



# Renewable Fuel Standard Update

Background on proposed amendments to  
Portland City Code Chapter 16.60 Motor Vehicle Fuel

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## 1. History

In 2006, Portland City Council adopted a pathbreaking new climate policy with the intent to reduce dependence on nonrenewable fossil fuels: the Renewable Fuel Standard (RFS).<sup>1</sup> The RFS required a five (5) percent blend of biodiesel in every gallon of diesel fuel sold in Portland. Portland remains the only North American city to have enacted a requirement for replacing petroleum diesel with lower carbon biofuel alternatives. The State of Oregon adopted a nearly identical policy a few years after Portland.

Since 2006, changes in policy and markets have rendered the current RFS out of date. California and Oregon enacted low-carbon fuels programs<sup>2</sup> that include a carbon intensity standard, which Portland's code does not. Renewable diesel, a chemically identical "drop-in" replacement for petroleum diesel, was not available in 2006 and does not meet the definitions in the current RFS. Now, renewable diesel is projected to have a growing market share by 2025 (See Cost Analyses).<sup>3</sup> Recognizing these landscape changes, BPS staff began to investigate an update to the RFS in 2018. (See Project Timeline.)

In January 2020, Portland City Council moved authority to implement the RFS from the Bureau of Development Services to the Bureau of Planning and Sustainability. City Council directed

BPS to make recommendations to update the RFS to help meet the City's 100% Renewable Energy Resolution (this resolution remains one of the City's north star policies on climate).

In June 2020, Portland City Council adopted the Climate Emergency Declaration, acknowledging that the Portland metro area faces a human-made climate emergency and that frontline communities are the least responsible for – but most impacted by – climate change. The Declaration amended the City's targets for carbon emissions to at least a 50% reduction by 2030 and net-zero carbon emissions before 2050.

***BPS's proposed code amendments to the Renewable Fuel Standard are critical to help meet the City's climate and renewable energy goals.***

## 2. Biofuels primer

Biofuels are any fuel that is derived from plant or animal matter rather than fossil-fuel based sources. "Biofuels" and "renewable fuels" are used interchangeably. The three primary biofuels are:

- Biodiesel (B).
- Renewable diesel (R); and
- Ethanol (E).

The number following the letters B, R, or E refers to the percentage of biofuel in that blend. Therefore, B20 means a blend of 20 percent biodiesel and 80 percent petroleum diesel. E10 means a blend of 10 percent ethanol and 90 percent gasoline. R99 means a blend of 99 percent renewable diesel and one percent petroleum diesel.<sup>4</sup>

**Biodiesel** is a renewable, biodegradable fuel manufactured domestically from vegetable oils, animal fats, or recycled restaurant grease. The current RFS is five (5) percent biodiesel in every gallon of diesel sold at the pump.

**Renewable diesel** is a renewable replacement fuel for diesel that is chemically identical to petroleum diesel. It is considered a "drop-in" fuel; an easy replacement for diesel that requires no engine retrofits. Because of its ease and performance, it is well-liked by large fleets, including our own CityFleet, which has been using R75 - R99 since 2015. TriMet also runs all its buses on R99.

**Ethanol** is also known as ethyl alcohol or grain alcohol and is made from corn, sugar cane, or from feedstocks made of cellulose. The current RFS requires a 10 percent ethanol blend in

every gallon of gasoline. (The code amendment proposal does not affect gasoline or ethanol. The current 10 percent ethanol requirement will remain unchanged.)

### 3. Why the RFS matters

The RFS delivers four primary outcomes:

- Carbon emissions reductions and environmental health.
- Human health improvement.
- Local economic benefit.
- Energy independence.

#### **Carbon emissions reductions and environmental health**

Diesel fuel combustion in vehicles and off-road equipment is the fourth largest source of carbon emissions in Portland, representing about 14 percent of total local emissions and 35 percent of transportation emissions. Replacing petroleum diesel is a critical component of Portland's pathway to decarbonization.

Oregon snowpack and, therefore, Portland's water supply is affected by the release of black carbon emissions coming from diesel engines. Black carbon becomes black snow when particulate lands on snow and acts as a heated blanket, melting snowpack on our mountains. Black carbon is anywhere from 450 to 1,500 times more potent greenhouse gas than carbon dioxide (CO<sub>2</sub>) emissions, but it dissipates very quickly, in one to six weeks. The Intergovernmental Panel on Climate Change (IPCC) states that reducing black carbon is one of the fastest and easiest ways to slow down local warming. Renewable fuels emit thirty percent less black carbon so have an immediate positive impact on our local environment.

