



CALIFORNIA ENERGY COMMISSION

# The Alternative and Renewable Fuel and Vehicle Technology Program

Greater Sacramento  
Regional Clean Air Coalition  
Clean Technologies Forum  
Incentives Roundup Workshop

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**California Energy Commission**



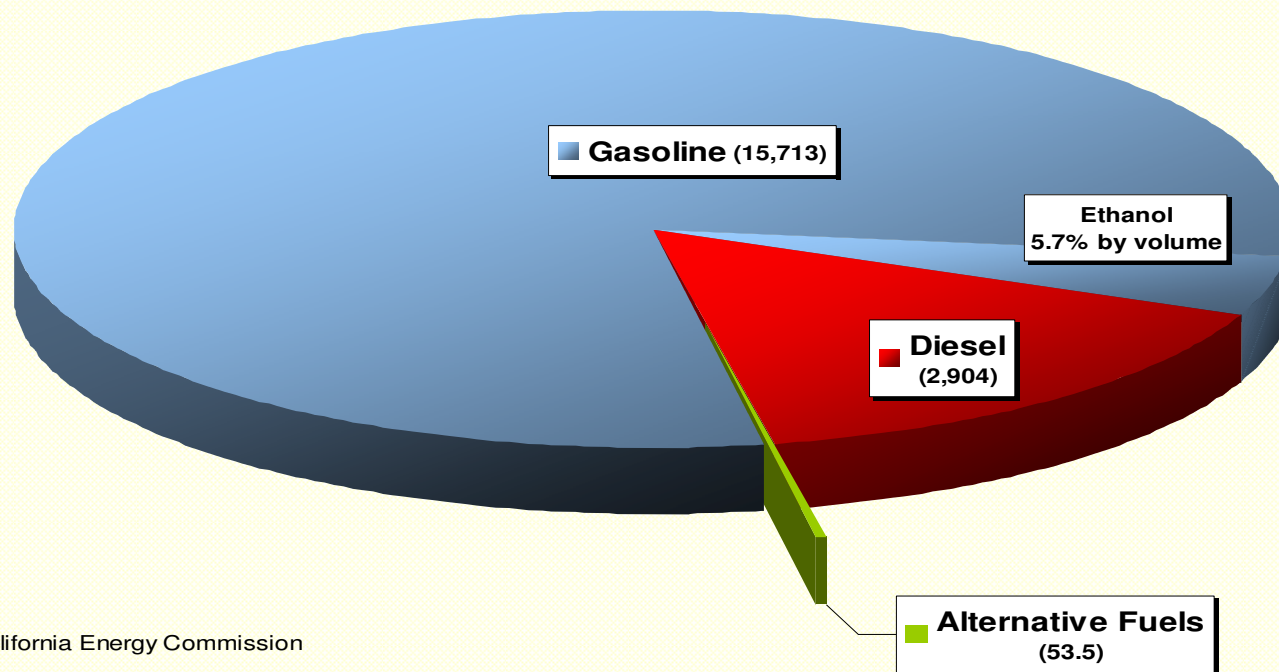
## California Nation-State

- Population: 36.8 million
- GDP: \$1.8 trillion - 8<sup>th</sup> largest economy
- GHG Emissions: 440 MMT (2004)
  - 7.2% of U.S. Emissions (Pew Center)
  - 10<sup>th</sup> largest emitter on global scale
  - Transportation accounts for 38 % of all GHG emissions
- Vehicles: 26.3 million cars + 0.92 million trucks
- Annual Fuel Consumption: 20 billion gallons
  - 16 billion gallons gasoline
  - 4 billion gallons diesel
  - 3<sup>rd</sup> largest consumer of vehicle fuels after China and US



# California's Petroleum and Alternative Fuels Demand

(millions of gallons)

