California Environmental Protection Agency

Air Resources Board

Low Carbon Fuel Standard Proposed Amendments

March 5, 2013

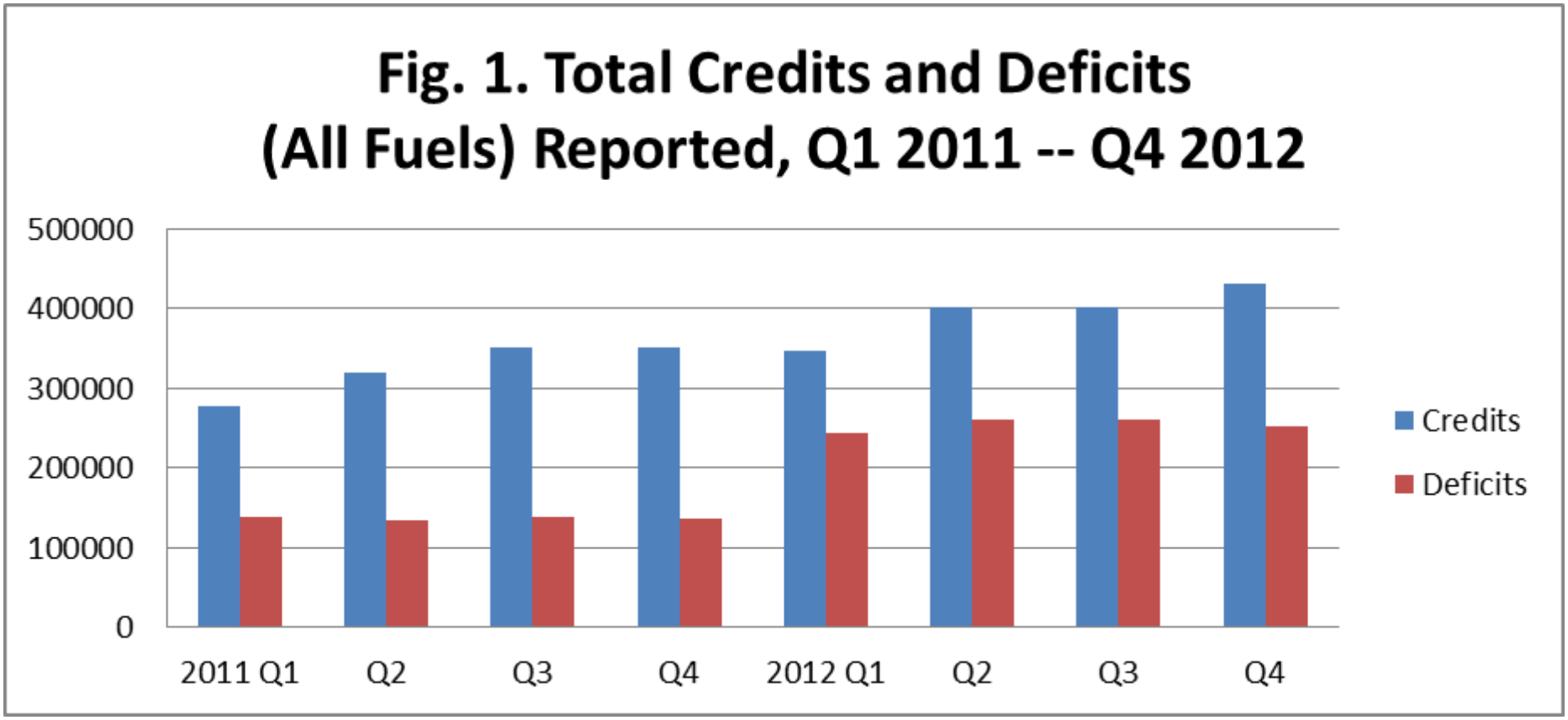
Agenda

- Overview
- Board Resolution Follow-Ups
  1. Indirect Land Use Change (iLUC) Values
  2. Electricity Credits for Fixed Guideway Transportation (e.g., Rail) and Forklifts
  3. Crude Oil Individual Refinery Approach
  4. Cost Containment Provisions
  5. Fuel Pathways
  6. Low-Energy-Use Refinery Provisions
  7. Sustainability Provisions
- Additional Considerations
  1. Enforcement Provisions
  2. Miscellaneous Changes
- LCFS Reporting Tool Updates
- Next Steps

