Low Carbon Fuel Standard Re-Adoption

November 13, 2014
Agenda

• Introduction
• GREET Clarification
• Crude Oil Provisions
• Refinery Investment Provisions
• Heavy-duty Electric Vehicle EERs
• Reporting/Recordkeeping Provisions and Retroactivity
• Next Steps
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The next few slides follow up on:

• The CA-GREET 2.0 public workshop held on August 22, 2014

• The posting of CA-GREET 2.0 for feedback on October 10, 2014

Our Objectives are to:

• Clear up misconceptions evident in the feedback we received

• Seek feedback on regulatory provisions not previously presented
Clarification: CA-GREET 2.0 will be used to Calculate CIs for all pathways. No pathways will retain 1.8b CIs

- Some feedback reflected a misconception that only Tier 1 CIs will be calculated with the new model
- As background, the schematic on the next slide shows how the Tier system works
Tier 1 and Tier 2 Schematic

**LCFS**

**Transportation Fuel Pathway CI Determination**

**Tier 1**

First Generation Fuels:
- Starch/sugar-based ethanol
- Bio/renewable diesel
- Fossil/renewable NG
- Biomethane from landfill gas

**Tier 1 Calculator used to Calculate CIs for Conventional Fuels**

Pathway CI Value

**CA-GREET 2.0**

**Tier 1 or Tier 2**

**Tier 2**

Next Generation Fuels:
- Cellulosic alcohol
- Biodiesel from algae
- Ethanol from straw/stover
- Biomethane from other than landfill gas; Hydrogen
- Electricity/low CI sources

**Tier 2 Lookup Table**

**Method 1 Available to Tier 2 only**

Method 2

Producer-Specific Pathway

**Method 2A**

Base application on certified pathway subject to substantiality requirements

**Method 2B**

No reference pathway exists; substantiality requirements don't apply

**Method 2**

A Base application on certified pathway subject to substantiality requirements

**Method 2B**

No reference pathway exists; substantiality requirements don't apply

**CA-GREET 2.0 Tier 2 Model used to Calculate CIs for Next Generation Fuels**

Pathway CI Value

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Clarification: Yellow cells in the Tier 1 Calculator tab do not contain default values

• Yellow cells are applicant input cells
  – They are not “defaults”
  – Values they happen to contain in our posted model have no significance

• Some input values do apply universally to all Tier 1 applicants. These include but are not limited to:
  – Agricultural feedstock production (with future LCFS audit protocols, custom values will be possible under Tier 2)
  – (Continued on next slide)
(Cont.) Some values do apply universally to all Tier 1 applicants. These include but are not limited to

• Other values beyond the control of the producer (e.g., UCO and tallow rendering energy)
We would like your feedback on the following two regulatory proposals:

- Calculating CIs based on U.S. EPA’s eGRID *average* energy mix for each subregion. No conversion to marginal

- Two CA-GREET 1.8b pathway sunset dates:
  - Pathways certified prior to December 1, 2014, would sunset one year from the effective date of the new regulation (approximately January 1, 2016)
  - Applications submitted and certified after December 1, 2014, would sunset on the effective date of the new regulation
Questions?
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Crude Oil Provisions

Discuss revisions made to July 10 workshop proposal

- OPGEEv1.1 Draft D
- Crude lookup table
- California average crude provision
- Innovative crude provision
- Refinery-specific incremental deficit option
OPGEE Revisions: Draft C to Draft D

- Corrected bulk assessment sheet overall error check
- Minor corrections to the bulk assessment macro
- Split the bulk assessment worksheet into two worksheets: inputs and results
- Made significant revisions to venting and fugitive emissions calculations:
  - Updated component counts
  - Revised some default emission factors to values appropriate for no vapor recovery
  - Added missing emission sources

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OPGEE Venting and Fugitives - Components

- Component counts (valves, flanges, pump seals)
  - ARB 2007 Oil and Gas Industry Survey forms basis for many component counts and some emission factors
  - Revised report issued in October 2013 corrected errors in a few tables, including component counts
  - Updated OPGEE using values from the revised report
  - Decreased the component count and fugitives estimate