Some advocates believe that renewable fuels are a misstep and will delay full electrification of the transportation sector. However, diesel vehicle replacement is lagging and the medium and heavy-duty classes of vehicles that currently run on diesel will take much longer to electrify than gasoline-powered vehicles. There are very few heavy-duty electric vehicle (EV) models on the market today, as compared to over thirty models that exist in the passenger category. In fact, electric and fuel cell trucks are not estimated to have much market share even by 2040, according to forecasts by IHS Markit and Bloomberg.<sup>5</sup>

BPS staff agree that in the long-term, electrification of heavy-duty vehicles is likely, but it will take many years for the market to develop and for equipment costs to reach the right level for consumer adoption of new equipment at scale. Best available science is unequivocal that the climate crisis is accelerating daily and that carbon emissions reductions in the near term (i.e.,

prior to 2030) are critical to averting the worst impacts of climate change.<sup>6</sup> Because a replacement for petroleum diesel is available now, this code amendment will ensure that Portland recognizes valuable near-term carbon reductions and immediate human health improvements.

### **Human health improvement**

Over 90 percent of Oregonians live where exposures to diesel exceed the Oregon public health benchmark for diesel particulate.<sup>7</sup> Diesel engines built before 2012 are disproportionate emitters of fine (less than 2.5 microns) and ultrafine (less than 0.1 microns) particulate aerosols. Heavy-duty diesels for instance represent 9.8 percent of the total Oregon motor vehicle fleet but are responsible for about 46 percent of all fine particulate emissions from motor vehicles in Oregon.<sup>8</sup> Heavy-duty diesels built after 2012 do not have the same health impacts, but still emit carbon.

Diesel particulate matter is a known cause of numerous lung diseases and exposure to it increases the risk of respiratory diseases like Covid-19. For example, the California Office of Environmental Health Hazard Assessment listed diesel exhaust among the five most hazardous substances to children because of its potent contribution to asthma and other respiratory illnesses among children.<sup>9</sup>

The human health issues posed by diesel combustion affect all Portlanders, but they disproportionately affect communities of color and low-income populations that have long been relegated to living along highways, arterials, and freight corridors – a result of past racist zoning and lending practices that still cause harm today.

BPS review of air quality research into the impact of biofuels has revealed some complexities with other pollutants. In order to fully understand these complexities, BPS is contracting with ERG to conduct modeling of the air quality impacts of the RFS policy proposal. The modeling will account for Portland's specific vehicle fleet mix, climate, and proposed renewable fuel blends.

However, it is clear that the lower carbon intensity fuels that the RFS is intended to promote will have an immediate positive impact on reducing diesel particulate and black carbon. Diesel particulate is one of the main air quality issues plaguing Portland and City Council has the clear authority to address it through the RFS.

### **Local economic benefit**

One of the main drivers for this code amendment is that market signals point to a significant increase in the production of biofuels, especially biodiesel and renewable diesel.<sup>10</sup> This policy helps bring certainty to an emerging market; it signals to the market that the transition to

renewable fuel is the preferred future. It will drive growth to markets that Portland is well-positioned to take advantage of because of our existing fossil fuel infrastructure and temperate climate.

Requiring renewable fuels, especially those produced in Oregon, has the benefit of keeping dollars in our local community and supporting local businesses. Biodiesel and renewable diesel both offer opportunities to build a more inclusive, circular, local economy, in which waste products like fats, oils, and grease can be reused to become valuable fuel products.

The introduction of biofuels into our local fuel supply has real potential to stabilize diesel prices. Biodiesel has been less expensive than petroleum diesel over the last several years, in part because of the Clean Fuels Program. (See Cost Analyses.)

### **Energy independence**

We can reduce our reliance on fossil fuels by growing a local economy for renewable fuels. Aside from their planet-warming emissions, we need look no further than the war in Ukraine for a stark example of the human and environmental costs of relying on fossil fuels. Fossil fuels remain inextricably linked to bloody conflict around the world. It's well past time to reduce our reliance on them.

In sum, updating Portland's Renewable Fuels Standard is a straightforward and efficient way to:

- Replace dirtier diesel fuels with cleaner, renewable options.
- Improve human health by removing a substantial amount of diesel particulate.
- Advance a local, circular, inclusive economy that is more independent from the global fossil fuel industry.

## **4. Proposed amendments**

The Bureau of Planning and Sustainability (BPS) recommends the following two changes to Portland's Renewable Fuel Standard.