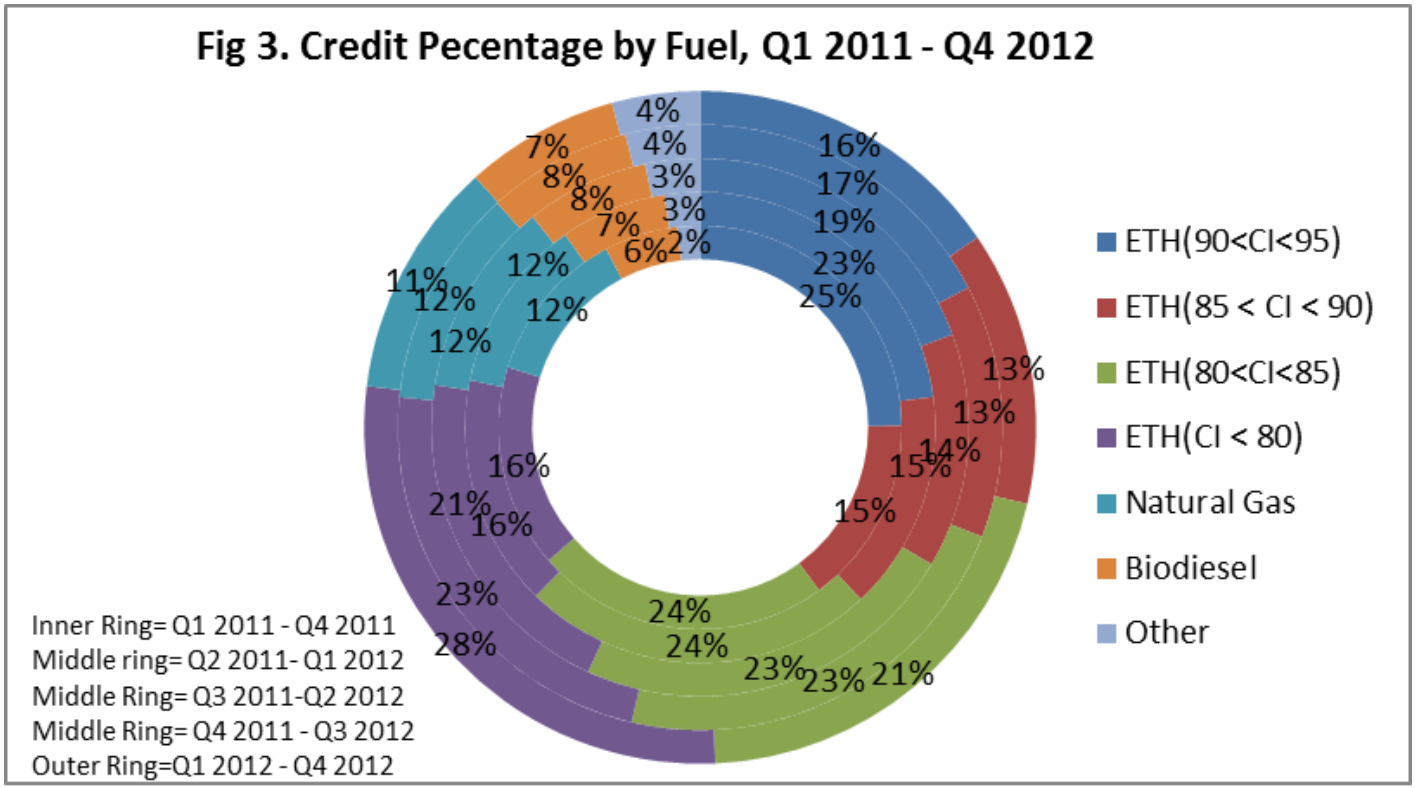
Overview

- Purpose of initial workshop is to present what ARB staff may be proposing to the Board in the fall
- Amendments have not yet been developed
- Some items will have their own workshops
- Status of the LCFS program to date

LCFS Status To Date



LCFS Status To Date



- Larger portion of low CI ethanol
- Continued contribution of alternative fuel (e.g. natural gas)
- Non-ethanol fuels make up about 20+ percent credits

LCFS Credit Transfers Update

- Increased credit trading activity in 2012 and that trend continues in 2013
- 40 credit transfers processed so far
  - 8 transfers completed in the 1st two months of 2013 alone
- 250,089 credits have been traded; the average credit price reported was $19
- An online credit transfer platform to be available for use through the LRT by end of March 2013.