- Compressor count
  - Changed from an oil flow rate to a gas flow rate basis
  - Reduces the compressor count and venting estimate, except for fields with high gas-to-oil ratio
• Revised the emission factor for gas dehydration
  – Used ARB 2007 Survey data for glycol dehydrators
  – Used only data for dehydrators without vapor recovery
  – Decreases the venting and fugitives estimate

• Revised the emission factor for crude storage tanks
  – U.S. EPA GHG Inventory emission factor
  – Assumes no vapor recovery
  – Increases the venting estimate
OPGEE Venting and Fugitives – Additional Venting Sources

• Added pneumatic devices as a venting source
  – High and low bleed controllers and chemical injection pumps powered by natural gas
  – U.S. EPA GHG Inventory used for component count and emission factor
  – Values assume no vapor recovery
  – Increase venting emissions estimate

• Net effect of all changes is to increase the venting and fugitive emissions CI by approximately 1 g/MJ
• OPGEE default now estimates:
  – Venting emissions of 22.1 scf CH$_4$/bbl
  – Fugitive emissions of 3.5 scf CH$_4$/bbl

• US EPA GHG Inventory for 2013
  – Onshore venting emissions of 21.1 scf CH$_4$/bbl
  – Onshore fugitive emissions of 1.4 scf CH$_4$/bbl
  – Values do not include associated gas processing

• Alberta Energy Regulator (ST-60B 2013)
  – Bitumen battery venting emissions of 23.7 scf CH$_4$/bbl
  – Crude battery venting emissions of 19.7 scf CH$_4$/bbl
  – Calculated values assume solution gas is 84 percent CH$_4$
Crude Lookup Table Revisions

• Revised estimates use OPGEEv1.1 Draft D

• Added carbon intensity estimates for many U.S. and Alberta crudes

• Altered the venting and fugitives emission factors for crudes known to use vapor recovery
  – California: used the ARB 2007 Oil and Gas Industry survey to estimate average emission factors that incorporate vapor recovery
  – ANS: used data and information supplied by producers
  – Changes documented on MCON Inputs spreadsheet
Effect of Revisions on Lookup Table CIs

- CI values for most imported crudes increase by approximately 1 g/MJ
- CI value for ANS decreased by about 3 g/MJ
- CI values for California production decreased (on average) by approximately 0.3 g/MJ
- Revised 2010 Baseline Crude Average carbon intensity is 12.71 g/MJ
Changes made to the July workshop proposal:

• Provide a transition from the current 2010 Baseline and Lookup Table to the proposed values

• Removed the proposal for an Executive Officer certification of CI values for new crudes. New crudes will use the default CI value

• Continue to propose a three-year cycle for:
  – Revising OPGEE if necessary
  – Updating CI values using most recent production data
  – Adding new crudes to the lookup table
Innovative Crude Method Provision

• Removed waste biomass-based steam, heat, and electricity from the proposed amendments
• Clarified that solar and wind electricity will not qualify for credit if it enters the grid
• Incorporated separate operational starting date requirements
  – 2010 or later for solar steam and CCS
  – 2015 or later for solar heat and electricity and wind electricity
• Provided a separate default credit calculation for solar steam with a quality of 65 to 75 percent
Refinery-Specific Incremental Deficit Option

- Including a table listing the carbon intensity values for crudes supplied to California in 2010

- Requiring the LC-LE refinery to submit a detailed calculation of their refinery 2010 baseline
  - Due by January 1, 2016, as part of the notification to ARB of the choice to use the refinery-specific option
  - Subject to Executive Officer approval
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Refinery Investment Provision

Changes made to:

- Definitions
- General Requirements
- Calculation of Credits
Definition added:

“Petroleum product” means all refined and semi-refined products that are produced at a refinery by processing crude oil and other petroleum-based feedstocks, including petroleum products derived from co-processing biomass and petroleum feedstock together, but not including plastics or plastic products.
Two New Requirements

