Low Carbon Fuel Standard Policy and Regulatory Development Working Group Meeting

November 16, 2007
## Tentative Schedule

### WG3 Session 1: Nov. 16, 2007
- Scope of LCFS
- Diesel fuel
- Drive train efficiency adjustment factor
- Baseline
- Targets
- Upstream emission (crude oil)
- Banking and trading of credits

### WG3 Session 2: Dec. 20, 2007
- Land use change
- Default values
- Boundaries and compliance paths
- Dealing with uncertainty in lifecycle analysis
- Point of regulation
- Compliance, certification, auditing, and penalties
Tentative Schedule (con’t)

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Agenda

- WG3: Session 1 list of policy issues
  1. Scope of standard
  2. Diesel fuel and drivetrain efficiency adjustment factor
  3. Upstream emission – crude oil
  4. Baseline
  5. Targets
  6. Banking and trading of credits

- Stakeholder presentations
- Future meeting dates
1. Scope of LCFS
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Option 1 (UC Recommendation):
Apply to all gasoline and diesel used for transportation in CA; non-liquid fuels (electricity, natural gas, propane, and hydrogen) to voluntarily opt-in; exclude aviation and bunker fuel

- Advantages:
  - Electricity, CNG, LPG, and H₂ can generate credits
  - Electricity: Provide time for developing learnings

- Disadvantages:
  - Difficulty to distinguish electricity used for transportation from other uses; potential overlap with other policies
1. Scope of LCFS

Option 2 (Staff Recommendation):
Apply to all gasoline, diesel, natural gas, propane, and electricity; hydrogen opt-in; exclude aviation and bunker fuel

- Advantages:
  - CNG and LPG fleets are in place
  - Electricity and hydrogen can help generate credits

- Disadvantages:
  - Similar problems with electricity as Option 1
1. Scope of LCFS

Option 3:
LCFS apply to all fuels in CA used for transportation; exclude aviation and bunker fuel

- Advantages:
  - All fuel-vehicle pathways used needed to achieve 2020 target
  - Electricity and hydrogen can generate significant credits

- Disadvantages:
  - Large scope may be challenging to administrate
  - Inclusion of electricity may create the complexity of overlapping with other policies - double counting
1. Scope of LCFS

Summary:

Option 1 (UC Recommendation):
- Apply to all gasoline and diesel used for transportation in CA; non-liquid fuels (electricity, natural gas, propane, and hydrogen) to voluntarily opt-in; exclude aviation and bunker fuel

Option 2 (Staff Recommendation):
- Apply to all gasoline, diesel, natural gas, propane, and electricity; hydrogen opt-in; exclude aviation and bunker fuel

Option 3:
- LCFS apply to all fuels in CA used for transportation, excluding aviation and bunker fuel
2. Diesel Fuel and Drivetrain Efficiency Adjustment Factor
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Option 1:

Ignore differences in efficiencies between gasoline and diesel drivetrains

a) Pool diesel and gasoline to create single AFCI baseline of 92 gCO₂e/MJ (and a single target)
   - **Advantages**: Would encourage the sales of diesel fuel and vehicles
   - **Disadvantages**: Potential higher local diesel-related air pollution and effects, environmental justice impacts

b) **(Staff Recommendation)**: Treat gasoline and diesel separately with 2 separate baselines and targets carbon intensity of 10% reduction each
   - **Advantage**: Avoid the problem of expected increases in diesel fuel sales and diesel related effects; promote development of alternative fuels; no overlap with AB1493
   - **Disadvantage**: Added complexity, reduce flexibility
2. Diesel Fuel and Drivetrain Efficiency Adjustment Factor

Option 2 (UC Recommendation):
Adjust diesel’s carbon intensity using an adjustment factor to reflect drivetrain efficiency differences

a) Treat all diesel fuel sales the same and apply the same diesel adjustment factor
   • **Advantages**: Appropriately reflect differences between light duty vehicles powered by gasoline or diesel
   • **Disadvantages**: Lead to problems of allowing compliance through increased sales of heavy duty diesel fuels; double credit used for AB 1493 compliance; issues of changes in future efficiencies

b) Treat heavy and light duty diesel differently:
   - Heavy duty diesel: un-adjusted AFCI of 91 gCO₂e/MJ
   - Light duty diesel: adjusted AFCI of 71 gCO₂e/MJ
   • **Advantages**: Retain incentive to displace gasoline use with light duty diesel
   • **Disadvantages**: Distinguishing between light and heavy duty diesel sales will be challenging; AB 1493 issues
2. Diesel Fuel and Drivetrain Efficiency Adjustment Factor

