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

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**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**

- 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 gCO₂ per barrel solar steam.
  - $\text{Credits}_{\text{Innov}}(MT) = 27,550 \times \frac{V_{\text{steam}} \times f_{\text{solar}}}{V_{\text{crude produced}}} \times V_{\text{Innov}} \times C$
- Solar and wind based electricity
  - Default credit of 485 gCO₂ per kW-hr solar/wind electricity.
  - $\text{Credits}_{\text{Innov}}(MT) = 485 \times \frac{E_{\text{electricity}} \times f_{\text{renew}}}{V_{\text{crude produced}}} \times V_{\text{Innov}} \times C$
**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.

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**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

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**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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