**a. Accelerate the increase in percentage of renewable fuels by volume**

***At full implementation, the proposal would replace 99 percent of petroleum diesel sold in the city with renewable fuels by 2026.***

The proposal takes a fuel-neutral approach to increasing the percentage of renewable fuels on a quick timeline that is supported by BPS’s research and industry stakeholder engagement. Fuel neutral means that as long as retailers can meet the standard, the City remains agnostic as to the specific blend percentages of biodiesel versus renewable diesel. Any combination of biodiesel and renewable diesel can be supplied at the pump.<sup>11</sup> Table 1 shows the proposed schedule for phasing in renewable fuels.

Table 1. Proposed phase-in of blending requirements (percent by volume), 2023-2026:

<b>Fuel Type</b>	<b>Current</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>
% Petroleum diesel	95	85	65	35	1
% Renewable fuels	5	15	35	65	99
% Total	100	100	100	100	100

The minimum volume of renewable fuel required is currently set at 5 percent biodiesel. The first proposed change occurs in 2023, when the renewable fuel requirement increases to 15 percent. It then increases annually, so that by 2026, all diesel fuel sold in the city of Portland would be 99 percent renewable. Due to Federal blending credits, that incent blending biofuels with fossil fuels, one percent of petroleum diesel will remain in the fuel blend after 2026.

The proposed changes apply to the sale of diesel fuel only. The standard does not apply to the use of diesel fuel in the city. It also does not apply to gasoline (the existing 10 percent ethanol requirement will remain unchanged.)

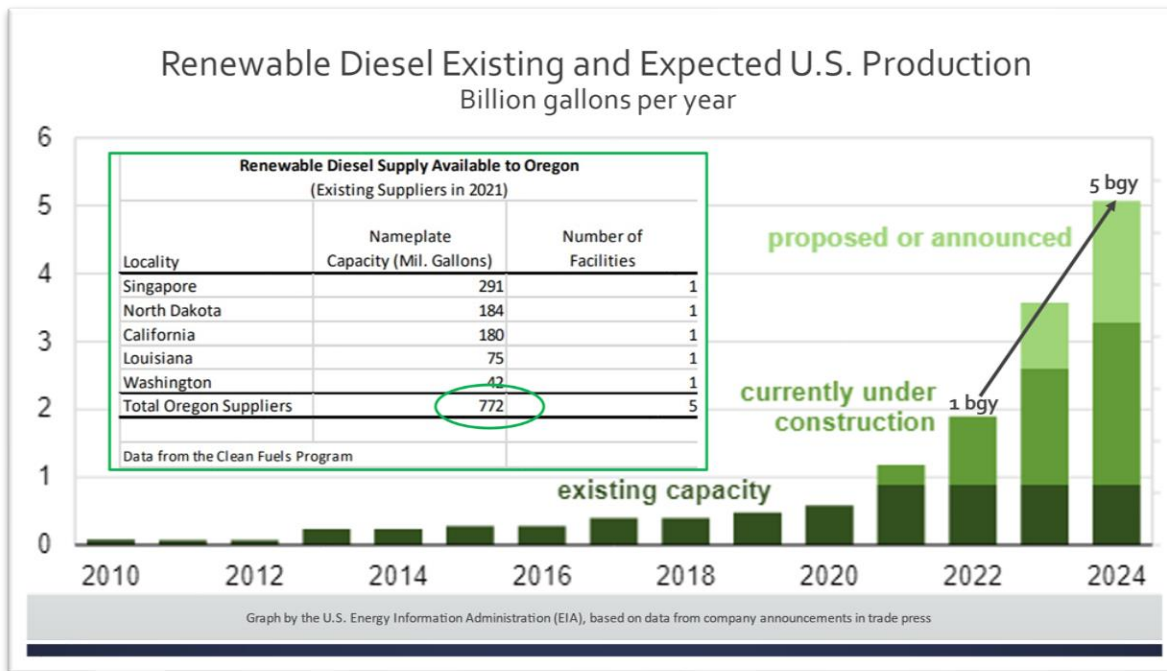
**Rationale for proposed schedule**

BPS commissioned a consultant to conduct extensive fuel research, interviews, and stakeholder engagement to guide policy development. We listened to suppliers, producers, and other key actors in the renewable fuels industry to develop an aggressive but feasible phase-in schedule. BPS tested the phase-in schedule with local suppliers and producers in a workshop held in September 2021 that included small local companies and global fossil fuel suppliers like BP. We heard consensus that achieving 99 percent renewable by 2026 is feasible. Advocates for statewide policy to replace petroleum diesel have promoted a similar timeline.

