

Agenda Item C

Setting the Baseline Standard

Updated

June 23, 2010



Decision Point

In order to proceed with our LCFS program assessment DEQ must decide whether to use a single, combined gasoline/diesel **Baseline Standard** for Oregon's LCFS program, or to use two separate Baseline Standards, one for gasoline and one for diesel fuel. After considering the committee's comments today, DEQ will select an approach to use in our program evaluation.

Key Questions for the Advisory Committee

1. Should there be one combined baseline standard for both gasoline and diesel, or two standards, one for gasoline and one for diesel?
2. If one combined baseline standard is used, should a diesel EER be applied for light-duty diesel fuel use? Diesel used in light-duty vehicles would be considered a substitute for gasoline. How much future fuel switching from conventional gasoline to conventional diesel will occur? Will it be significant enough to warrant concern about any associated increase in air toxic pollution from increased diesel use?

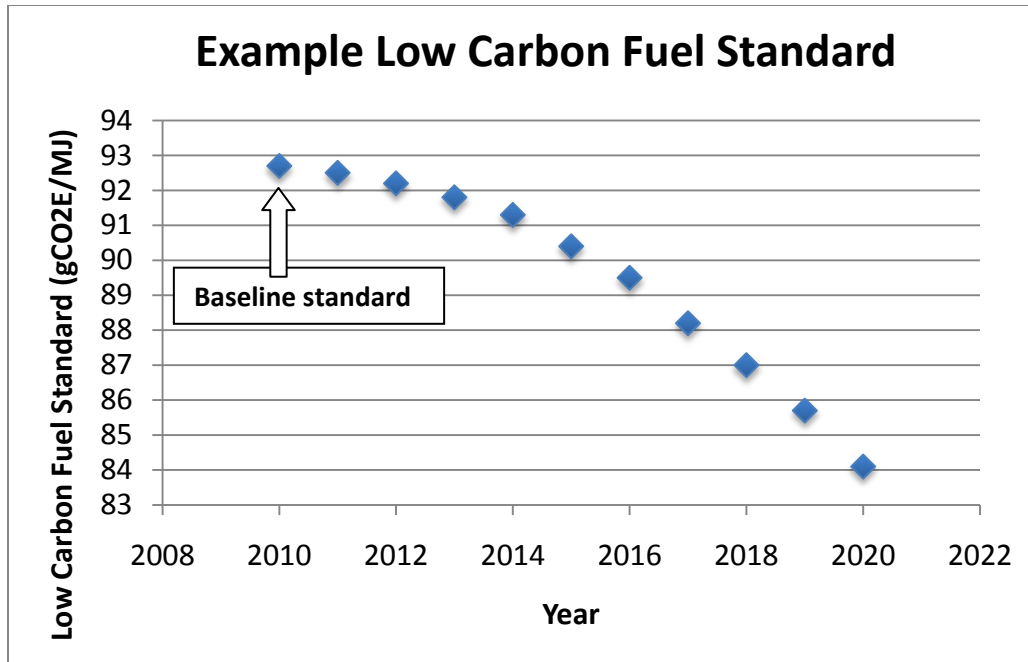
Previous Committee Discussion

This topic was initially discussed at the Jan 27, 2010 advisory committee meeting. As a result, DEQ received suggestions from the committee about data sources to use in calculating a baseline standard. The goal of the low carbon fuel standard is to reduce the average amount of greenhouse gas emissions per unit of fuel energy of the fuels by 10 percent below 2010 levels. The Baseline Standard serves as the benchmark from which reductions in carbon intensity are measured over the life of the program.

To determine compliance for a LCFS, DEQ must establish:

- A. The baseline standard (or standards), which reflects the carbon intensity of Oregon's 2010 fuel mix.
- B. The average carbon intensity that must be met in each year between 2012 and 2022. This declining value is the low carbon fuel "standard," and is established using the baseline standard (or standards).

The baseline standard is essential in determining the carbon intensity targets that must be achieved in the future to reach the required reduction in 2022, and for determining the phase-in schedule of the rule. The LCFS Baseline Standard will reflect the average carbon intensity of Oregon's 2010 fuel mix.



Options and Key Considerations: Committee Discussion

The selection of one vs. two baseline standards is largely a policy choice. Each approach has its advantages. One issue that is central to this choice is how the carbon intensity of light-duty diesel fuel **used as a substitute for gasoline** is treated in comparison to gasoline. For this discussion, we must begin by revisiting the topic of a fuel’s Energy Economy Ratio (EER), especially the use of an EER for diesel fuel used as a substitute for gasoline.

