

California Environmental Protection Agency



Air Resources Board



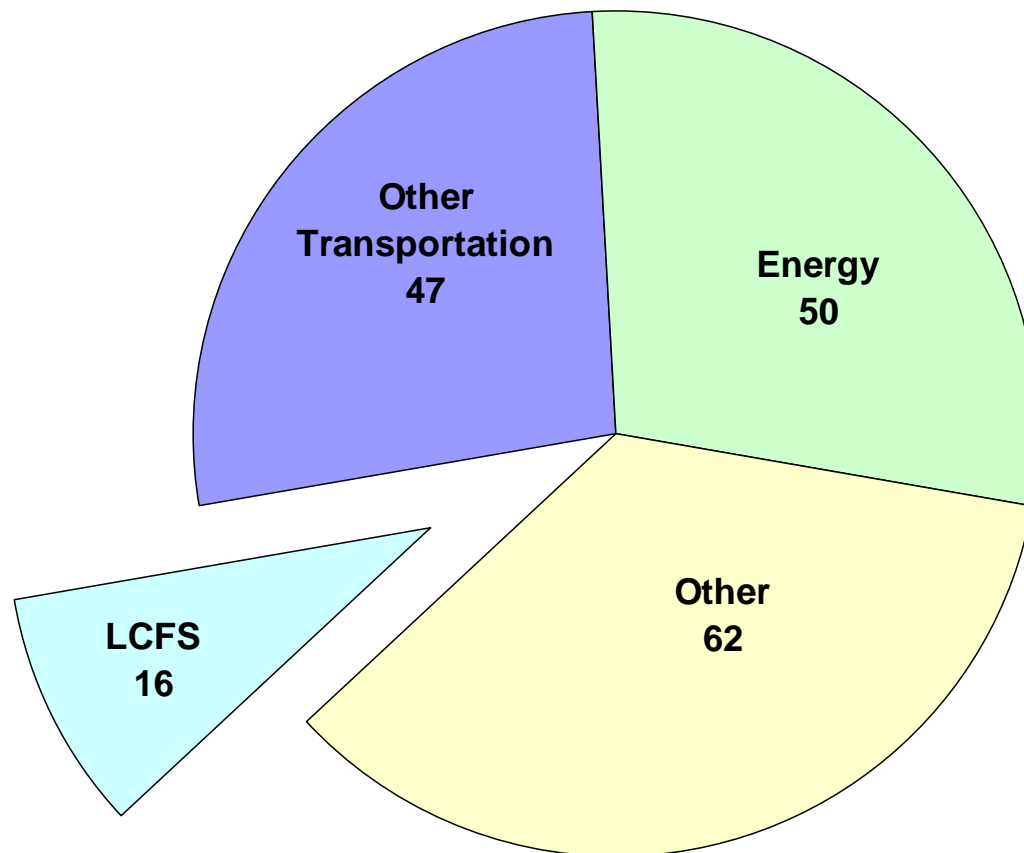
Briefing on the California Low Carbon Fuel Standard

**ARB Board Meeting
March 26, 2009**



Role of LCFS in AB 32

2020 Reductions Proposed in AB 32
(MMTCO₂e)





What are the Goals of the LCFS?

- Create a durable framework for the introduction of low carbon fuels
- Achieve at least a 10% reduction in average fuel carbon intensity by 2020
- Reduce petroleum dependency by 20%
- Provide market incentives for advanced transportation fuels
- Create pathway to much higher long-term GHG reductions