The uncertainty that exists lies in the supply of renewable diesel (RD) and whether that will materialize on the projected schedule. This is forecasting and forecasts can be wrong. Nobody truly can say what will happen, but we have relied upon the best data and industry insight available to us.

Plenty of RD is supply forecasted to enter the US market in the proposed timeframe. Figure 1 shows a 400 percent increase in US production in the next two years.

Figure 1. Existing and expected production of U.S. Renewable Diesel



Source: Energy Information Administration, Oregon DEQ

According to the Oregon Clean Fuels Program, the current supply available to Oregon is well over 700 million gallons per year. Portland needs about 110-120 million gallons to replace current petroleum diesel consumption.

To manage the uncertainty regarding the supply forecast, BPS proposes to convene an advisory group of fuel producers and suppliers to weigh in on the phase-in schedule over the next few years to allow us to adjust course if supply becomes more limited than forecasted.

On the biodiesel front, there are no limitations on supply. In fact, certain retailers in Portland already blend up to twenty percent in order to keep per gallon prices lower.

Finally, Title 16.60 already gives the Director of BPS interim rule authority, and this will not change. This authority allows the Director to temporarily suspend or modify the biofuel content requirements based on a determination that the requirements are *temporarily infeasible due to economic or technical circumstances*. The Director’s determination shall be made by issuing an order and filing a report with the City Council.

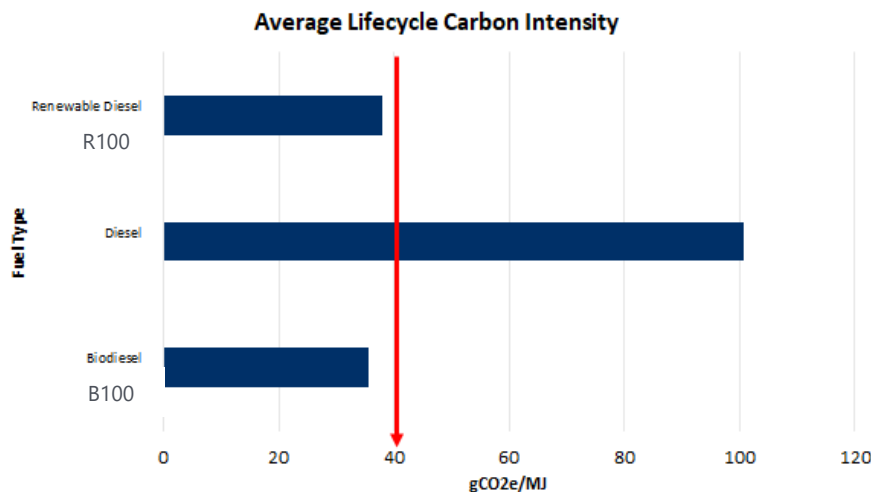
**More industry input will be sought**

BPS will release the code amendment proposal for public comment in July 2022, to elicit broader industry input on the question of timeline feasibility and blend percentages. This feedback will inform if or how BPS needs to adjust the proposed timeline and blend percentages before bringing an ordinance to City Council.

**b. Add a carbon intensity standard<sup>12</sup>**

In addition, BPS is proposing a carbon intensity standard for renewable diesel and biodiesel, aligned with the Oregon Department of Environmental Quality Clean Fuels Program. Renewable fuels used to meet the standard will need to have a lifecycle carbon intensity of 40 grams of carbon dioxide equivalent per megajoule (gCO<sub>2</sub>e/MJ). A carbon intensity standard ensures that renewable fuels in Portland are truly lower carbon across their entire lifecycle (from production to utilization).

Figure 2. Average lifecycle carbon intensity of fuels in Oregon



Source: BPS, Oregon Clean Fuels Program



Carbon intensity is the measure of lifecycle greenhouse gas emissions from transportation fuels. The lower the fuel's carbon intensity is, the lower its total emissions are relative to the fuel it displaces.

Carbon intensity allows us to compare different fuels side-by-side in terms of the total greenhouse gas impact. The lifecycle carbon intensity measured by the Oregon Clean Fuels program encompasses emissions from the extraction, refining or production, transportation to a dispensing facility, and combustion of the fuel. This means that the carbon intensity accounts for not just the feedstock (e.g., soybean, canola, waste grease, tallow, etc.), but also any fuels used in the production process, supply chain transportation, and even a land use factor that accounts for the land use impacts of loss of agricultural land or deforestation. This means that Oregon's carbon intensity values address many stakeholder concerns about fuel feedstock, production practices, distance the fuel travels to Portland.