Energy Economy Ratio (EER): Recall that the EER is used to adjust the carbon intensity of an alternative fuel to account for the travel efficiency of a vehicle using that fuel; and the comparison is made relative to a conventional diesel or gasoline vehicle.¹ For example, when a heavy-duty vehicle owner switches fuels from diesel to CNG, an EER can be applied to account for the decreased efficiency of the CNG engine. Likewise, an electric vehicle can travel four times farther than a gasoline-powered vehicle given the same amount of fuel energy (megajoules). An electric vehicle will therefore have an EER of four, relative to a gasoline vehicle, but this will decline to three in the future (see the Electricity topic paper from the May 20 meeting).

Modern diesel passenger vehicles are more energy efficient than an equivalent gasoline passenger vehicle (i.e. will travel farther on the same number of megajoules). California staff estimates that there is about a 16 percent improvement in the adjusted carbon intensity of light-duty diesel vehicles using conventional diesel fuel compared to gasoline vehicles. Light-duty (passenger) diesel fuel could therefore have an EER of approximately 1.16 **when switches occur from gasoline to diesel**. This point is important when

¹ Energy economy ratio: EER refers to the factor that is used to account for differences in energy efficiency among different types of fuels and vehicles. The EER is defined as the ratio of the number of miles driven per unit energy consumed for a fuel of interest (such as electric, natural gas, or hydrogen vehicles) to the miles driven per unit energy for a reference fuel (such as gasoline or diesel).

considering the use of one vs. two baseline standards.

DEQ is not considering applying a diesel EER to the baseline diesel fuel currently being used in the 2010 fuels mix. An EER should only be applied to diesel that substitutes for gasoline so it is neither relevant nor appropriate to apply it to the baseline. DEQ could consider applying an EER to diesel fuel that substitutes for gasoline in the future. This is what California ARB refers to as “fuel switching”, and would only be applicable to a LCFS program that used a single baseline standard. The application of a diesel fuel EER is described below:

1. **Option #1 - Single Baseline Standard, diesel EER Applied to light-duty diesel uses:** A single baseline standard would average the carbon intensities for conventional gasoline and diesel fuel together². As noted above, no diesel EER would be applied to diesel fuel that does not substitute for gasoline. Because light-duty diesel substitutes for gasoline, diesel EER could be used to adjust the diesel carbon intensity for diesel fuel consumed by light-duty vehicles. Without an EER, the carbon intensity of conventional diesel fuels is approximately 91.8 gCO₂e/MJ. With a diesel EER of 1.16 applied, the carbon intensity of conventional diesel fuel used in light-duty vehicles as a substitute for gasoline would be reduced to 79.1 gCO₂e/MJ.

Considerations: The practical consequence of using a diesel EER in this manner is that conventional diesel used in light-duty applications would become a “low carbon fuel”. As a result, there might be less incentive for fuel producers to reduce the carbon intensity of alternatives diesel fuel because diesel fuel used in light-duty applications would likely be below that of the 2022 standard.

2. **Option #2 – Single Baseline Standard, no diesel EER Applied:** A single baseline standard would average the carbon intensities for conventional gasoline and diesel fuel together as described above. In this option, no diesel EER is applied and the carbon intensity of all conventional diesel fuel is approximately 91.8 gCO₂e/MJ.

Considerations: This approach would provide a consistent approach to both the carbon intensities of gasoline and diesel (i.e. keeps the LCFS program neutral on the future use of conventional gasoline vs. conventional diesel). However, the relative efficiency of diesel vehicles when diesel fuel is substituted for gasoline is not accounted for.

3. **Option #3 – Two Baseline Standards:** Two baselines would be set, one for gasoline and gasoline substitutes and one for diesel and diesel substitutes. No diesel EER adjustment would be applied because there would be no comparison of diesel fuel to gasoline.

Considerations: Each fuel type (gasoline and diesel) would be required to achieve a ten percent reduction from its own baseline standard.

Other Key Policy Considerations

1. **Fuels Innovation:** In Option #3, establishing separate baselines for gasoline and diesel would require each fuel type to reduce its carbon intensity by ten percent. This could better promote innovation and advancements within each fuel type for lowering carbon intensities. Option #2 is neutral in this issue.

² Weighted by relative fuel volumes sold in Oregon

In Option #1, using more conventional diesel fuel to replace gasoline in light-duty engines becomes a legitimate compliance option, one that will not be seen as an innovative approach to meeting the standard.