Board Resolution Follow-Ups

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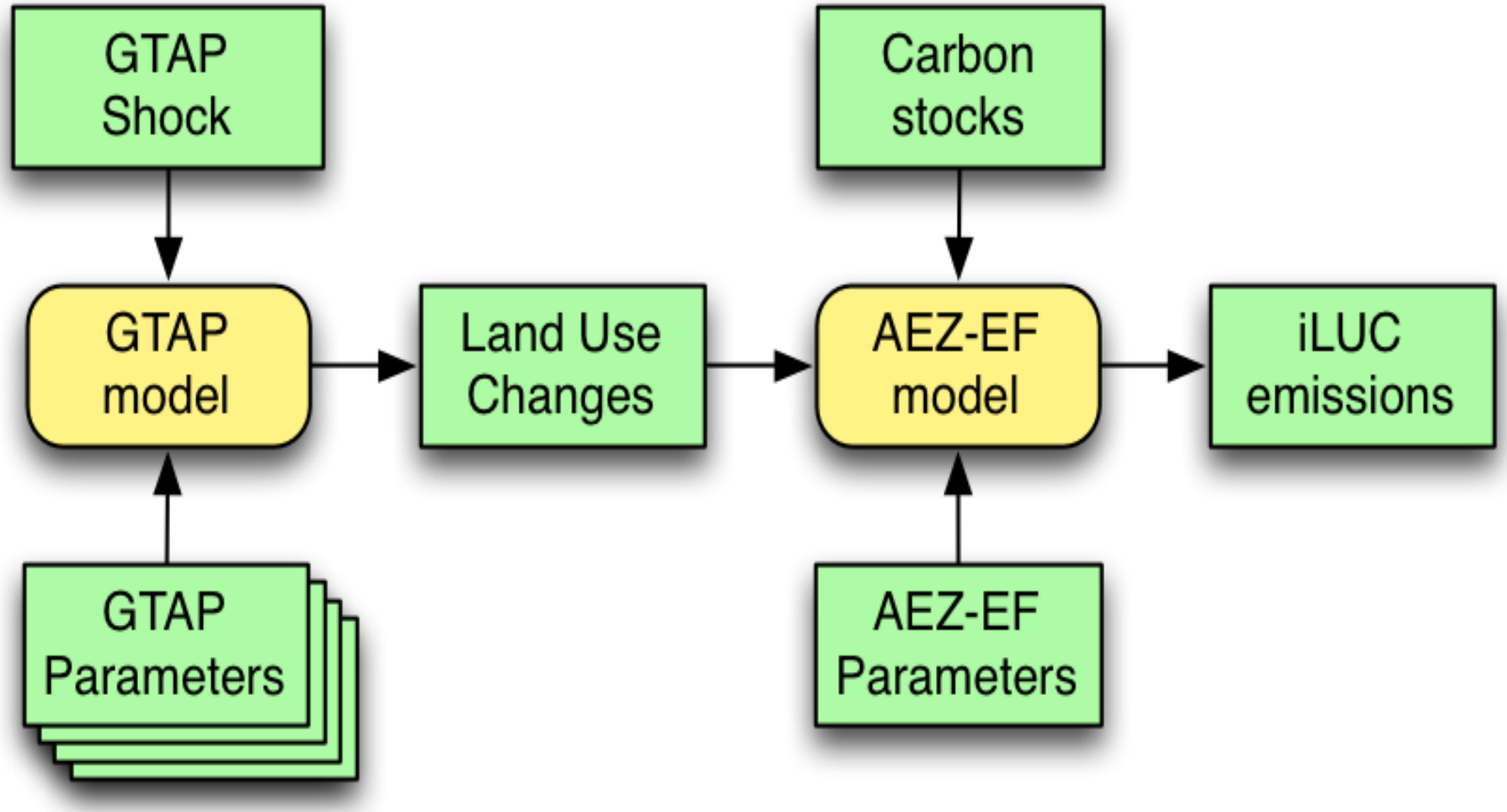
iLUC Background

- Board approved the LCFS Regulation in 2009
- iLUC values approved:
  - Corn ethanol – 30 g/MJ
  - Sugarcane ethanol – 46 g/MJ
  - Soy biodiesel – 62 g/MJ
- iLUC values estimated using GTAP model v.6 with 2001 data
- Emission factors from Woods Hole incorporated into GTAP

iLUC Background (cont.)