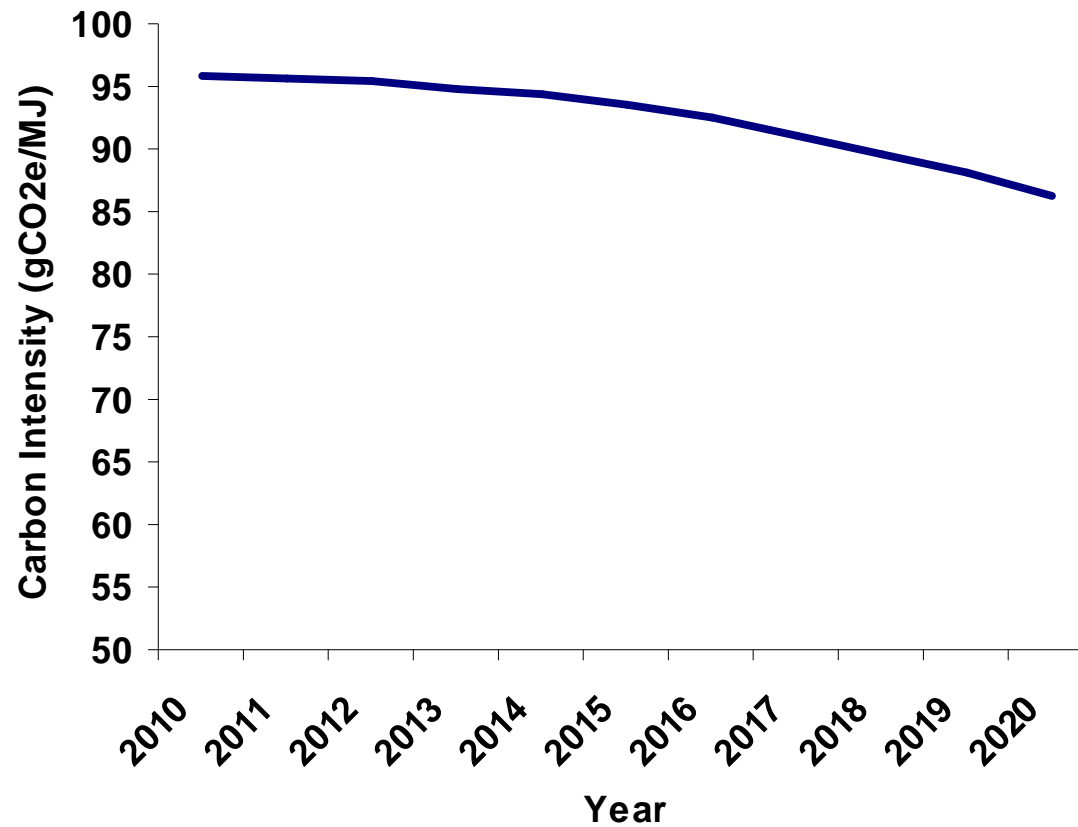
What is a Low Carbon Fuel?

- Transparent to motorists: works in today's vehicles and fueling facilities
- Typical fuels include:
 - Gasoline blended with low-carbon ethanol
 - Diesel blended with biodiesel or renewable diesel
 - Natural gas or biogas
 - Electricity used in an electric or plug-in electric vehicle
 - Hydrogen used in a fuel cell vehicle



LCFS Compliance Schedules

Compliance Schedule for Gasoline and Gasoline Substitutes





Compliance Scenarios

Standards can be achieved by:

- Increasing volumes of liquid biofuels: California ethanol, cellulosic ethanol, sugarcane ethanol, biodiesel, renewable diesel
- Increasing biofuel use in flexible-fueled vehicles using E-85
- Increasing electricity and hydrogen use in plug-in hybrid, battery electric, and fuel cell vehicles
- Increasing use of CNG as a transportation fuel



What are the Compliance Options?

Regulation is market-based and allows the following compliance options to lower cost and provide flexibility:

- Provide low carbon fuel(s)
- Use banked credits
- Use purchased credits
- Use any combination of the above



Who Is Regulated?

- Providers of most petroleum and biofuels are 'regulated parties' under the LCFS
- Providers of fuels that already meet 2020 levels must 'opt in' and become regulated parties if they want to earn credits:
 - Electricity
 - Hydrogen & hydrogen blends
 - Some fossil CNG
 - Biogas CNG and LNG



How is Compliance Determined?

- Compliance based on system of determining annual credits and deficits
- Fuels with lower carbon intensity than the standard generate credits
- Fuels with higher carbon intensity than the standard generate deficits
- Annually, the mix of fuels must meet the standard



How is Carbon Intensity Determined?