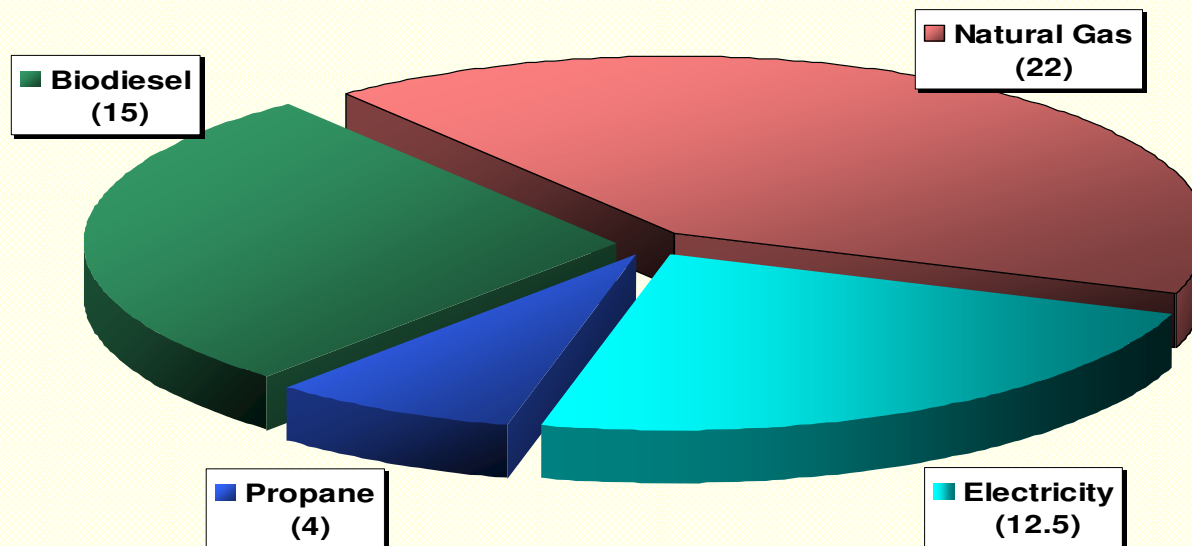


Source: California Energy Commission



# California Alternative Fuels Demand - 2005

(millions of gallons of petroleum displaced)



Source: California Energy Commission



# California's Alternative Fuels Plan

- Full-fuel-cycle analysis of all fuels, specific recommendations.
- Goals: 9% in 2012, 11% in 2017, 26% in 2022.
- Displacement of 4 billion gge in 2020 (20%).
- Natural gas and propane can make a large contribution to this goal, with corresponding large reductions in GHG and air pollution.

California Energy Commission



California Air Resources Board





## State Policy Priorities

- Heavy reliance on petroleum-based fuels in the transportation sector remains a concern
- Multiple state policy drivers: petroleum reduction, fuel diversity, environmental improvement, waste reduction, air quality, and global climate change
- State commitment to transform the state's fuels market by developing and expanding the use of alternative transportation fuels, particularly, low-carbon and ultra low-carbon fuels
- Surplus biomass resources from agriculture, forestry and urban waste streams presents both a challenge and opportunity for fuel developers and suppliers.

