

**Low Carbon Fuel Standard
Policy and Regulatory
Development
Working Group Meeting**

November 16, 2007

California Environmental Protection Agency









Air Resources Board

Tentative Schedule

Task Name	Nov 11, '07							Nov 18, '07						
	M	T	W	T	F	S	S	M	T	W	T	F	S	
<input type="checkbox"/> WG3 Session 1: Nov. 16, 2007														
<input type="checkbox"/> Scope of LCFS														
<input type="checkbox"/> Diesel fuel														
<input type="checkbox"/> Drive train efficiency adjustment factor														
<input type="checkbox"/> Baseline														
<input type="checkbox"/> Targets														
<input type="checkbox"/> Upstream emission (crude oil)														
<input type="checkbox"/> Banking and trading of credits														

Task Name	Dec 16, '07							Dec 23, '07						
	S	S	M	T	W	T	F	S	S	M	T	W	T	F
<input type="checkbox"/> WG3 Session 2: Dec. 20, 2007														
<input type="checkbox"/> Land use change														
<input type="checkbox"/> Default values														
<input type="checkbox"/> Boundaries and compliance paths														
<input type="checkbox"/> Dealing with uncertainty in lifecycle analysis														
<input type="checkbox"/> Point of regulation														
<input type="checkbox"/> Compliance, certification, auditing, and penalties														

Tentative Schedule (con't)

Task Name	Jan 13, '08							Jan 20, '08							
	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
WG3 Session 3: Jan.17, 2008															
Interaction with AB1493, AB32, and other policy instruments															
Upstream emissions (refineries)															
Innovation credits, CCS, offsets, and opt-ins															
Environmental justice and sustainability															
Cost analysis															

Task Name	Feb 17, '08							Feb 24, '08									
	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
WG3 Session 4: Feb. 21, 2008																	
Additional topics and program review																	
Stakeholder suggested topics																	
Infrastructure, biofuel availability, and distribution																	
Technology timing																	

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 AFCl of 91 gCO₂e/MJ
 - Light duty diesel: adjusted AFCl 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 AFCl intensity target for gasoline to above 10% (target ~12.4%)

- **Advantages:**
 - Simplicity
 - At 12.4% gasoline AFCl 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 APCI 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 APCI 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

4. Baseline

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 CO₂e/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 AFCl 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 CO₂e/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

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Option 2 (Staff Recommendation):

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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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