- Carbon intensity to each fuel based on:
 - Origin of feedstock
 - Production/processing emissions
 - Transportation/distribution emissions
 - Vehicle emissions
 - Land use changes: direct and indirect
- Regulated parties may propose additional carbon intensities for ARB's approval



Components of Carbon Intensity

Carbon Intensity is based on a full life-cycle accounting of ***all*** GHG emissions

Two primary components:

- ***Traditional***: Emissions due to the production, transport, storage and use of the fuel
- ***Other Effects***: Emissions due to other effects, such as induced land use change



Land Use Change

- Land Use Change
 - Increased corn produced to meet demand for ethanol, thus displacing soybeans;
 - non-ag land (native grasslands/forests) converted to soybean production to meet demand
- Impact:
 - GHG emissions increase because native grasslands/forests sequester more carbon than agricultural land



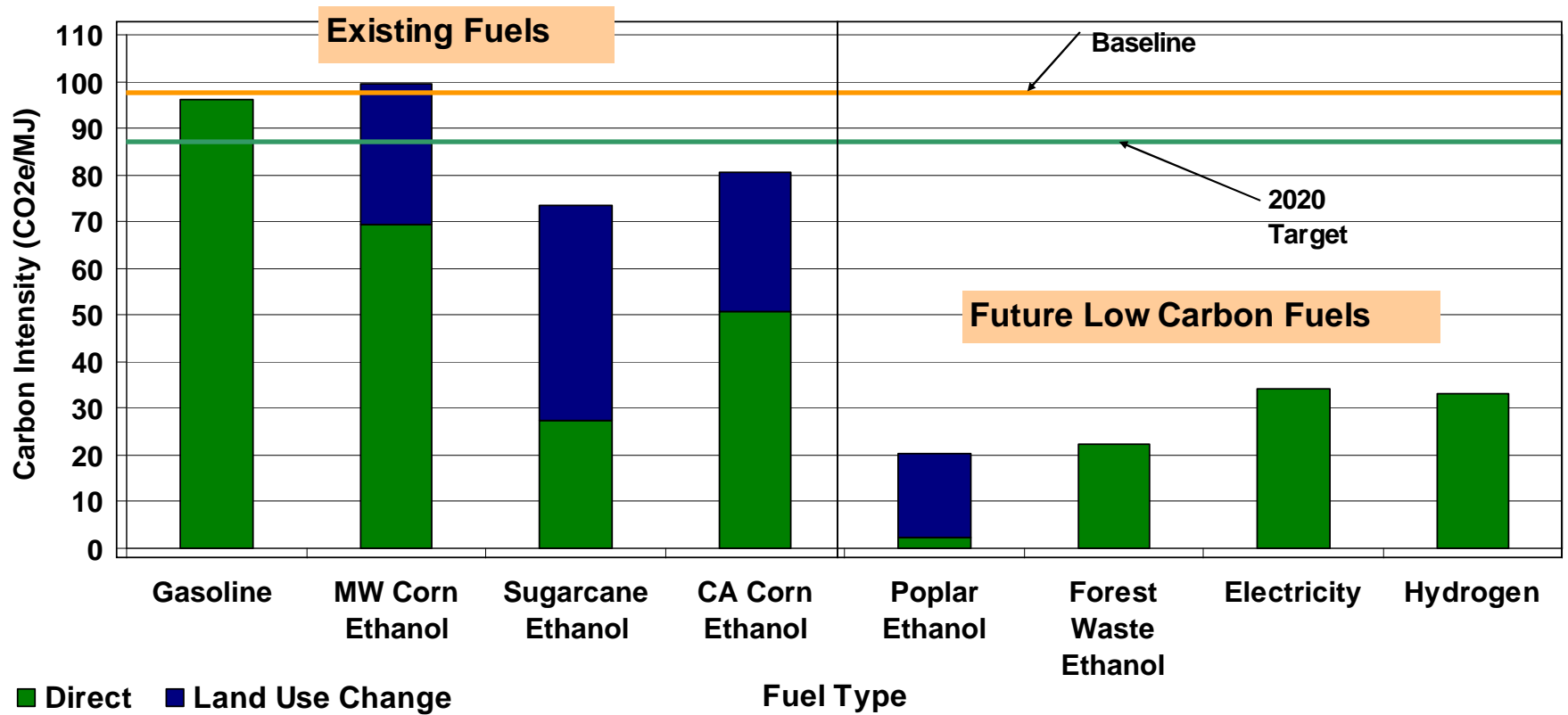
No Land Use Effect

Many biofuels will likely have little or no land use effects when they:

- Are not derived from crops
- Are derived from crops grown on marginal ag lands
- Are derived from waste



