Overview

• LCFS Overview

• Formal LCFS Program Review

• Sustainability Activities
Transportation Emissions Increasing

• GHG emissions increasing

• Transportation sector about 40 percent of GHG emissions in 2020

• Large reductions necessary to offset growth

GHG Programs for Transportation

• Fuels
  – Low Carbon Fuel Standard - 2009

• Vehicle GHG Emissions Standards
  – Pavley Standards - 2004
  – Advanced Clean Cars – 2012 (proposed)

• Vehicle Miles Traveled
  – Sustainable Communities (SB 375) - 2010
LCFS - 3rd Largest GHG Measure

Achieves 13% of AB 32 reductions

Estimated 2020 Scoping Plan Reductions (MMTCO$_2$e)

Additional Objectives of LCFS

- Spur innovation and investment in clean fuels
- Transform CA transportation fuel pool:
- Create durable framework for near- and long-term transition to low carbon fuels
- Establish a model for regional and national standards
**Basic LCFS Requirements**

- Sets annual carbon intensity standards for gasoline, diesel, and fuels that replace them.

- Carbon intensity is measure of energy required to produce a fuel and is surrogate for GHG emissions.

- Carbon intensity based on lifecycle analysis.

- Performance standard requires 10% reduction in carbon intensity by 2020.

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**Provides Time for Needed Biofuel Advances**

- Gentle slope in early years
- Backloaded
**LCFS Accounts for Lifecycle Emissions**

- Carbon intensity includes both direct and indirect emissions
  - Direct: well-to-wheel; seed-to-wheel
  - Indirect emissions: Land use change
- Carbon intensity of fuels can vary significantly
- Proper accounting sends clear signal to reduce carbon intensity of transportation fuels

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**Foundation of LCFS: Lifecycle Assessment**

- **Corn Field**: 36 g/MJ
- **Land Use Change**: 30 g/MJ
- **Bio-Refinery**: 16-38 g/MJ
- **Transportation**: 2 g/MJ
- **Co-products**: Blend with gasoline
- **Vehicles**: Emissions are Offset

*Corn Ethanol: 75-97 g/MJ*

*Illustrative only*
LCFS Applies to Regulated Parties

- Providers of most petroleum and biofuels are ‘regulated parties’ under the LCFS
- Providers of clean fuels that already meet 2020 target are exempt but can ‘opt in’ program and earn credits
- Generated credits can be bought and sold by regulated parties

LCFS Working As Designed

- Program in its early years
- Working as designed
- Approximately 70 fuel providers are reporting & complying
- Innovations are occurring
Scope of Formal Program Review

- Advisory Panel formed to assist staff
- Review covers various topics:
  - Technology and Investment
  - Supply
  - Economic Impacts
  - Environmental Impacts
- Topics added for review

Formation of Advisory Panel

- Objective: Establish a diverse Advisory Panel of experts to reflect the best information and perspectives
- Broad solicitation for applications
- Panel includes:
  - Fuel providers
  - Vehicle manufacturers
  - Government agencies
  - Environmental organizations
  - Economic experts
  - Academia
**Role of Advisory Panel**

- Focus on high level review
- Complement efforts of technical workgroups
- Assist ARB staff by:
  - Reviewing/commenting on work
  - Suggesting other topics for study
  - Identifying additional information
  - Conducting independent analyses
- Panelists available for ongoing consultation

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**Extensive Public Process**

- Panel convened five times, one supplemental meeting
- Two public workshops
- Individual meetings
- All panelist and public comments posted online

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### Panel Discussions

- Added two topics at Panel's request:
  - High Carbon Intensity Crude Oil
  - Credit Trading
  - Wide range of opinions expressed on topics
  - Effort made to reflect range of perspectives in program review report

### Themes from Panel Discussions

Program is in its early years:
- Market appears to be responding
- Next-generation low carbon fuels likely needed to meet targets in latter years
- Need for continued monitoring and periodic review
Investments responding to market signal

Advanced Biofuel Investments Increasing

California Biofuel Activity

- Two ethanol plants restarting: 115 MGY
- CEC awarded $56 million to biofuel projects
- $45 million in DOE grants awarded to CA businesses
- $200 million Mendota sugar-beet-to-ethanol plant in planning stage
- 18 of the “Hottest Companies in Bioenergy for 2009-2010” are located in California
Other Themes from Panel Discussions