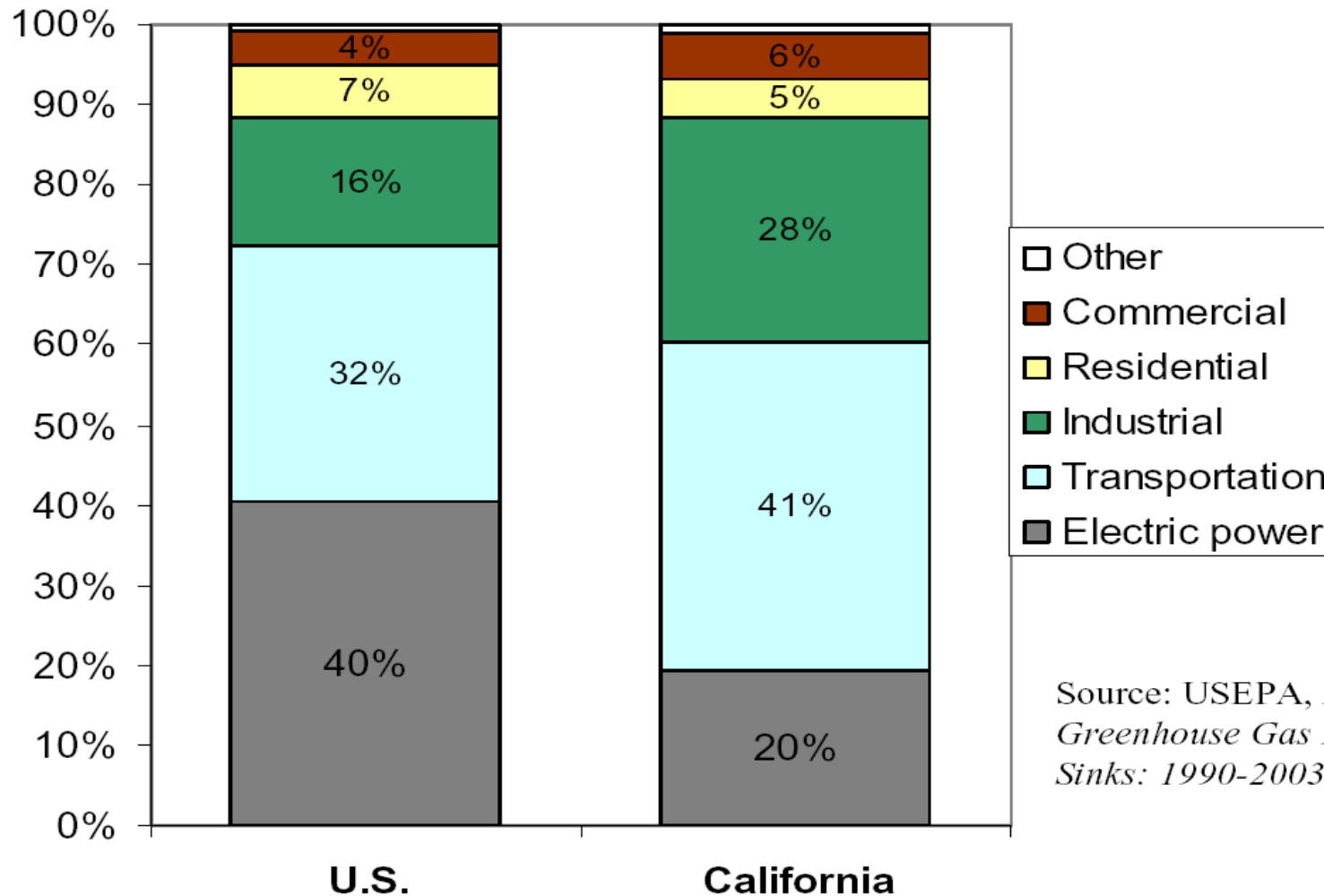


## Reducing California's Petroleum Dependence

- August 2003 Joint Report by the Energy Commission and Air Resources Board in response to state legislation
- Recommended state petroleum reduction goals.
  - Reduce demand for gasoline and diesel to 15 percent below 2003 levels by 2020
  - Increase use of alternative fuels by 20 percent
- Urged a doubling of vehicle fuel economy through Federal Corporate Average Fuel Economy standards (found to be cost-effective with current vehicle technology)



# Sources of Greenhouse Gas Emissions



Source: USEPA, *Inventory of US Greenhouse Gas Emissions and Sinks: 1990-2003*



## Global Warming Solutions Act of 2006

- On September 27, 2006, Governor Schwarzenegger signed legislation, Assembly Bill 32, the Global Warming Solutions Act of 2006.
- California's initiative is intended to limit greenhouse gas emissions from the state's largest emitting sources.
- This legislation gives the California Air Resources Board significant, new responsibilities.



## California's Low Carbon Fuel Standard

- On January 9, 2007, the Governor issued Executive Order S-1-07, establishing the world's first Low Carbon Fuel Standard for transportation fuels.
- Petroleum refiners, gasoline sellers and fuel suppliers must reduce the carbon content of their fuels by 10 percent by 2020.
- By regulating carbon fuel content, this standard will support the state's greenhouse gas reduction targets, while promoting the use of alternative fuels.
- Adding ethanol or other biofuels into gasoline is one option for meeting the Standard; advanced biofuels show promise.