Option 3 (UC Recommendation):
Target gasoline only; diesel and other fuels opt-in; increase the AFCI intensity target for gasoline to above 10% (target ~12.4%)

- **Advantages:**
  - Simplicity
  - At 12.4% gasoline AFCI target for gasoline, there could be incentive to reduce the carbon content of other fuels

- **Disadvantages:**
  - Diesel and other petroleum fuels have no target carbon intensity; potential to reduce innovation for other fuels
2. Diesel Fuel: Summary

Option 1:
- Ignore differences in efficiencies between gasoline and diesel drivetrains
  - a) Single AFCI baseline of 92 gCO2e/MJ
  - b) **(Staff Recommendation):** Separately treat gasoline and diesel; 10% reduction each

Option 2 (UC Recommendation):
- Adjust diesel’s carbon intensity using an adjustment factor to reflect drivetrain efficiency differences
  - a) Treat all diesel fuel sales the same and apply adjustment factor
  - b) Treat heavy and light duty diesel differently:
    - HDV= 91 gCO2e/MJ, LDV= 71 gCO2e/MJ

Option 3 (UC Recommendation):
- Use gasoline sales as compliance tool, with diesel opt-in; increase AFCI intensity target for gasoline to ~12.4%
3. Upstream Emissions: Crude Oil
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Option 1: Using a fixed, average value across all crude oil types

- Advantages:
  - Fixed upstream value is much simpler
  - May reduce rationalization

- Disadvantages:
  - Less accurate accounting
  - Ignore carbon footprint of heavier crudes
  - No incentive for innovations
  - Will need to consider existing and future crude mix
3. Upstream Emission: Crude Oil

Option 2. (UC Recommendation):
For each type of crude, conduct full GHG lifecycle analysis
- Categorize fuel inputs and conduct full LCA
- Default values could be set for gasoline from conventional crude, heavy oil, tar sands, coal

- Advantages:
  - More accurately assess the total emission impacts of crudes
  - Create additional incentives to monitor and reduce GHG emissions through credit for over-compliance
  - Use conventional crude as baseline, encourage opt-ins for firms that can demonstrate better values

- Disadvantages:
  - Promote rationalization and related increases in GHG emissions with higher costs
  - More calculation intensive; potential uncertainties
3. Upstream Emission: Crude Oil

Option 3: (Staff Recommendation):
Using a fixed, average value for conventional crude oil; non-conventional heavy crudes (tar sand, oil shale, coal to liquid, gas to liquid, other heavy oils) treated separately

- Advantages:
  - Retains simplicity of Option 1
  - Account for carbon footprint of conventional heavier crude oil
  - Reduced rationalization for conventional crudes

- Disadvantages:
  - May promote rationalization for un-conventional crudes
3. Upstream Emission: Crude Oil

Summary:

**Option 1:**
- Using a fixed, average value across **all** crude oil types

**Option 2. (UC Recommendation):**
- For each type of crude, conduct full GHG lifecycle analysis

**Option 3: (Staff Recommendation):**
- Using a fixed, average value for conventional crude oil; non-conventional heavy crudes (tar sand, oil shale, coal to liquid, gas to liquid, other heavy oils) treated separately
4. Baseline
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Option 1 (Staff Recommendation):
A uniform state-wide baseline should be applied; baseline year is the most recent year for which data are available before the LCFS was announced; use 2006 data

- Advantages:
  - A single value is easier to develop and maintain; 2006 data are available

- Disadvantages:
  - A single state-wide baseline is harder for some regulated entities to meet than others
  - Wider range of compliance costs for different firms
4. Baseline

Option 2:
Firm specific or facility specific carbon intensity baseline

- Advantages:
  - Reduce differences associated with different firms meeting a single baseline

- Disadvantages:
  - Early GHG emission reductions penalized; signal to firms anticipating possible future regulation not to risk good environmental behavior
  - Complexity in defining individual baselines
  - Firm-level targets may not necessarily result in 10% reduction in total carbon intensity
4. Baseline

**Summary:**

**Option 1 (Staff Recommendation):**
A uniform state-wide baseline should be applied; baseline year is the most recent year for which data are available before the LCFS was announced; use 2006 data.

