2023 Annual Cost of the Clean Fuel Standard

Summary

The Clean Fuel Standard (CFS) reduces greenhouse gas emissions by gradually requiring fuel producers and suppliers to lower the carbon intensity, or lifecycle greenhouse gas emissions per unit of energy, of transportation fuels using a market-based system. By 2038, the CFS is expected to reduce 4.3 million metric tons of carbon dioxide or the equivalent in other greenhouse gases (CO_2e) annually.

The CFS works by setting a carbon intensity standard for transportation fuels that declines each year. Producers and suppliers of fuels above the standard generate deficits, while those below the standard generate credits. At the end of each compliance period, producers and suppliers with deficits must purchase enough credits from low-carbon fuel producers and suppliers to make up their deficits. This incentivizes the production and use of low-carbon fuels and aims to make them more available and affordable.

WAC 173-424-710(5) requires the Department of Ecology to estimate the total greenhouse gas emissions and the average cost or cost savings per gallon of gasoline or diesel attributable to the CFS each year. This analysis estimates possible impacts from Jan. 1, 2023 through Dec. 31, 2023, and indicates that the CFS may have raised the price of the average gallon of gasoline by less than a penny in 2023 – $0.006 – and reduced an estimated 1.4 million metric tons of CO_2e.

Estimated total greenhouse gases reduced

Each fuel is given a carbon intensity score. Credits are generated in proportion to how far below the carbon intensity standard each fuel is in grams of CO_2e per megajoule. Therefore, the total greenhouse gases (metric tons of CO_2e) reduced through the CFS in 2023 is estimated to be equal to the total number of credits generated.

In 2023, 1,424,591 credits were generated, which is assumed to equal 1,424,591 metric tons of CO_2e reduced. This is the equivalent to the annual emissions of 339,055 gasoline-powered cars.[1]

[1] https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator

Estimated per-gallon cost of the CFS program

The cost of gasoline and diesel, like most globally traded commodities, is primarily driven by global market forces. Factors such as seasonal fluctuations, refinery or pipeline disruptions, and geopolitical events dictate supply and demand, and fuel producers and suppliers use complex competitive pricing strategies reflecting these varying conditions. Government policies, like the CFS, typically have a minor influence on retail fuel prices compared to global market forces.

The estimated cost impacts of the CFS are the cost of purchasing credits (the cost of compliance) and the cost of the annual fee charged to administer the program distributed across the total volume of fuel sold in Washington. Our methods for calculating these values use standardized carbon intensity values and an average credit price. In order to reflect the reality that consumers face when they fill their gas tanks, we estimated average cost impacts on a gallon of gasoline blended with 10% ethanol (E10) and a gallon of diesel blended with 2.5% biodiesel (B2.5). Nationally, gasoline is blended with 10% ethanol on average,[2] and Washington law requires all diesel to be blended with at least 2% biodiesel.[3]

The cost impacts shown below are based on assumptions that may not perfectly reflect actual business decisions in a competitive market. While these estimates account for the cost savings generated when revenue from CFS credits is used to lower the cost of low-carbon fuels that are blended into gasoline and diesel, they also assume that producers and suppliers pass on the full cost of the program fee to consumers.

Our analysis determined the following estimated cost impacts for 2023:

	E10 gasoline	**B2.5 diesel**
Cost of compliance per gallon	$0.0053	$0.0061
Cost of CFS fee per gallon	$0.0007	$0.0006
Total	**$0.0060**	**$0.0067**

The values in this table were calculated using the formulas described in this document.

Cost per gallon: Average estimated per-gallon cost of CFS compliance

The average estimated cost of the CFS is associated with the difference in the carbon intensity of the fuel when compared to the carbon intensity standard for the year and the cost of credits in the program. The formula below is also used by Oregon's Clean Fuels Program to estimate the average cost per gallon of gasoline or diesel fuel.[4]

[2] https://afdc.energy.gov/fuels/ethanol-fuel-basics
[3] https://app.leg.wa.gov/rcw/default.aspx?cite=43.19.642
[4] https://www.oregon.gov/deq/ghgp/cfp/pages/annual-cost.aspx

$$Average\ estimated\ cost\ of\ compliance\ per\ gallon = [(Carbon\ Intensity - Standard) \times (Energy\ Density)] \times \left(\frac{1\ tonne}{1{,}000{,}000\ g}\right) \times (Credit\ Price)$$

Where:

$Carbon\ Intensity$ means the amount of lifecycle greenhouse gas emissions per unit of energy of fuel expressed in grams of carbon dioxide equivalent per megajoule (gCO_2e/MJ)