Regulatory certainty needed:

• LCFS encourages further innovation and long-term investments

• Clear market signals encourage healthy and robust credit system credit

• Panelists suggested flexible compliance mechanism may enhance regulatory certainty

Formal Program Review Report

• Final Draft issued December 8, 2011

• Reflects ARB staff assessment as well as range of perspectives from Panelists and public

• Report covers:
  – Technology assessment and fuel supplies
  – Meeting the targets
  – Economic and environmental impacts
  – Assessment of heavy crude and credit market options
  – Harmonization with other programs
### Technology and Fuel Supplies

- Many different technologies in development
- Biofuel investments increasing
- Limited volumes of very low carbon fuel available
- Cellulosic ethanol outlook lower
- Carbon intensity for conventional ethanol improving
- Fuel supplies adequate in the near term

### Meeting the Targets

- Evaluated 16 illustrative scenarios
- Built around various “what-ifs”
  - Cellulosic ethanol availability low
  - Flex fuel vehicles are readily available
  - Very low carbon intensity fuels delayed
- Some scenarios relied on banked credits
- Multiple potential paths possible to compliance
- Ongoing program monitoring necessary
- Next-gen biofuels needed for long-term compliance
**Economic Assessment**

- Updated 2009 Economic Analysis
- Results differed among scenarios
- Negligible impacts in gasoline scenarios
- No near-term impacts in diesel scenarios
- Work with CEC and stakeholders on refined analysis

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**Environmental Assessment**

- Continual staff monitoring since 2009
- Staff found no changes to the 2009 environmental impacts analysis
- Released district guidance on biorefinery siting practices
- Recommended Actions:
  - Continue multimedia evaluations of emerging fuels
  - Sustainability work continue
Other Program Review Topics

- High Carbon Intensity Crude Oil
- Credit Trading
- Status of Lifecycle Analyses
- Harmonization with Other Programs

Program Review Conclusions

- Early phase of implementation - program is working
- Credits being accrued and carbon intensities progressively decreasing
- Further refinements can help ensure long-term compliance
- Regulatory certainty is a key driver to maintain clear market signal to trigger investments
- Substantial investments in next generation biofuels needed for long-term success
Program Review Next Steps

• Finalize Formal Program Review Report
• Address specific tasks from Advisory Panel effort
  – Flexible compliance mechanisms
  – Potential expansion of credit market
  – Updated economic assessment
• Complete next formal review by January 1, 2015
• Update Board annually

December 16, 2011

Update on LCFS Sustainability Activities

• Board directed staff to develop sustainability provisions
• Sustainability: Ability to meet the needs of the present generations without compromising the ability of future generations to meet their needs
• Three parts to consider: environmental, social, and economic sustainability

December 16, 2011
**Sustainability Activities**

- Board approved the Workplan in May 2010
- Established Sustainability Workgroup (SWG)
  - Forestry - Other State agencies
  - NGOs - Regulated parties
  - Academia
- Drafted core sustainability principles for biofuels
- Currently developing criteria and indicators by which sustainability can be measured

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**Sustainability Approach**

- Voluntary program
  - Trade and commerce issues
  - Evaluating reporting requirements
- Evaluating third-party certification
  - Numerous certification programs can play key role in sustainability determination
- Evaluating role of incentives
  - Proof of sustainability has a cost
  - Sustainable practices should be rewarded
Sustainability Status

• Environmental Principles
  – Soil, water, air, biodiversity
  – Several meetings with panels of speakers
  – Distributed draft principles and criteria for comments

• Social Principles
  – Human and labor rights
  – Working with experts on International Labor Organization and others

Sustainability Next Steps

• Finish draft social sustainability provisions

• Address:
  – Economic sustainability
  – Group certification
  – Chain of custody
  – Reporting requirements
  – Incentives

• Draft overall LCFS sustainability provisions

• Return with recommendations

• May be policy/regulatory combination
Summary

- LCFS is working as designed
- Ongoing monitoring of program implementation important
- No Board action required on Formal Program Review or sustainability activities