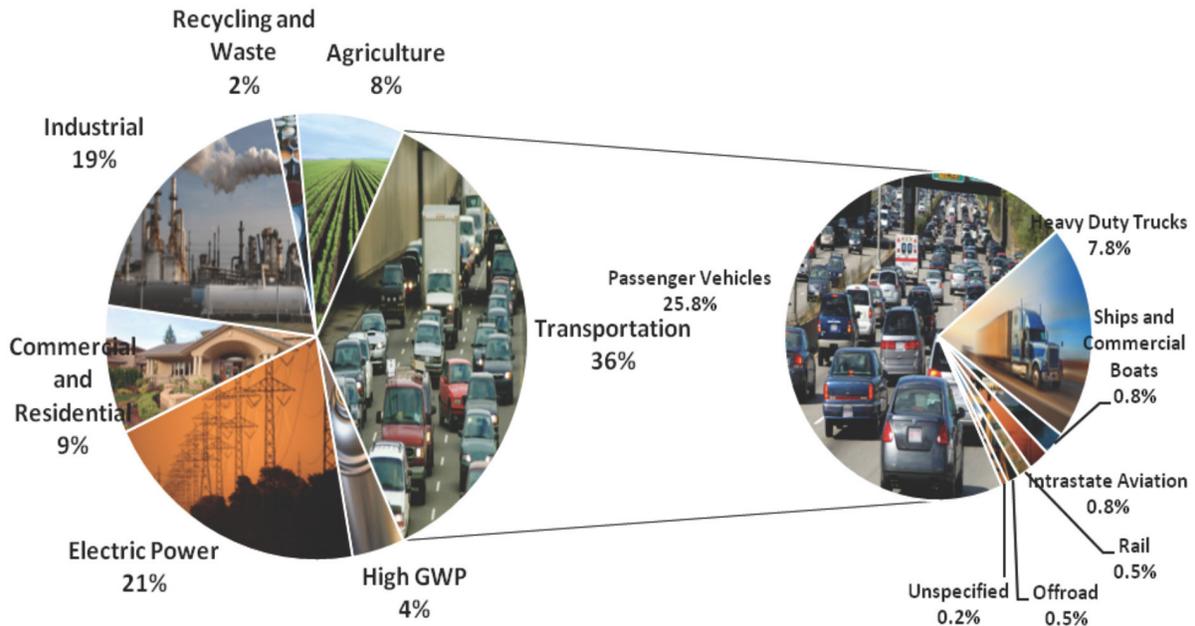
California's transportation system is a core element of the state's way of life and economic vitality. As critical as the transportation system is to California's way of life and economy, it is also the state's biggest source of greenhouse gas emissions that contribute to global climate change. The transportation system also generates air pollutants that contribute to poor air quality and diminished public health in many parts of California. In 2012, the transportation sector was responsible for:

- » 36% of the total greenhouse gases in the state
- » 83% of smog-forming oxides of nitrogen (NOx)
- » 95% of diesel particulate matter (PM) emissions

“ ... A portfolio approach will give us the best chance of meeting stringent goals for a sustainable transportation future. Given the uncertainties and the long timelines, it is critical to nurture a portfolio of key technologies toward commercialization. All our work in characterizing pathways and comparing them flows toward this conclusion.”

Sustainable Transportation Energy Pathways, a Research Summary for Decision Makers, University of California at Davis, Institute of Transportation Studies, 2011.

California Greenhouse Gas Inventory by Sector for 2012



Source: Energy Commission staff based on California Air Resources Board data, available at http://www.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_scopingplan_00-12_2014-03-24.pdf. 2014 Integrated Energy Policy Report Update, page 13.

To meet climate goals, the state must reduce greenhouse gas emissions from transportation while safeguarding its transportation system from the risks of climate change. The chart below highlights some of the policies California has enacted to reduce greenhouse gas emissions, criteria air pollutants, and petroleum use.

Vision for Transforming the Transportation System

California is committed to mitigating the impact of the transportation sector, as reaffirmed by the passage of Assembly Bill 8 (Perea, Chapter 401, Statutes of 2013) (AB 8) which extends the Alternative and Renewable Fuel and Vehicle Technology Program (ARFVTP) through January 1, 2024. AB 8 makes up to an additional \$1 billion available in ARFVTP funds for continued efforts in cleaning up the state's transportation sector, placing the state in a position to make progress in attaining clean air, public health, energy security, and climate change policy goals.

At the kick-off workshop for the 2014 IEPR Update, State legislators shared their vision for transitioning to alternative fuels and vehicle technologies:

- » **Senator Mark DeSaulnier** (representing California Senate District 7) wrote that AB 8 "...provides us with an opportunity to ensure that our progress toward a zero-emission vehicle fleet benefits all Californians, not just the more affluent among us."
- » **Senator Fran Pavely** (representing California Senate District 27) noted how significant benefits can be gained from continued funding in the truck, freight, and goods movement sectors in addressing the state's nonattainment air quality areas—which often correspond with large transportation corridors.

