



January 2010 Agenda Item E

Establishing New Fuel Pathways and Sub-pathways

A central part of Oregon's Low Carbon Fuel Standard (LCFS) program and rules will be a lookup table listing carbon intensities for the fuels most likely to be supplied in Oregon. A carbon intensity value will be specified for each fuel pathway, and in some cases several sub-pathways. A fuel pathway refers to the whole process of producing and using a fuel, including: extracting or growing the feedstock; transporting the feedstock to the refinery; refining the feedstock into a fuel; transporting and storing the finished fuel; and combusting the fuel in a vehicle.

Each pathway refers to a distinct combination of feedstock and fuel, while each sub-pathway refers to a distinct process for making the feedstock into the fuel. For example, corn ethanol is a fuel pathway (corn is the feedstock and ethanol is the fuel), with several sub-pathways to take into account different processes and sources of process energy (for example, the wet mill process using natural gas, or the dry mill process using coal energy).

DEQ plans to calculate carbon intensity values for several fuel pathways and sub-pathways, and will consult with stakeholder groups to ensure that the lookup table covers the most likely pathways and sub-pathways for the early years of the LCFS program. However, we foresee several circumstances under which the lookup table may need to be updated over time:

- Researchers develop new low-carbon fuels, for example biobutanol;
- Researchers develop technologies to produce existing fuels from new feedstocks, for example biodiesel from algae;
- Industry develops a new and improved process for making an existing fuel from an existing feedstock, for example a biofuel refining process that uses less energy or earns increased co-product credits;
- Petroleum refineries increase the percentage of high carbon intensity crude oils in their refining mix; and
- Producers of high carbon intensity crude oils adopt carbon capture and sequestration or other process efficiencies or methods that lower the carbon intensity of their product.

As new technologies and new feedstocks emerge, DEQ will likely continue to add new pathways and sub-pathways to the carbon intensity lookup table under its own initiative. However, DEQ proposes to include in the proposed rules a process for fuel producers to propose new fuel pathways and sub-pathways as well, in order to encourage and reward innovation and to make sure that the carbon intensity lookup table accurately reflects current fuels sold in Oregon.

Advisory Committee Objective

The goal for the January 27 meeting is for DEQ to share information about this topic with the advisory committee, including proposed criteria for adding new fuel pathways and sub-pathways to the carbon intensity lookup table. DEQ hopes to get input from the advisory committee on this proposal, as well as to hear committee members' ideas and concerns about the process for adding pathways and sub-pathways.

Note: DEQ plans to bring a proposal to a future advisory committee meeting for calculating the carbon intensities for gasoline and diesel produced wholly or partly from high carbon intensity crude oil. The advisory committee will have a more comprehensive discussion on this topic once DEQ has finished analyzing the sources and carbon intensities of Oregon's current petroleum fuels.

Discussion questions for the advisory committee:

1. Under what circumstances should a new fuel pathway or sub-pathway be added to the carbon intensity lookup table?
2. What considerations should DEQ keep in mind when designing a process for adding pathways and sub-pathways to the carbon intensity lookup table?

Each of these discussion questions has a companion discussion piece on the following pages.

1. Under what circumstances should a new fuel pathway or sub-pathway be added to the carbon intensity lookup table?

As mentioned above, DEQ envisions several situations where additions to the carbon intensity (CI) lookup table will be warranted due to new fuels and feedstocks, and new and improved production processes. In order to manage the workload for evaluating and approving applications, DEQ proposes that changes proposed by regulated parties must meet a significance threshold in order for DEQ to consider adding them to the lookup table:

- DEQ considers the introduction of a new class of fuel or a new feedstock resulting in a new pathway to be significant, in and of itself. Hence, in these cases DEQ proposes not to set any minimum production levels for additions to the lookup table.
- With regard to new and improved processes for producing a feedstock-fuel combination already in the lookup table, DEQ proposes to establish requirements to distinguish substantial changes and improvements from minor changes. DEQ proposes that for new sub-pathways regulated parties must be able to meet the following two threshold requirements:
 1. **Minimum Thresholds for Changes in Carbon Intensity:** The improvement in “source-to-tank” carbon intensity of the fuel using the new process, compared to the existing process in the lookup table, is at least 5.0 g CO₂e/MJ or 10 percent, whichever is less; AND
 2. **Minimum Fuel Volume Thresholds:** The regulated party is able and intends to provide more than one million gasoline gallon equivalents per year of the fuel in Oregon. (The

second criterion does not apply if all providers of that fuel supply less than one million gasoline gallon equivalents per year in aggregate.)

Discussion

New and Improved Processes, Criteria 1: Minimum Thresholds for Changes in Carbon Intensity

This requirement establishes minimum threshold levels that represent a “significant” change in a fuel’s carbon intensity. DEQ is considering using two carbon intensity thresholds, with the regulated party needing to meet whichever was less in their particular case: a fixed carbon intensity value of 5.0 g CO₂e/MJ, or a percentage change (10 percent) threshold. DEQ would consider a change in a fuel’s carbon intensity to be significant if that change was more than either of these two criteria. For example:

- Using California’s lookup table, North American natural gas (fossil source) liquefied into LNG has a carbon intensity of 72.38 g CO₂e/MJ.¹ In this case the applicable threshold is the lesser of 5.0 g CO₂e/MJ or 10 percent (7.24 g CO₂e/MJ).
- Again, using California’s lookup table, landfill gas liquefied into LNG has a carbon intensity of 15.56 g CO₂e/MJ.² In this case the applicable threshold is the lesser of 5.0 g CO₂e/MJ or 10 percent (1.56 g CO₂e/MJ).