2. Flexibility to Comply: Option #1 (single baseline, light-duty diesel EER) could provide some added flexibility for regulated parties to comply with the standard because conventional diesel could be used as a substitute for gasoline in light-duty vehicles, and would earn credits as a low carbon fuel. In theory, this means that a regulated party could meet its compliance obligation in part by selling more conventional diesel fuel into the light-duty market, creating low carbon fuel credit. Option #3 could also provide some flexibility for regulated parties, as illustrated through California's approach (two baselines), since credits earned on the diesel side can be used on the gasoline side, and vice versa.
3. Toxicity of Diesel PM: Diesel particulate matter is a potent toxic air pollutant and a major public health concern. California did not want to promote the increased use of petroleum diesel because of this. New diesel vehicles, primarily those manufactured after 2007, and those that have had emissions control devices (particulate filters and catalytic converters) installed are very clean, but older vehicles are much dirtier. Oregon has made diesel particulate reduction a top priority for protecting public health. The LCFS program should be designed to support this priority.

Key Implementation Considerations

1. Complexity: Option #2 (single baseline, no diesel EER) or Option #3 (two baselines) would be the simplest to implement. Option 1 (single baseline, light-duty diesel EER) would be more complex to administer, due to the difficulty of tracking fuel switches from gasoline to diesel.
2. Tracking light-duty diesel used as a substitute for gasoline: In Option #1, a tracking system would have to be developed to document any fuel switches from gasoline to diesel for consideration in applying a diesel EER. Under this scenario, there would be some very difficult implementation challenges for how to identify, track, and document actual fuel switches from gasoline to diesel. The following are options to consider:
 - a. Changes to the ratio of gasoline to diesel sold in Oregon

Concerns with this approach include that gasoline use could decrease proportionally to diesel use due to factors that have nothing to do with fuel users substituting diesel for gasoline. For example, increased adoption of electric or natural gas light-duty vehicles, as well as the recently adopted federal fuel economy requirements for gasoline vehicles, could decrease the relative market share for gasoline without any substitution of diesel for gasoline occurring. Conversely, if heavy-duty use of CNG or electricity increased, the relative share of diesel could be underestimated.
 - b. Increase in volume of diesel sold in Oregon

Concerns with this approach include that it would be impossible to distinguish the effects of users switching from gasoline to diesel from increases in diesel use occurring due to other reasons (such as increased economic growth). On the other hand, switches from diesel to CNG, electricity, or hydrogen could mask the effect of switches from gasoline to diesel, and the light-duty diesel volume could be underestimated.
 - c. Number of additional diesel passenger cars registered

Concerns with this approach include:

- Obtaining the number of diesel passenger cars registered from DMV in a timely manner. There would be a time lag in data obtained. In addition, DMV data needs to be VIN decoded to obtain the number of light-duty vehicles registered. DEQ currently obtains VIN decoded data every three to four years.
- DEQ would need to estimate the amount of diesel used by the light-duty vehicles.
- The data might not reflect fuel switching from gasoline to medium-duty vehicles.

3. Credits from fuel switches from gasoline to diesel: Once we have a known volume of fuel that represents the amount of diesel fuel substituted for gasoline, credits for that fuel will need to be assigned. There are no practical ways to do this. Any assumption DEQ makes could create inequities for regulated parties.

Proposal for Discussion

At this point, DEQ proposes to use Option #3 Two Baselines. On balance, DEQ believes this to be the best approach for the following reasons:

- The use of one baseline standard cannot be done properly without applying a diesel EER to light-duty diesel use;
- Applying a diesel EER to light-duty diesel fuel use will involve many unknowns with no practical way of tracking it;
- The use of two baseline standards eliminates the need to create and implement a complex mechanism for identifying and allocating carbon credits due to fuel switching from gasoline to diesel. It avoids the potentially controversial point of granting conventional diesel fuel status as a “low carbon fuel”;
- The use of two baseline standards promotes the development of lower carbon intensity fuels for both gasoline and conventional diesel fuels; and
- The use of two baseline standards eliminates the concern that the LCFS would promote increased toxic air pollution by incentivizing the increased use of diesel fuel (i.e. keeps the LCFS program neutral on this point).

However, DEQ wishes to hear from the committee before deciding which approach to move forward with in our compliance scenarios and economic analysis. Additional questions for the committee to consider include: Are there other pros and cons for each option that should be considered? Are there any unintended consequences? Are there other options that should be considered?

Immediately following our June meeting, DEQ will consider the Committee’s comments on this issue and determine for the purposes of our program assessment whether to use one combined baseline standard or two, and whether or not a diesel EER should be applied to light-duty diesel fuel.