**Option 2:**
- Firm specific or facility specific carbon intensity baseline
5. Targets
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Option 1 (UC Recommendation):
Provider of transportation fuels regulated by or participating in LCFS should be held to the same standard; target value for transportation fuels = 83 CO$_2$e/MJ* in 2020

- Advantages:
  - Single target accurately reflects saving in carbon intensity when switching fuels

- Disadvantages:
  - Reduce technology innovations for fuels that already meet or exceed target; issues of diesel

* Relative to weighted AFCI of gasoline for baseline year of 2004. See UC Report Part I, Table 2-1.
5. Targets

Option 2:

Obtain 10% reduction for each fuel

- Advantages:
  - Reduction in each fuel could promote technology innovations for each fuel and reduce carbon intensities across all fuels

- Disadvantages:
  - Does not accurately reflect inherent reduction in carbon intensity by some fuels
  - Inhibit promotion of cleaner technologies
5. Targets

Option 3 (Staff Recommendation):

10% reduction for gasoline and diesel; non-gasoline fuels (i.e. CNG, LNG, electricity, others) will be compared to gasoline; compliance is met and credit will be awarded for reductions beyond 10% reduction relative to gasoline

- Advantages:
  - Promotes use of alternative/low carbon density fuels
  - Stimulate technological innovation

- Disadvantages:
  - Individual considerations needed for non-gasoline fuels
  - Administratively more challenging than option 1
5. Targets

Summary:

Option 1 (UC Recommendation):
- Provider of transportation fuels regulated by or participating in LCFS should be held to the same standard; target value for all transportation fuel = 83 CO$_2$e/MJ* in 2020

Option 2:
- Obtain 10% reduction for each fuel or firm

Option 3 (Staff Recommendation):
- 10% reduction for gasoline and diesel; non-gasoline fuels (i.e. CNG, LNG, electricity, others) will be compared to gasoline; compliance is met and credit will be awarded for reductions beyond 10% reduction relative to gasoline
6. Banking and Trading of Credits
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Option 1: (UC Recommendation):
No limit on the ability of any legal entity to trade or bank LCFS credits; borrowing not allowed; not allowed for AB32 compliance; regulators serve as record keepers only; buyers and seller do not communicate price of allowance to the regulators; allow voluntary emissions reductions by retiring the credit

- **Advantages:**
  - Trading and banking of credits are important LCFS design elements

- **Disadvantages:**
  - Potential for errors, disputes, and fraud in their handling is possible
  - Allowance market are not regulated by the securities or commodities commissions
6. Banking and Trading of Credits

Option 2 (Staff Recommendation):
Similar to Option 1 but allow export of LCFS credit to AB32 but not vice versa

- Advantages:
  - Allows innovation and multiple markets for resultant credits
  - All generated credits will be used
  - Increases potential for technological innovation

- Disadvantages:
  - Smaller pool of LCFS credits
6. Banking and Trading of Credits

Summary:

Option 1: (UC Recommendation):
- No limit on the ability of any legal entity to trade or bank LCFS credits; borrowing not allowed; not allowed for AB32 compliance; regulators serve as record keepers only; buyers and seller do not communicate price of allowance to the regulators; allow voluntary emissions reductions by retiring the credit

Option 2 (Staff Recommendation):
- Similar to Option 1 but allow export of LCFS credit to AB32 but not vice versa
Tentative Future Meetings

- Proposed future meeting dates:
  - December 20, 2007 (Thursday)
  - January 17, 2008 (Thursday)
  - February 21, 2008 (Thursday)
  - All meetings located in CR550 at ARB

- Additional meeting information TBD
Thank You

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