From the examples above, we can see that the 5.0 g CO₂e/MJ threshold is more favorable to relatively higher carbon intensity fuels, while the 10 percent threshold is more favorable to relatively lower carbon intensity fuels. DEQ believes that this hybrid approach will be fairer than either setting a single value threshold or setting a straight percentage threshold.

Note: As mentioned on page 1, DEQ also envisions a possible scenario where changes to a regulated party’s fuel production process could result in carbon intensities higher than what is reflected in the lookup table, particularly with regard to petroleum fuels where changes could occur in production processes or the type of crude oil used. As part of a comprehensive discussion about high carbon intensity crude oils, DEQ plans to bring a proposal to the advisory committee on setting thresholds for requiring regulated parties to propose new sub-pathways when their fuel’s carbon intensity has increased.

New and Improved Processes, Criteria 2: Minimum Fuel Volume Thresholds

The intention of the second volume requirement is to ensure that, for fully-commercialized fuels, the proposed process changes will result in a substantial amount of fuel production. The exception for fuels where aggregate production by all producers is less than one million gallons is meant to preserve an incentive for technology improvements in emerging fuels.

¹ Liquefied in California with 90 percent efficiency. Value from Section 95486 of the California Low Carbon Fuel Standard regulation, found at: <http://www.arb.ca.gov/regact/2009/lcfs09/lcfsfro.pdf>.

² Liquefied in California with 90 percent efficiency. Section 95486 of the California Low Carbon Fuel Standard regulation.

Once a new fuel pathway or sub-pathway is established, any regulated party can use it if they can demonstrate that the pathway or sub-pathway best describes their process. DEQ's proposed criteria are similar to criteria adopted by the California Air Resources Board in its regulations.³

Questions for Committee

1. Does the advisory committee agree with this proposal for substantiality requirements? Does the committee suggest any different or additional criteria?
2. Do advisory committee members foresee additional situations which would warrant additions to the carbon intensity lookup table that DEQ should consider when designing the process for proposing new pathways and sub-pathways?

2. What other considerations should DEQ keep in mind when designing a process for adding pathways and sub-pathways to the carbon intensity lookup table?

The reason for providing a process to establish new pathways and sub-pathways is to ensure that the carbon intensity lookup table reflects fuels used in Oregon. The LCFS regulation should provide a thorough process, including opportunity for public review, to ensure that any carbon intensity reductions claimed by regulated parties are real. However, the process should also be as expeditious as possible to ensure that producers are able to take advantage of bona fide improvements and innovations, which will promote and reward innovation in low-carbon fuel technology. In addition to the criteria discussed in Section 1 above, committee input is sought on the following considerations that DEQ will need to take into account when designing the process:

- The level of technical support documentation that will be required and considered scientifically defensible information for demonstrating improvements in carbon intensities;
- Provisions to ensure a public review and comment process (i.e. compliance with Oregon's Administrative Procedures Act) when a new fuel pathway is being considered by DEQ; and
- Provisions to protect confidential business information.

For example, DEQ will likely require regulated parties to provide a GREET⁴ spreadsheet where the regulated party has specified which model inputs it proposes to change, as well as documentation supporting the regulated party's proposed changes to the inputs in the GREET model. Documentation could include information such as: official factory technical specifications for new equipment contributing to carbon intensity reductions; technical drawings, schematics, flow diagrams and maps describing proposed process changes; technical papers (e.g., published journal articles, university or

³ The guidelines for determining carbon intensity values are contained in Section 95486 of the California Low Carbon Fuel Standard regulation, found at: <http://www.arb.ca.gov/regact/2009/lcfs09/lcfsfro.pdf>.

⁴ Greenhouse Gases, Regulated Emissions and Energy Use in Transportation. DEQ is using the GREET model to determine carbon intensities of fuels under the LCFS. See presentation from December 3 LCFS advisory committee meeting for more information about GREET: http://www.deq.state.or.us/aq/committees/docs/lcfs/B_LCA.pdf

consultant reports) reporting the results of studies; and other emissions monitoring data collected by entities testing or using the proposed equipment and processes.

Our proposed regulations will also address legal requirements related to disclosure of information, public notice, and general administrative procedures. DEQ is investigating Oregon legal requirements to determine whether a full rulemaking before the Environmental Quality Commission would be necessary in every instance where the carbon intensity lookup table is changed or augmented.

DEQ invites the advisory committee to share concerns and recommendations on designing a process that will be expeditious for regulated parties, while preserving opportunities for public involvement. When drafting the proposed LCFS rule, DEQ will incorporate committee recommendations for the best process design to establishing new pathways and sub-pathways.