References

Other DEQ briefing papers that are relevant to the LCFS baseline include:

- Updates and Reviews of LCFS Rule (Agenda Item C at the 5/27/2010 meeting)
- Establishing New Fuel Pathways and Sub-pathways (Agenda Item D at the 5/27/2010 meeting)
- The Phase-in of Compliance Schedule (Agenda Item D of the 1/27/2009 meeting)

Discussion papers are available on our website at:

<http://www.deq.state.or.us/aq/committees/advcomLowCarbonFuel.htm>.

Appendix A

Key advisory committee comments on this topic raised during the 1/27/2010 discussion included:

One Baseline Standard vs. Two

- By setting separate baselines for gasoline and diesel, California aims to discourage switching from gasoline to diesel and promote innovation and advancements in each fuel type. ³ California wants to discourage fuel switching to convention diesel because diesel particulate pollution is a serious toxic air pollutant (i.e. a likely carcinogen). Diesel particulate is one of the top air toxics of concern in Oregon as well.
- Oil industry prefers one standard, based upon new numbers from CARB on carbon intensity of soy biodiesel, which is not much better than petro diesel.
- Commenter does not get the point of two standards and is concerned about creating silos. **Response (CARB):** *If there are two standards, improvements will have to be made on each side. Credits from each can still be applied toward compliance for the other fuel category. There are concerns about the lack of enough low carbon diesel alternatives.*
- Commenter expressed preference for two standards, but sees that benefits will also come from one standard.
- Andy Ginsburg asked whether committee was comfortable with a tentative consensus that they preferred one standard, but with plans to re-examine the issue once they have seen compliance scenarios.
- Diesel vehicles travel approximately 30 percent farther for the amount of carbon emissions generated.
- In order to evaluate the importance of flexibility, it will be easier to understand if we had a couple of draft scenarios, even if they are rough.

³ From California Air Resources Board: *Proposed Regulation to Implement the Low Carbon Fuel Standard Volume I Staff Report: Initial Statement of Reasons March 5, 2009.*

- Does the statute allow for two standards, differentiating between gasoline and diesel? **Response:** *We can check with DOJ later in the process, if it seems to be a relevant issue. Please note: DEQ checked, and the statute does allow for two standards.*

Fuel Innovation

- CARB is concerned about setting a direction for beyond 2020 – if innovations do not start to happen before 2020 in diesel alternatives, it will be more difficult to meet even deeper reductions in the long-term. This is a key concern driving CARB’s decision to set two standards.
- The biggest contribution of the LCFS is stimulating innovation in the fuels market, so we want to make sure the program we design does that. **Response (DEQ):** *Oregon is much smaller than California, and has much less chance of stimulating innovation in fuels, so perhaps other factors, such as avoiding complexity, should drive Oregon’s decision about one versus two standards.*

Fuel switching from gasoline to diesel

- Fuel switching almost guarantees a new vehicle. New diesel controls are stricter, so increased diesel particulate pollution is not an issue.
- We have high benzene content in our gasoline, so switching to diesel is not a big concern.
- Switching more of the light-duty fleet to diesel would have an immediate effect on carbon emissions. Reducing emissions in the short run is more valuable than in the long term. Two standards will delay the reduction in emissions, which makes the reductions worth less.

Energy Economy Ration (EER) for electricity issues

- Commenter is concerned about vehicles that are not easy to categorize, like certain pickups. How will electricity providers track when electricity is used to displace gasoline and when it displaces diesel? It would be easier for them to have one standard. **Response (CARB):** *If the vehicles replace gasoline vehicles, then they are compared with gasoline, and vice versa. Credits from heavy-duty fleets will be applied against diesel.*
- Also, please note that light-duty and heavy-duty EERs for electricity are different. Light-duty EER for electricity is three (or 4), and the heavy-duty is 2.7. The EER is also different for light-duty and heavy-duty CNG use. So even with one standard, fuel providers might need to track the difference.

Energy Economy Ration (EER) for diesel issues

- Commenter expressed concern that one standard will allow credits for what regulated parties are already doing, causing lower benefit from the program. **Response:** *Baseline could be set to ensure that there is no credit for existing diesels, only for new users of diesel. Response (CARB):* *Some people suggested that higher targets be set along with a single standard, like 14-15 percent, to compensate for regular diesel being already compliant. If you have one standard and apply an EER to the baseline diesel fuel, then once you take into account efficiency of diesel vehicles, regular diesel will generate credits without doing anything to improve its carbon intensity. Those credits could be applied toward gasoline, and gasoline would not have to make many improvements either.*