Table 2 shows the volume-weighted carbon intensity of biofuels as reported by Oregon DEQ. For biodiesel (B100) and renewable diesel (R100), the two fuels implicated by the proposed update to the RFS, the average carbon intensity in Oregon is below 40 grams of carbon dioxide equivalent per megajoule (expressed as gCO<sub>2e</sub>/MJ). Blended products, like B20 with 80% petroleum diesel, have a higher lifecycle carbon intensity than B100 shown in Figure 2 and Table 2.

A carbon intensity of 40 is a good starting point because it ensures lower carbon fuels are used in Portland to meet the RFS, without overly constraining the market to the lowest carbon fuels that are in more limited supply. The carbon intensity of biodiesel and renewable diesel in Oregon has increased a bit because the lowest carbon feedstocks are in high demand in markets like California with higher credit values. Beginning with an even lower carbon intensity standard will risk higher diesel fuel prices if supply becomes constrained. Instead, BPS proposes to start with a level that the average products in Oregon already meet. As the average CI in Oregon declines, the carbon intensity standard can be adjusted down to ensure we continue to use the lowest carbon products here in Portland.

Table 2: Oregon average carbon intensity of approved pathways by fuel type, 2016 – 2021

Year	2016	2017	2018	2019	2020	2021
<b>Fuel type</b>	<b>Straight Average Per Year</b>					
Biodiesel B100	33.34 <sup>a</sup>	34.08 <sup>a</sup>	35.31 <sup>a</sup>	34.80 <sup>a</sup>	35.52 <sup>a</sup>	34.60 <sup>a</sup>
Ethanol	62.45 <sup>a</sup>	61.51 <sup>a</sup>	58.85 <sup>a</sup>	57.57 <sup>a</sup>	57.12 <sup>a</sup>	51.70 <sup>a</sup>
Renewable Diesel R100	n.a.	33.60	31.94	32.11	34.53	33.57
Renewable Propane	n.a.	n.a.	39.26 <sup>b</sup>	39.26 <sup>b</sup>	55.00 <sup>b</sup>	32.21
Renewable Natural Gas	34.32 <sup>a</sup>	33.30 <sup>a</sup>	34.65 <sup>a</sup>	34.89 <sup>a</sup>	33.39 <sup>a</sup>	35.69 <sup>a</sup>

- Unless indicated otherwise, all values are based on facility-level carbon intensity values certified and used for reporting fuel volumes under the CFP.
- n.a. indicates no fuel pathway and CI values were applicable under the CFP in that year.
- <sup>a</sup>Values include temporary and facility-level fuel pathway CI values
- <sup>b</sup>Temporary fuel pathway CI values available only

Source: Oregon Department of Environmental Quality

Low-carbon fuel producers across North America and beyond are continuously evaluating ways to lower the carbon intensity of their fuels by sourcing low-carbon feedstocks, improving the efficiency of their operations, integrating renewable energy into their production, increasing the production of co-products from what was previously considered waste, or by considering carbon capture and sequestration practices. Programs like the Oregon Clean Fuels program drive these investments in lower carbon intensity as the lower carbon products generate more credits, and therefore, more profit for producers. This has resulted in the carbon intensity of ethanol and biodiesel used in Oregon dropping since the start of the Oregon Clean Fuels program.