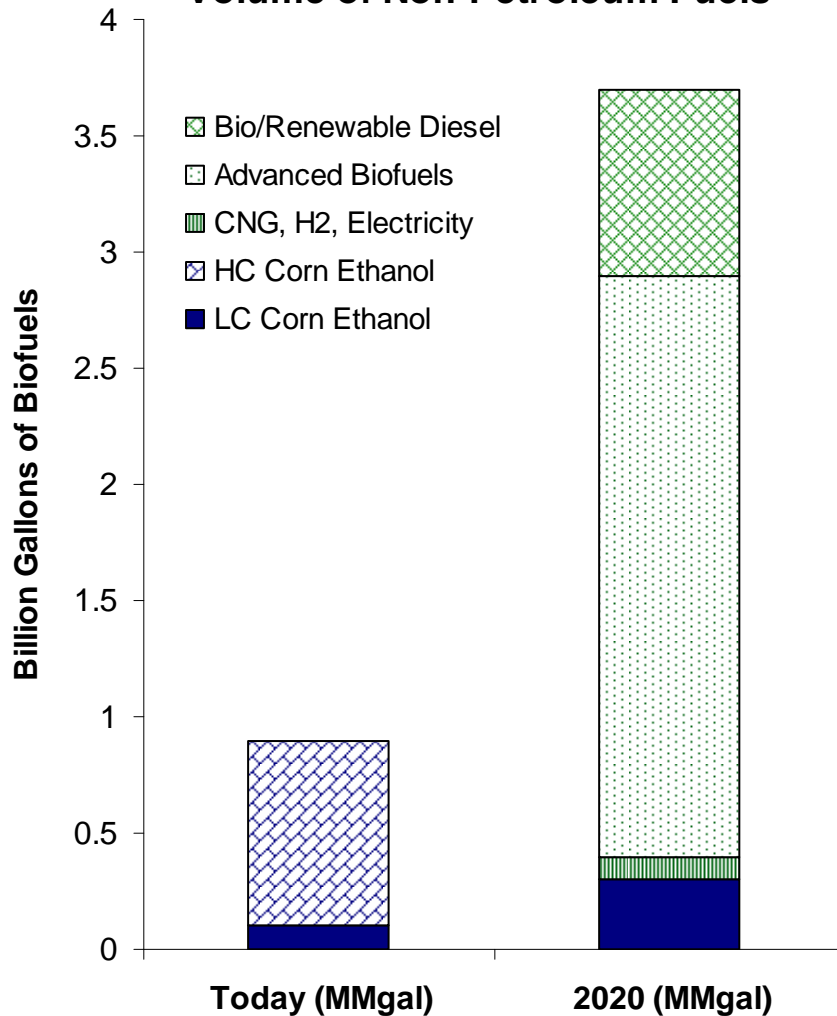
Carbon Intensity Values





LCFS Increases Biofuel Demand and Fuel Diversity

LCFS Quadruples the Volume of Non-Petroleum Fuels



LCFS Diversifies the Fuel Supply And Reduced Petroleum Consumption

Fuel	2020	
	% Difference	Volume (billion gge)
Advanced Biofuels	4800	3.3
LC Corn Ethanol	75	0.2
CNG, Electricity, FCV	N/A	0.1
HC Corn Ethanol	-100	0.0
Gasoline	-13	11.8
Diesel	-17	4.5



Environmental Analysis

- Total of 16 MMTCO₂e reduction in 2020
- Represents about 10% of reductions necessary to meet AB 32 Scoping Plan goals
- 3 times greater than the GHG benefits from the Federal Program
- Overall reductions in criteria pollutant emissions expected from use of advanced technology vehicles



Biofuel Production Facilities

- Environmental analysis considers possible impacts from new biofuel facilities
- Up to 24 potential facilities based on available biomass feedstocks
- Mitigation expected due to local permitting and CEQA requirements
- ARB staff committed to develop best practices guidance for local use to guide whatever development occurs



Economic Analysis

- Estimated Overall Savings
 - Profits for producers, or savings to customers, or both
 - Savings could be \$0.00 -\$0.08/gal
- Savings estimates depend on future oil prices
- Impact on producers will vary depending on carbon reduction investment strategy



LCFS Public Outreach

- ARB has held 15 public workshops and 200 stakeholder meetings in developing the regulation over the last several years
- Received over 200 public comment letters
- Next public workshop is tomorrow



Summary

- LCFS needed to reach California's GHG reduction goals for transportation
- LCFS provides framework for transition to sustainable alternative fuels
- Innovation is the key to low-carbon advanced biofuels
- Low-carbon renewable fuels play important role



Related Presentations

University of California Presentations