## State Bioenergy Goals

- Governor's Executive Order S-06-06 (April 2006) sets instate production and use targets.
- Established targets to increase the in-state production of bioenergy and biofuels
- Governor released the Bioenergy Action Plan in July 2006, committing state agencies to take a series of specific actions.
- The Bioenergy Interagency Working Group meets regularly to address and seek to remove barriers to sustainable bioenergy development.



## State and Federal Policy Drivers to Reduce GHGs Will Increase Demand for Biofuels

- **California's Climate Change Reduction Goals – AB 32**
  - 1990 Levels by 2020 (~30% reduction)
  - 80 percent reduction by 2050
- **California's Low Carbon Fuel Standard**
  - 10 % reduction in carbon intensity of transportation fuels by 2020
- **BioEnergy Action Plan (Executive Order S-06-06)**
  - *“Maximize the contributions of bioenergy toward achieving the state’s petroleum reduction, climate change, renewable energy, and environmental goals.”*
  - Policy goal to increase in-state production of biofuels  
2010 – 20%     $\implies$     2020 – 40%     $\implies$     2050 – 70%



# The Alternative and Renewable Fuel and Vehicle Technology Program

- Assembly Bill 118 (Nunez, Chapter 750, Statutes of 2007) created the Alternative and Renewable Fuel and Vehicle Technology Program administered by the Energy Commission.
- Subsequently amended by AB 109 (Nunez, Chapter 313, Statutes of 2008).
- “The emphasis of this program is to develop and deploy innovative technologies that transform California’s fuels and vehicle types to help attain the state’s climate change policies.”



## Funding and Objectives

- Up to \$100 million per year for 7 ½ Years (\$75 million for FY 08-09; \$101 million for FY 09-10)
- Develop, produce, manufacture, and deploy alternative and renewable fuels, advanced vehicles, vehicle efficiency improvements for on-road and non-road applications.
- Emphasize workforce training and job creation
- Foster education, promotion and technology centers
- Prepare environmental, market and technology assessments



## AB 118 Investment Plan Funding Allocations – First Two Years

Fuel / Technology	2-Year Funding Allocation (million)
Electric Drive	\$46
Hydrogen	\$40
Ethanol	\$12
Renewable Diesel/Biodiesel	\$6
Natural Gas (Includes \$10 M for Biomethane)	\$43
Propane	\$2
Market Development and Program Support	\$27
<b>Total</b>	<b>\$176</b>



## Electric Drive Program Summary

- Plug-in hybrid electric passenger vehicle retrofits
- Medium- and heavy-duty hybrid vehicle RD&D
- Non-road projects for ports and truck stop electrification
- Electric charging
- Manufacturing facilities and equipment



## Biofuels Program Summary

- E-85 fueling stations
- Ethanol feedstock and project feasibility studies for new plants
- New ethanol pilot plants using waste feedstocks
- Renewable diesel production plants using waste feedstocks
- Construct renewable diesel blending and storage terminal facilities
- Biomethane production plants



## Hydrogen Development Support

- Funding for Hydrogen Fueling stations to match the Auto Manufacturers roll-out of Fuel Cell Vehicles (FCVs)
- Funding to support certify a retail Hydrogen dispenser and assure fuel quality



# Natural Gas and Propane Program Summary

- Light-duty natural gas vehicles
- Medium- and heavy-duty natural gas vehicles for port trucks, school buses, and other vehicles
- Natural gas fueling station installations
- Biomethane production plants
- Medium-duty propane school buses and other vehicles



## Next Steps

- Update of the Investment Plan for FY 10-11; underway, next Advisory Committee Meeting is April 30, 2010.
- Notice of Proposed Awards (NOPAs)- For 3 Solicitations; Biomethane Production (\$21.5 M), Alternative Fuel Infrastructure (\$13.8 M) and MD/HD Advanced Vehicle Demonstrations (\$9.5 M)-to be released in April
- Solicitations for: Advanced Biofuel Production (\$15 M), Vehicle and Component Manufacturing(\$19 M), Ethanol Production (\$6 M), Hydrogen fueling Infrastructure( \$22 M), Center of Excellence (\$3 M) and Propane School buses (\$2 M) to be released in April/May



CALIFORNIA ENERGY COMMISSION

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