Policy Objectives	Policy Origin	Goals and Milestones
Greenhouse Gas (GHG) Reduction	AB 32, California Global Warming Solutions Act	Reduce GHG emissions to 1990 levels by 2020
	Executive Orders S-3-05 and B-16-2012	Reduce GHG emissions to 80% below 1990 levels by 2050 in California
	Low Carbon Fuel Standard	10% reduction in carbon intensity of transportation fuels in California by 2020
Petroleum Reduction	California <i>State Alternative Fuels Plan</i>	Reduce petroleum fuel use in California to 15% below 2003 levels by 2020
In-State Biofuels Production	California <i>Bioenergy Action Plan</i>	Produce in California 20% of biofuels used in state by 2010, 40% by 2020, and 75% by 2050
Federal Renewable Fuel Standard	Energy Policy Act of 2005, Energy Independence and Security Act of 2007	36 billion gallons of renewable fuel by 2022
Improved Air Quality	Clean Air Act	80% reduction in NOx from current levels by 2023
Increased Zero-Emission Vehicles (ZEVs)	California Air Resources Board's ZEV Mandate, California Executive Order B-16-2012	Infrastructure to accommodate 1 million electric vehicles by 2020 and 1.5 million electric vehicles by 2025 in California

Source: California Energy Commission staff, 2014 Integrated Energy Policy Report Update, page 11.

- » **Assemblymember Henry Perea** (representing California Assembly District 31) stressed the importance of equity and investing in infrastructure, pointing out the need to develop fueling infrastructure in regions such as the Central Valley—which is not in attainment with air quality standards and has some of the highest pollution and asthma rates in the country—even if residents cannot yet afford the vehicles.
- » **Assemblymember Nancy Skinner** (representing California Assembly District 15) identified the importance of continued funding for alternative fuel infrastructure for the successful commercialization and deployment of alternative fuels.

Invest in a Portfolio of Strategies

There is also strong support for investing in a portfolio of strategies as the state transitions away from conventional fossil-based fuels. Dr. Joan Ogden, Professor of Environmental Science and Policy at the University of California, Davis, and Director of the Sustainability Transportation

Energy Pathways Program at the Institute of Transportation Studies, spoke on the importance of a portfolio approach to achieve the interlinked air quality, greenhouse gas, and energy security goals. There are a variety of options for addressing transportation energy challenges, such as more widespread use of low-carbon alternative fuels and vehicle technologies, increased vehicle efficiency, and reduced number of vehicle miles traveled. Studies suggest that a sustainable transportation system will consist of a variety of highly efficient vehicle technologies that will use a variety of low-carbon fuels. When looking to California's transportation future, different fuels and technology types will suit different needs for transportation applications, and for that reason the ARFVTP will continue to support a diverse mix of fuels, associated infrastructure, and vehicle technologies.

INCENTIVES ARE NEEDED

In combination with regulatory and policy support, incentives will play a key role in supporting and encouraging the use of the alternative fuels and vehicle technologies necessary for transforming California's transportation

“Taking significant amounts of carbon out of our economy without harming its vibrancy is exactly the sort of challenge at which California excels. This is exciting, it is bold, and it is absolutely necessary if we are to have any chance of stopping potentially catastrophic changes to our climate system.”

Governor Edmund G. Brown’s inaugural address, remarks as prepared, January 5, 2015.

market. It is important to continue to think of ways to best use state funds to improve affordable access to clean fuels and technologies to consumers, particularly those who are middle to low income, live in areas most challenged with poor air quality, or in regions that are economically depressed.

The Alternative and Renewable Fuel and Vehicle Technology Program Plays an Important Role in Meeting Climate, Air Quality, and Energy Goals

Through the ARFVTP, the Energy Commission has invested in a portfolio of projects that have the potential to be transformative, including

- » **Deploying electric vehicle infrastructure and supporting incentives:** The Commission strives to replace gasoline-powered vehicles with battery-electric vehicles and plug-in hybrid electric vehicles to reduce emissions and gasoline consumption.
- » **Building a foundation for hydrogen fueling stations:** Funding conveniently located hydrogen fueling stations encourages fuel cell electric vehicle rollout across California.
- » **Advancing low carbon biofuels:** Biofuels produced from low-carbon-intensity feedstocks can displace petroleum and reduce greenhouse gas emissions.
- » **Accelerating fleet turnover with appropriate natural gas vehicle incentives and infrastructure support:** Advancing natural gas engines that have the potential to operate at extremely low emission levels advances state climate goals.
- » **Incubating innovation in medium and heavy duty advanced technology vehicles:** The Commission solicits clean technologies for goods movement and freight transport to reduce diesel fuel use, reduce emissions, improve air quality, and improve public health.

- » **Supporting manufacturing in California:** Electric drive-related manufacturing encourages the in-state deployment of electric drive vehicles.

- » **Advancing workforce training and development:** The Commission aims to align clean technology investments with economic development.

- » **Continually evaluating technology trends and market needs:** Inviting public input and expert advice ensure the programs remain responsive to the needs of Californians.

California Leads the Way

Although transforming California's transportation market is a huge undertaking, policies and programs like the ARFVTP make California a leader in clean fuel innovations. As such, California is a testing ground for innovating, developing, and demonstrating cutting-edge transportation technologies and supporting them on the path to commercial deployment. California air quality standards are based on public health impacts and are not adjusted to reflect the capability of existing technology. Instead, the standards have successfully forced technology innovation that can meet air quality standards. Furthermore, California is leveraging efforts and lessons learned with other states and countries as continued innovation and breakthroughs are needed to meet the state's goals.

For more information, please see the 2014 Integrated Energy Policy Report Update, available at www.energy.ca.gov/2014_energy/policy/.

Edmund G. Brown Jr.
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