$Standard$ is shown in Table 1 or Table 2 of the CFS rule (WAC 173-424-900)

$Energy\ Density$ is shown in Table 3 of the CFS rule (WAC 173-424-900)

$Credit\ Price$ for 2023 is shown in the Monthly Credit Transaction Report

Average estimated per-gallon cost of CFS compliance on gasoline (E10)

$$Average\ estimated\ cost\ per\ gallon\ of\ E10 = \left[\left(98.93\frac{gCO2e}{MJ} - 98.44\frac{gCO2e}{MJ}\right) \times \left(118.38\frac{MJ}{gallon}\right)\right] \times \left(\frac{1\ tonne}{1{,}000{,}000\ g}\right) \times \left(\frac{\$91.23}{tonne}\right)$$

Average estimated per-gallon cost of CFS compliance on diesel (B2.5)

$$Average\ estimated\ cost\ per\ gallon\ of\ B2.5 = \left[\left(100.11\frac{gCO2e}{MJ} - 99.61\frac{gCO2e}{MJ}\right) \times \left(134.27\frac{MJ}{gallon}\right)\right] \times \left(\frac{1\ tonne}{1{,}000{,}000\ g}\right) \times \left(\frac{\$91.23}{tonne}\right)$$

Cost of participation: Average estimated per-gallon cost of the CFS participation fee

Producers and suppliers of gasoline and diesel fuel are subject to a fee to cover the cost of implementing the CFS. The formula below represents the impact of the CFS fee per gallon of gasoline. This assumes that the fee is fully passed through to consumers.

The calculation accounts for the distribution of the fee across volumes of each fuel. For example, of total gasoline and diesel deficits, 73% were generated by gasoline, so 73% of the fee charged to suppliers of gasoline or diesel is assumed to be associated with the cost of gasoline.

This method assumes full passthrough of the deficit generator fee but does not assume passthrough of the fee charged to participants who are only generating credits and are only charged a credit generator fee.

$$Average\ Cost\ of\ CFS\ fee\ pergallon\ of\ fuel = (blend\ rate\ of\ gasoline\ or\ diesel\ ) \times \frac{(deficit\ fee\ generated\ by\ gasoline\ or\ diesel)}{(gallons\ of\ gasoline\ or\ diesel\ reported)}$$

Where:

$blend\ rate\ of\ gasoline\ or\ diesel$ is the percentage of gasoline or diesel per gallon of E10 or B2.5

$$\left[\frac{deficit\ fee\ generated\ by\ gasoline\ or\ diesel\ (total\ gasoline\ or\ diesel\ deficits)}{(total\ gasoline\ deficits + total\ diesel\ deficits)}\right] \times total\ fee\ generated\ by\ gasoline\ and\ diesel$$

$gallons\ of\ gasoline\ or\ diesel\ reported$ is based on volume of fuel reported in the Washington Fuel Reporting System (WFRS) during 2023 and is available in the CFS Quarter 4 Data Summary

Average estimated per-gallon cost of CFS fee on gasoline

$$Average\ estimated\ cost\ of\ CFS\ fee\ per gallon\ of\ E10 = .9 \times \frac{\$1{,}803{,}371.51}{2{,}449{,}901{,}942\ gallons\ gasoline}$$

Where

$.9$ is the blend rate for gasoline in a gallon of E10

$\$1{,}803{,}371.51$ is the deficit fee generated by gasoline as show below:

$$\left[\frac{608{,}782\ gasoline\ deficits}{(608{,}782\ gasoline\ deficits + 194{,}828\ diesel\ deficits)}\right] \times \$2{,}380{,}503 = \$1{,}803{,}371.51$$

$2{,}449{,}901{,}942$ is the number gallons of gasoline reported in WFRS during 2023 as seen in the CFS Quarter 4 Data Summary

Average estimated per-gallon cost of CFS fee on diesel

$$Average\ estimated\ cost\ of\ CFS\ fee\ per gallon\ of\ B2.5 = .975 \times \frac{\$577{,}131.49}{908{,}188{,}111\ gallons\ diesel}$$

Where

$.975$ is the blend rate for diesel in a gallon of B2.5

$\$577{,}131.49$ is the deficit fee generated by diesel as show below:

$$\left[\frac{194{,}828\ diesel\ deficits}{(608{,}782\ gasoline\ deficits + 194{,}828\ diesel\ deficits)}\right] \times \$2{,}380{,}503 = \$577{,}131.49$$

$908{,}188{,}111$ is the number of gallons of diesel reported in WFRS during 2023 as seen in the CFS Quarter 4 Data Summary

Contact

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ADA Accessibility

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