- Board directed staff to establish Expert Working Group (EWG) to help further refine iLUC analysis
- EWG formed in 2010 and group presented its results to the Board in 2010
- Several modifications to the analysis resulted from EWG recommendations
- Additional updates under consideration

New iLUC Methodology



AEZ-EF Model

- Carbon emissions factors updated using Agro-Ecological Zone Emissions Factor (AEZ-EF) model
- Accounts for both carbon release and sequestration and accounts for various combinations of land conversion/reversion
- Published on LCFS website and discussed at workshop in November 2011
- Minor modifications since 2011

Updated GTAP Model

- Updated to GTAP v.7 to reflect 2004 data
- Incorporated cropland pasture, updated livestock sector structure and co-product treatment, land productivity for new cropland, etc.
- Added canola, palm, and sorghum sectors

GTAP Parameters under Review

Parameters/areas of focus:

- Elasticities
  - Price/yield
  - Land transformation
  - Crop yields with respect to area expansion
  - Armington
  - Cropland pasture
- DDGS response in export markets
- Forestry sector treatment
- Irrigation impacts

Uncertainty and Scenario/Sensitivity Analysis

- Monte Carlo analysis
  - Simultaneous variation of all parameters
  - Used to identify uncertainty and critical parameters that contribute to uncertainty
- Scenario + sensitivity analysis for the U. S.
- Combination shock + scenario analysis

Experts Assisting ARB on iLUC

- Wally Tyner and Farzad Taheripour, Purdue University
- Mike O'Hare, Rich Plevin, and Wolfram Schlenker, UC Berkeley
- Sonia Yeh and Julie Witcover, UC Davis
- Holly Gibbs, University of Wisconsin

Next Steps

- Schedule a workshop in April to discuss:
  - Updated AEZ-EF model
  - Draft results from GTAP + AEZ-EF model
  - Results from uncertainty, scenario/sensitivity analysis and Monte Carlo analysis
- Initiate independent academic review

Timeline for iLUC Analysis for 2013

- April and mid-June – iLUC Workshops
- May-June – Independent academic review
- September 9 – Staff report released, beginning of 45-day comment period
- October 24 – Board Hearing

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Board Resolution Follow-Ups

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Electricity Credits for Fixed Guideway Transportation and Forklifts

- Board directed staff (Resolution 11-39) to further evaluate feasibility of generating credits for electricity used in nonroad transportation sources

- Staff is considering adding fixed guideway transportation (electric rail) and electric forklifts to the regulation

Staff Concept: Credit Generation for Fixed Guideway Transportation

- Regulated Parties - Transit agencies, with utilities as potential back up regulated parties
- Considering statewide average or marginal electricity mix
- EER = (MJ/passenger $mile_{diesel\ bus}$)/(MJ/passenger $mile_{rail}$)
  - EER heavy rail 4.6 (range 3.0 to 5.5)
  - EER light rail 3.3 (range 2.6 to 5.5)
  - EER trolley bus 3.3

Staff Concept: Credit Generation for Electric Forklifts

- Regulated parties - Utilities, with fleet operators able to participate if interested
- Considering statewide average or marginal electricity mix
- $EER_{electric\ forklift} = 3.1$ (compared to diesel forklift) or 3.7 (compared to LPG forklift)
- Estimate of the number of electric forklifts and electricity usage in each utility service area provided to regulated parties for reporting

Comments Received to Date

- Held two LCFS Electricity Workgroup meetings to discuss concepts for fixed guideway and electric forklift credit generation
- Several Workgroup participants suggested these (and other) sources be included in the LCFS baseline
- Staff will present several scenarios related to baseline/additive approach

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Crude Oil Individual Refinery Approach

Resolution 11-39 directed the Executive Officer to evaluate and propose, as appropriate, an option for individual regulated parties to have their deficits for gasoline and diesel determined on a refinery-specific basis that accounts for the carbon intensity of domestic and imported crude oils, intermediate products, and finished fuels.

