Low Carbon Fuel Standard Overview

Sam Wade
Chief, Transportation Fuels Branch
February 10, 2015 PMAC Meeting
LCFS History

• Original adoption in 2009, amended in 2011
• Goal: Reduce carbon intensity (CI) of transportation fuel pool by at least 10% by 2020
• Expected benefits:
  – Help reduce greenhouse gases (GHG) emissions to 1990 levels by 2020
  – Transform and diversify fuel pool
  – Air quality benefits
LCFS is Part of a Portfolio of GHG Policies

- Transportation sector responsible for:
  - 40% of GHG emissions
  - 80% NOx emissions
  - 95% PM emissions

- LCFS works with the following programs to reduce transportation GHG emissions:
  - Cap-and-Trade Program
  - Advanced Clean Car Program
  - SB 375
Others are Following California:
Pacific Coast Collaborative Update

Toward an integrated West Coast market for low-carbon fuels

- **CA and BC**: Program in place
- **WA**: Gov. Inslee’s EO 14-04
- **OR**: Legislation pending to remove 2015 sunset
- Recent ICCT research finds that the clean fuel goals of all jurisdictions achievable simultaneously

Basic LCFS Requirements

• Sets annual CI standards for gasoline, diesel, and the fuels that replace them

• CI is the measure of GHG emissions associated with producing and consuming a fuel, which is measured in grams of carbon dioxide equivalent per megajoule (gCO$_2$e/MJ)

• CI based on complete lifecycle analysis
**Fuel Life Cycle – CARBOB**

- **Oil Well**: 12 g/MJ
- **Transportation**: 1 g/MJ
- **Refinery**: 14 g/MJ
- **Transportation**: 1 g/MJ
- **Vehicle**: 74 g/MJ

**CARBOB**: 101 g/MJ
Fuel Life Cycle – Biogas CNG

- Biogas Extraction: 1 g/MJ
- Flare Credit: -66 g/MJ
- Processing: 18 g/MJ
- Pipeline Transmission: 2 g/MJ
- CNG Stations: 2 g/MJ
- CNG Trucks: 61 g/MJ

Biogas to CNG in California:
~18 g/MJ

With Energy Efficiency Ratio:
~20 g/MJ
The California LCFS is Working

- Low carbon fuel use is increasing
- The LCFS credit market is functioning well
- Credits have exceeded deficits in all quarters and a significant credit bank has been built
Sources of Credits: 2011 vs. 2014

The contribution of non-ethanol alternative fuels continues to expand

* Through first 3 Quarters of 2014
Credit Prices and Volumes

Credit Price ($/metric ton CO2e) vs. Volume Transacted (metric tons CO2e)

Volume of Credits Transacted
Average Credit Price

ARB data, for 2014 values see monthly Credit Trading Activity Reports available from:
http://www.arb.ca.gov/fuels/lcfs/lrmonthlycreditreports.htm
Legal Challenges have Hindered Low Carbon Fuel Investment

- **Federal: 9th Circuit Court of Appeals**
  - Rejected several constitutional claims
  - Returned case to district court for additional determinations
  - U.S. Supreme Court denied plaintiffs’ request for review

- **State: Court of Appeal**
  - Found procedural issues with CEQA and APA
  - Rejected plaintiff’s request to enjoin LCFS
  - Allowed ARB to enforce program while addressing court’s concerns
Proposed Re-Adoption

Staff developed the proposed rulemaking package to:

- Work with the ADF rule to address the court’s concerns
- Clarify and enhance the regulation
- Incorporate Board’s direction, stakeholder input, and lessons learned from five years of implementation
- Incorporate latest science and technical knowledge
## Summary of Re-Adoption

### Core Concepts Remain Unchanged

- Use of lifecycle analysis including indirect land use change (ILUC) effects
- Declining carbon intensity (CI) targets through 2020
- Credit generation and trading
- Quarterly and annual reporting requirements

### Key Areas of Proposed Improvement

- CI calculation tools updated using latest science
- 2016-2020 targets adjusted
- Max credit price capped at $200 per credit
- Streamlining implementation
Proposed Curve Update

- Retain requirement to reduce average carbon intensity 10% by 2020

- Modify interim (2016-2019) requirements to address delayed investment due to legal challenges

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<th>Year</th>
<th>Current Reduction Percent</th>
<th>Proposed Reduction Percent</th>
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<td>2016</td>
<td>3.5 percent</td>
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<tr>
<td>2020 onwards</td>
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Proposed Curve Helps Draw Down Credit Bank

Existing vs. Proposed Standards and Annual Fuel Carbon Intensity

- Significant bank of credits built up due to legal challenge
- Credit bank drawn down allows time for low carbon fuel investment to accelerate
- Future adjustments needed to address Governor’s post-2020 petroleum reduction goals

Example uses carbon Intensities based on composite of gasoline and diesel fuels
New Concept: Cost Containment

• Year-End Credit Clearance Market will prevent price spikes in the unlikely event of credit shortages
• Defer deficits if pro-rata share of credits made available are purchased
• Price cap in 2016: $200/MTCO$_2$e (adjusted for inflation in future years)
• Compliance debt carried over is assessed a 5% annual interest rate
• All deferred deficits must be repaid within 5 years
LCFS credits and deficits reduce the production costs of low carbon fuels and increase the production cost of fossil fuels.

Increased/decreased production costs may or may not translate to higher or lower retail and wholesale prices for these fuels.

For one description of the complexity of this issue see (Lade and Lin 2013): http://www.its.ucdavis.edu/research/publications/publication-detail/?pub_id=1996
**February:** First Board Hearing on proposed LCFS re-adoption and ADF adoption

**Summer:** Second Board Hearing

**January:** Implementation of the improved LCFS

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2015

Reaction to stakeholder comment, Board direction and additional peer review of CI tools

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2016

Adjust IT tools and prepare for other process changes