

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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Fuel Pathways Update

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

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CA-GREET 2.0 Clarifications

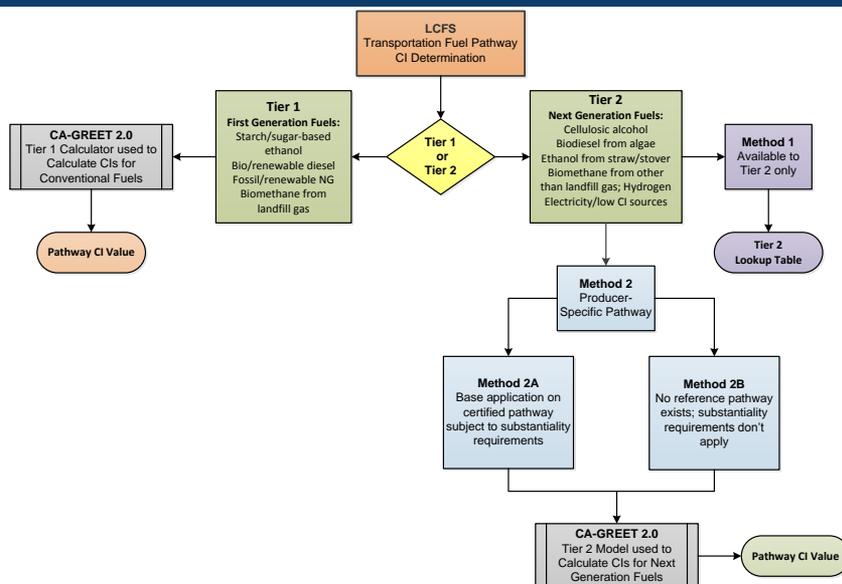
Clarification: CA-GREET 2.0 will be used to Calculate CIs for *all* pathways. No pathways will retain 1.8b CIs

- 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

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Tier 1 and Tier 2 Schematic



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CA-GREET 2.0 Clarifications (cont.)

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)

CA-GREET 2.0 Clarifications (cont.)

(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)

Regulatory Proposal Update

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 reg (approximately January 1, 2016)
 - Applications submitted and certified after December 1, 2014, would sunset on the effective date of the new regulation

CA-GREET 2.0

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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

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OPGEE Venting and Fugitives – Revised Emission Factors

- 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

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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

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OPGEE Venting and Fugitives Comparison

- OPGEE default now estimates:
 - Venting emissions of 22.1 scf CH₄/bbl
 - Fugitive emissions of 3.5 scf CH₄/bbl
- US EPA GHG Inventory for 2013
 - Onshore venting emissions of 21.1 scf CH₄/bbl
 - Onshore fugitive emissions of 1.4 scf CH₄/bbl
 - Values do not include associated gas processing
- Alberta Energy Regulator (ST-60B 2013)
 - Bitumen battery venting emissions of 23.7 scf CH₄/bbl
 - Crude battery venting emissions of 19.7 scf CH₄/bbl
 - Calculated values assume solution gas is 84 percent CH₄

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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

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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

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California Average Crude Provision

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

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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

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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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OPGEE and Crude

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Refinery Investment Provision

Changes made to:

- Definitions
- General Requirements
- Calculation of Credits

Section 95481

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

Section 95489(f)(1)

Two New Requirements

- Capital Investment
- No increase in criteria pollutants or toxics

Section 95489(f)(2)

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

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

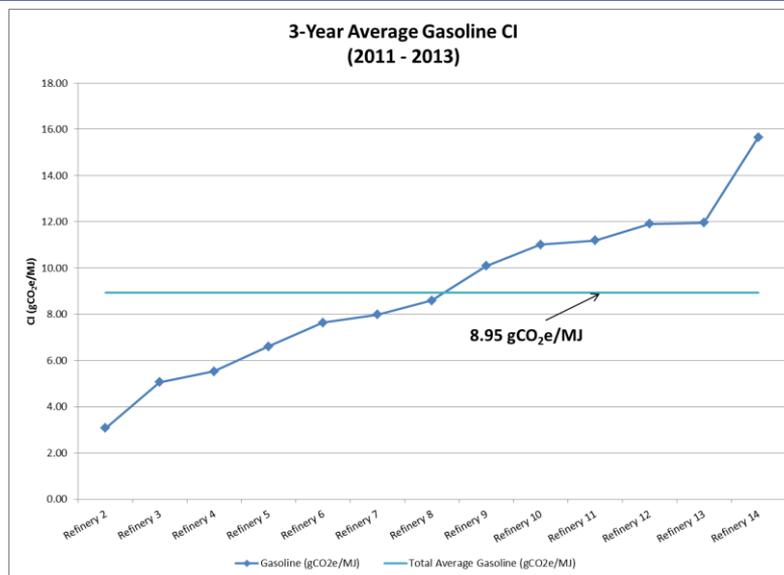
“M” is an adjustment factor based on whether the CI_{post}^{XD} is above or below the industry average

- “M” = 1.0 for CI_{post}^{XD} below the industry average
- “M” = 0.5 for CI_{post}^{XD} above the industry average

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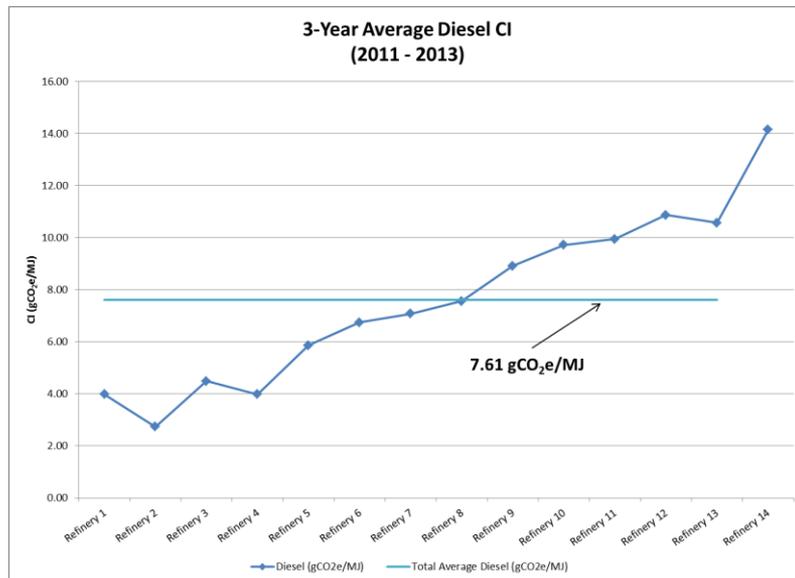
Section 95489(f)(2)



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Section 95489(f)(2)



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Section 95489(f)(3)(a)(4)

Hydrogen

- Purchased hydrogen will have a carbon intensity of 10.8 tons CO₂e 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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Refinery Investment Credit

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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

| | Current Regulation | Proposed Regulation | Data Source |
|-----------------------|--------------------|---------------------|---|
| Heavy-duty EVs (all) | 2.7 | | TIAX LLC, 2007 |
| Heavy-duty EVs trucks | | 2.7 | TIAX LLC, 2007 |
| Heavy-duty EVs buses | | 4.2 | Independent testing, comparable test cycle for two bus technologies operating in CA |

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Regulatory Language and Concepts

Revised Draft Regulatory Language and Concepts

- Section 95481. *Definitions and Acronyms*
- Section 95491. *Reporting & Recordkeeping*

Section 95481. Definitions and Acronyms

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

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Section 95491. Reporting and Recordkeeping

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

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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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| | |
|---|--|
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Thank You