Crude Oil Individual Refinery Approach

Staff intends to evaluate a regulatory amendment allowing individual refiners a one-time opportunity to "opt-out" of the California Average Approach and utilize either the Refinery-Specific or Hybrid Approach

- California Average Approach: Base and incremental deficits common for all refineries
- Refinery-Specific Approach: Base and incremental deficits are refinery-specific
- Hybrid Approach: Base deficit common to all refineries but incremental deficit is refinery-specific

Crude Oil Individual Refinery Approach

ARB will issue a confidential survey request for 2010 and 2012 refinery/company data.

- Crude oil name designations and volumes supplied to each refinery
- Major intermediates supplied to the refinery
- Imported finished products sold in California

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Cost Containment Provision

- Regulations in place to help drive low-CI fuel volumes (e.g., cellulosic, drop-in, etc.)
- Commercialization slower than expected
- 2011 Advisory Panel took up fuel availability issues
  - Proposed a mechanism to address potential fuel and LCFS credit shortfalls in the market
  - Overall goals: to create certainty, stability, and clear incentives
- Board requested follow-up in Resolution 11-39

Guiding Principles

- Cost-containment
- Transparency and predictability
- Preservation of low-CI fuel development incentives
- Fairness
- Market stability
- Achievement of maximum GHG emission reductions

Next Steps

- Paper release week of March 18th to introduce several potential options

- First workshop March 27th, location and agenda to follow

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Fuel Pathways Background

- Approved LCFS fuel pathways in the Lookup Table
- Establishing additional fuel pathways for the Lookup Table:
  - *Method 2A:* Improvements to existing pathways
  - *Method 2B*: New fuel pathways or processes
- ARB staff also develops high-priority pathways
  - Made available to producers via Method 1
  - Generic: designed to be used by as many producers as possible

Proposed New Fuel Pathways

- Staff proposes pathways for consideration by the Executive Officer (EO) or the Board
- The EO approved 6 applications (28 pathways) on February 24, 2011
- Staff will be proposing 36 new applications (118 pathways) for the Board to consider
  - 103 pathways under Method 2A and 2B, contained in 32 applications
  - 15 staff-developed internal pathways, contained in 4 ARB pathway documents
- Additional 17 applications in evaluation pipeline

Proposed Fuel Pathways Summary

Fuel	Number of Pathways	General Description
Biodiesel	2	Method 1 (generic) pathways.[1] Conversion of mixed tallow to Biodiesel. One pathway for any U.S. producer and another for California producers. High-energy rendering.
Biomethane	1	Method 1 (generic) pathway. Biomethane produced from the anaerobic digestion of high-solids food and green wastes (greater than 15 percent total solids).
Ethanol	101	2A/2B Applications. Feedstocks: corn, sorghum, wheat slurry, sugarcane, molasses (sugarcane sugar production co-product), and waste beverages.
Renewable Diesel	12	Method 1 (generic) pathway.[1] Renewable diesel from Midwest soy oil, corn oil, used cooking oil, and tallow. Low and high energy rendering. Transport via ship or rail
Liquefied Natural Gas (LNG)	2	2B Applications: North American Natural Gas from a transmission pipeline liquefied and transported by truck to vehicle refueling stations.
Total Pathways	**118**	

[1] Developed jointly by staff and external entities

Method 2 Website: http://www.arb.ca.gov/fuels/lcfs/2a2b/2a-2b-apps.htm

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Low Complexity and Low Energy-Use Refinery Provisions

- Resolution 11-39

  "…investigate the feasibility of developing into regulatory language for future rulemaking(s)….

  - *Accounting for lifecycle carbon intensity associated with low-energy refineries"*

- Status

  Planning to include in 2013 LCFS amendments

Low Complexity and Low Energy-Use Refinery Provisions

Conceptual Metric for Applicability

- Modified Nelson Complexity: Less than 5

+

- Total energy use of refinery: Less than 5 million MMBtu consumption per year

Low Complexity and Low Energy-Use Refinery Provisions

Under Consideration

1. Business as usual
2. Separate Baseline
3. Separate Baseline with reduced CI Obligation
4. Separate Baseline with “Last Margin to 2020”
5. Delayed entry to 2018
6. Delayed entry to 2018 for diesel and 2019 for gasoline
7. 5 g CO_2e/MJ credit for diesel and gasoline

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LCFS Sustainability Activities

- Staff directed by Board to develop sustainability provisions
- Sustainability: Ability to meet the needs of the present without compromising the ability of future generations to meet their needs.
- Contains three parts: environmental, social, and economic sustainability

