Low Carbon Fuel Standard Rulemaking

April 18, 2014
Agenda

• Innovative crude production method provision

• OPGEE revisions and crude lookup table calculations

• 2012 crude average CI calculation
**Current Innovative Crude Provision**

- Solar steam and CCS projects implemented during or after 2010
- Crude producer applies for innovative method
- Refinery purchasing the crude receives credit
- Subject to 1.0 gCO$_2$/MJ threshold
- Comparison baseline method defined as production using a similar process but without the innovative technology
Considering Amendments To:

- Include as innovative methods
  - Onsite solar, wind, and biomass-based power generation
  - Biomass-based steam generation
- Remove or substantially reduce the 1 g/MJ threshold for CI reduction
- Allow the crude producer to receive credit
- Specify the comparison baseline and simplify the application process for some methods
- Establish a maximum innovative credit
Crude Producer Opt-in

• Crude producer:
  – responsible for preparing the method application
  – incurs financial risk of employing the method
  – responsible for recordkeeping following method approval

• Propose allowing the producer to opt-in as a regulated party and earn LCFS credit

• Crude producer may decline to opt-in; California refinery(s) purchasing crude may then claim the credit
Innovative Method Comparison Baseline

- Innovative method credit calculated relative to a comparison baseline
- System boundaries may be limited to only those portions of crude recovery process affected by the innovative method
- Proposing to establish a required comparison baseline for steam and electricity production
- Solar and biomass-based steam: NG-fired once-through steam generator (OTSG) with an efficiency of 88 percent (LHV basis)
- Solar, wind, and biomass-based electricity: NG-fired combined-cycle power plant with an efficiency of 50.6 percent (LHV basis)
Example: Required Comparison Baseline

\[ \Delta C_I_{\text{actual}} \]

\[ \Delta C_I_{\text{innov}} \]

Solar SG \hspace{2cm} NG-fired SG \hspace{2cm} Coal-fired SG

- Facility displacing coal-fired steam with solar steam will only get innovative credit for the displacement of NG-fired steam.
- The CI reduction from coal-fired steam to NG-fired steam is not considered innovative.
- Actual CI reduction will be reflected in crude lookup table CI calculation.
Simplified Application and Default Credit

• Proposing to simplify the application and credit calculation for solar steam and solar/wind power

• Solar steam
  – Default credit of 27,550 gCO$_2$ per barrel solar steam
  – \( \text{Credits}_{\text{Innov}}(MT) = 27,550 \times \frac{V_{\text{steam}} \times f_{\text{solar}}}{V_{\text{crudeproduced}}} \times V_{\text{Innov}} \times C \)

• Solar and wind based electricity
  – Default credit of 485 gCO$_2$ per kW-hr solar/wind electricity
  – \( \text{Credits}_{\text{Innov}}(MT) = 485 \times \frac{E_{\text{electricity}} \times f_{\text{renew}}}{V_{\text{crudeproduced}}} \times V_{\text{Innov}} \times C \)
All Other Innovative Methods

- Comprehensive application process including:
  - ARB approval of comparison baseline
  - Detailed LCA of innovative method and comparison baseline

- $Credits_{Innov}(MT) = \Delta CI_{Innov} \times E_{Innov} \times V_{Innov} \times C$
Maximum Innovative Credit Allowable

• Considering a maximum allowable innovative method credit that is proportional to the base deficit incurred by the fuels produced from the crude

\[ Credits_{max,innov} = (CI_{CARBOB} - CI_{Standard}^{Gasoline}) \times E_{innov} \times V_{innov} \times C \]

• MCON CI value in the crude lookup table will reflect the actual CI reduction and not the maximum allowable for innovative method credit
Carbon Capture and Sequestration

- CO₂ EOR has potential to be an important means of sequestration and ARB staff will continue to evaluate this technology.

- Credit generation for CCS projects will only be allowed after ARB has in place an approved quantification methodology for monitoring, reporting, verification, and permanence requirements.
OPGEE Revisions and Crude CI’s

• Minor revisions to OPGEE v1.1 since last year
  – OPGEE v1.1 Draft B and documentation posted to March 11, 2014, workshop webpage
  – Revisions discussed in Appendix E of documentation

• Draft CI values for Crude Lookup Table (Table 8) will be posted for feedback this spring
  – Over 100 internationally and nationally marketed crudes
  – Nearly 200 California oil fields
  – Default carbon intensity values
Default Crude CI Values

• Stakeholder feedback from the March workshop

• Proposing to establish default values for:
  – Thermally enhanced oil recovery
  – Bitumen or heavy oil production with upgrading
  – Country-specific conventional production

• Default value(s) used until CI value for the MCON is entered into the crude lookup table
2012 Crude Average CI

- Calculation of the 2012 crude average CI was posted for comment on March 20, 2014
- Comment period closed on April 4, 2014
- No comments were received
- 2012 Crude Average CI is 11.36 g/MJ
- No incremental deficit applies to fuels produced in 2014
Feedback Requested by May 9

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