• Capital Investment

• No increase in criteria pollutants or toxics
Calculation methodology

\[ \Delta CI_{RIC}^{XD} = CI_{pre}^{XD} - CI_{post}^{XD} \]

(i.e., difference in carbon intensity from pre-project and post-project)

Calculations will take into account indirect emissions from imported and exported steam and electricity and purchased hydrogen.
Section 95489(f)(2)

Calculation methodology for credits

\[ Credits_{RIC}^{XD} = (\Delta CI_{RIC}^{XD} \times E^{XD} \times C) \times M \]

“M” is an adjustment factor based on whether the \( CI_{post}^{XD} \) is above or below the industry average

- “M” = 1.0 for \( CI_{post}^{XD} \) below the industry average
- “M” = 0.5 for \( CI_{post}^{XD} \) above the industry average
3-Year Average Diesel CI
(2011 - 2013)

7.61 gCO₂e/MJ

Diesel (gCO₂e/MJ)
Total Average Diesel (gCO₂e/MJ)
Hydrogen

- Purchased hydrogen will have an carbon intensity of 10.8 tons CO$_2$e per ton hydrogen.

- For purchased hydrogen, a refinery may submit supporting documentation that the carbon intensity is different from the carbon intensity listed in section 95489(f)(2).
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**Heavy-duty Electric Vehicle EERs**

- Energy Economy Ratio: dimensionless value, representing the efficiency of a fuel as used in a vehicle powertrain as compared to diesel or gasoline fuel
- Used in adjustment of CI and credit calculation

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<td>TIAX LLC, 2007</td>
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<td>Heavy-duty EVs buses</td>
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<td>Independent testing, comparable test cycle for two bus technologies operating in CA</td>
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Revised Draft Regulatory Language and Concepts

• Section 95481. Definitions and Acronyms

• Section 95491. Reporting & Recordkeeping
New Transaction Type Definitions

- “Import with Obligation”
- “Import without Obligation”
- “Gain of Inventory”
Section 95481. Definitions and Acronyms

Revised Definition

“FPC Obligated Amount”

• Calculated at Fuel Pathway Code (FPC) level from quarterly data in the LRT-CBTS

• Must remain non-negative as summed across all quarterly data

• Credits/Deficits calculated quarterly for each FPC using FPC Obligated Amount
Quarterly Reporting – 30/60 Schedule

- Quarterly Reports submitted within two months of quarter end
- PTD Fuel Transactions are uploaded within 30 days of quarter end
- Second 30 days is the Report Reconciliation Period
- Complete reconciliation within 60 days of end of the quarter
CNG Conversion

• Specific to Quarterly Reporting Parameters for Natural Gas (CNG, LNG and L-CNG)
  – Report amount dispensed in scf for CNG and L-CNG
  – Report amount of LNG dispensed in gallons

• Convert CNG and L-CNG from pounds to scf

• Specifies conversion by use of this equation:

\[ \text{lbs CNG} \times \text{SCF} / (20.4 \text{ gm}) \times (453.59 \text{ gm}) / \text{lb} = \text{SCF} \]
PTD and Fuel “Export”

• A “Export” statement to buyer of fuel is to be provided when a fuel is sold without obligation

• Statement must be passed along to subsequent downstream buyers
  – Statement to indicate the transportation fuel is regulated under LCFS
  – Requires reporting of any portion of this fuel exported out of California
Credits Retroactivity

• No retroactive credits except for specific provisions:
  – Fuel Pathway Application
  – Physical Transport Mode

• Retroactive credits limited to no more than two quarters
Enforcement

Updated Provisions

“Authority to Suspend, Revoke or Modify”

• Credit/Deficit of Approved CI is Invalid

• Interim Account Suspension

• Final Determination

• Responsibility for Invalidated Credits or Miscalculated Deficits
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Next Steps

• Feedback due November 21, 2014

• Submit via email to Katrina Sideco at katrina.sideco@arb.ca.gov

• Staff report – December 2014

• Board Hearing – February 2015
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Thank You