LCFS Sustainability Activities

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

Sustainability Principles Being Considered

1. Legality
2. Planning, monitoring, and continuous improvement
3. GHG emissions
4. Conservation and biodiversity
5. Soil
6. Water
7. Air
8. Use of technology, inputs and management of waste
9. Human and labor rights
10. Rural and social development
11. Local and food security
12. Land rights

Sustainability Approach

- 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
  - Land rights

Sustainability Approach

- EU Renewable Energy Directive (EU RED)/Fuel Quality Directive
  - Volume requirement
  - Mandatory sustainability criteria
  - Approved voluntary schemes
- U.S. Renewable Fuel Standard (RFS2)
  - Volume requirement
  - Aggregate compliance
  - Quality Assurance Plan

Sustainability Approach

- Voluntary program
  - Trade and commerce issues
  - Hybrid approach
- Aggregate data

  Government conservation programs
- Third-party certification

  Numerous certification programs can play a key role in sustainability determination
- Incentives
  - Proof of sustainability has a cost
  - Sustainable practices should be rewarded

Sustainability Provisions

Concept

- Voluntary program
- 3rd-party certification required for CI credit
- CI credit awarded to biofuel facility for certified feedstock
- Amount of CI determined based on rigor of standard and amount of certified feedstock received

Sustainability Next Steps

- Finish draft sustainability principles and criteria
- Benchmark 3rd-party certification standards
- Cost analysis
- Determine CI credit signal

Agenda

- Additional Considerations

  1. Enforcement Provisions

  2. Miscellaneous Changes

- LCFS Reporting Tool Updates

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Enforcement Provisions

Calculation of "violation-days" (H&S 42400 et. seq.)

- "each day during any portion of which a violation occurs is a separate offense." H&S 42400 et seq.
- AB 32: Develop method to convert a violation into "number of days of violation." H&S 38580(b)(3).
- When compliance period is a year, how do you determine the point when the violation began?
- Prior examples:
  - Consumer products, 17 CCR 94546(f), (g)
  - Vessel shorepower, 17 CCR 93118.3(h)

Enforcement Provisions (cont.)

Affirmative defense

- Good faith, reasonably prudent precautions & due diligence, but violation still occurs (e.g., invalid credits sold to buyer)
- Evidence so far? None in LCFS, limited in RFS2
- Is an affirmative defense provision appropriate?
- How to keep system whole, provide certainty to regulated parties, reward good behavior, discourage misconduct, maintain strong enforcement signal?
- Recent EPA proposed affirmative defense provision

  3rd party quality assurance provider?

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Miscellaneous Updates

- Voluntary disclosure of credit seller status: Amendment to section 95488(e)
- Diesel reg party language (clarify section 95484 to address diesel blenders): Amend the diesel regulated party provisions (95484(a)(2))
- Other minor amendments may develop as we proceed and will be added as necessary

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LCFS Reporting Tool (LRT)

- User Account Maintenance
- Quarterly and Annual Reporting
  - Data file upload (XML or Excel)
  - Manual entry
- Credit and Deficit Calculations
- Biofuel Facility Listing
- Fuel Pathways and CIs

LRT Revisions (2013)

- LCFS Credit Account Balance Sheet (CABS)
- LCFS Credit Bank & Transfer System (CBTS)
- Other Revisions:
  - Marketable Crude Oil Names (MCON)
  - CI Changes
  - EER Changes
  - Excel Template for reporting

Credit Account Balance Sheet (Feb 2013)

- Ledger format
  - Displays all credit/deficit related activities by year or quarter
  - Integrated with credit transfer functionality and completed Credit Transfer Forms (CTF)
  - Contains all credits generated, sold , acquired, retired and exported
- Annual Summary and Summary-to-Date

  Summaries of credits, deficits and pertinent compliance calculations

Credit Tracking & Transfer (Mar 2013)

New Credit Transfer Process

- Buyer/Seller/Broker complete transfer online using CBTS
- The transfer occurs within CBTS
- Financial transactions handled by regulated parties
- CBTS captures and reports pertinent market statistics

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Next Steps

- Comments due March 20, 2013
- Submit via email to Katrina Sideco at ksideco@arb.ca.gov
- Next public workshops
  - April 2013
  - May 2013
  - June 2013
  - July 2013
- 45-day comment period begins September 9, 2013
- Board Hearing – October 2013

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http://www.arb.ca.gov/fuels/lcfs/lcfs.htm

Thank You