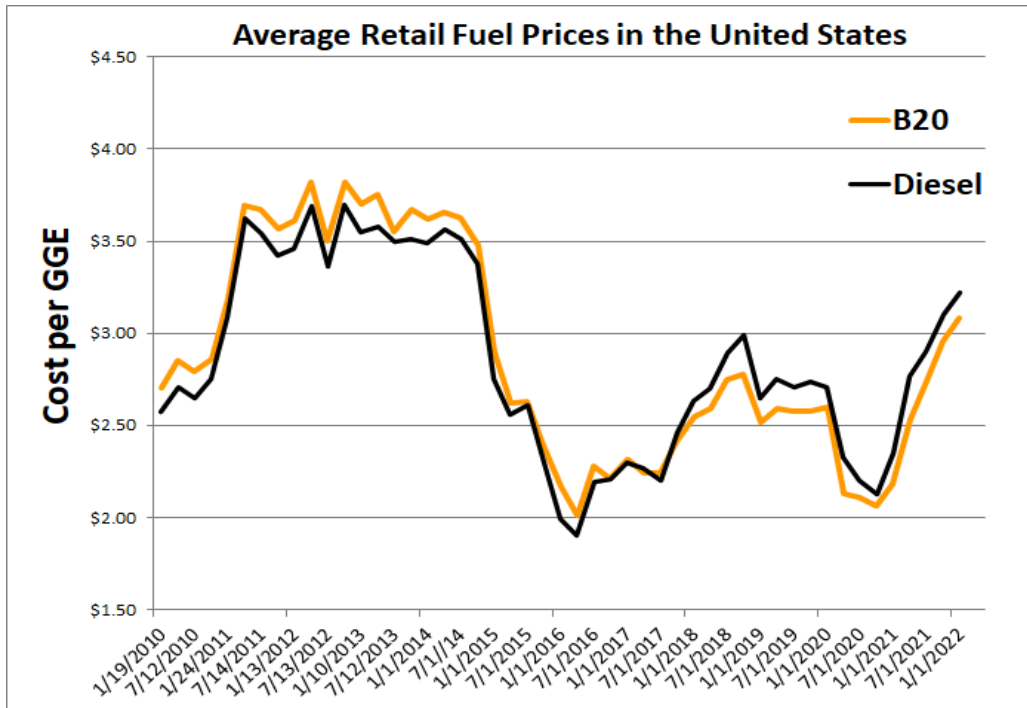
## 5. Cost analyses

BPS acknowledges the high sensitivity around inflation and fuel prices in the current moment. BPS believes opponents will frame the RFS proposal as a policy change that will increase diesel prices at the pump, threatening economic harm to people who can least afford it. Below we present the best available data on which staff based the code amendment proposal.

### Biodiesel cost analysis

Biodiesel data are only available at the national level. Figure 3 shows that biodiesel has been less expensive than petroleum diesel since 2017. In Oregon, biodiesel per gallon is even less expensive, due to the Oregon Clean Fuels Program credits. Privately disclosed local data confirms these national statistics.

Figure 3. Average Retail Fuel Prices in the United States 2010 – 2022



Source: [afdc.energy.gov/data](https://afdc.energy.gov/data)

Some retailers in Portland, like Safeway, currently blend up to 20 percent biodiesel with diesel fuel to reduce the per gallon cost at the pump.

Feedback from biodiesel producers and suppliers has been unequivocal that there is ample supply of biodiesel to require 15 percent renewable fuel in 2023 and beyond, without negative cost impacts.

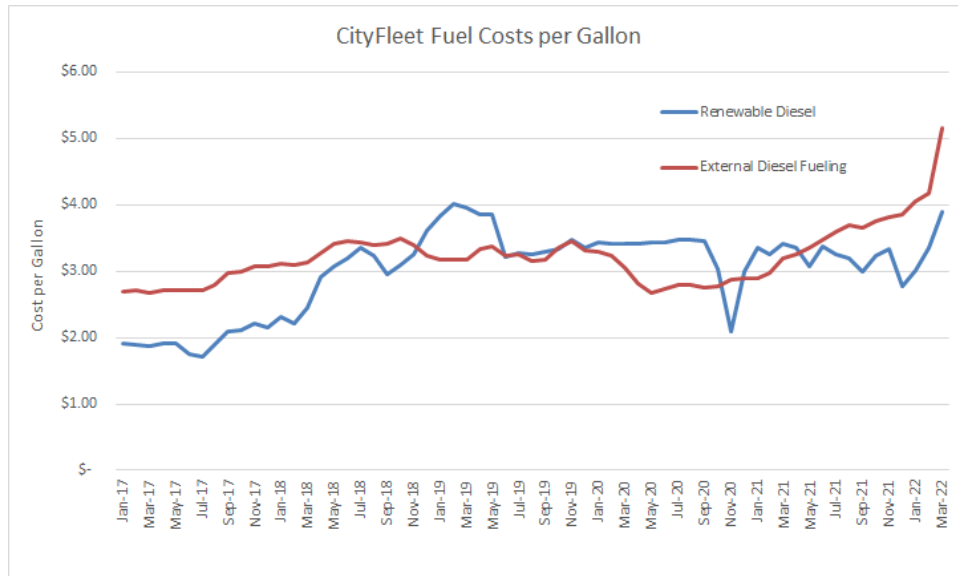
### Renewable diesel cost analysis

Renewable diesel is a relatively limited product today that only large purchasers like City of Portland and TriMet can access through negotiated contracts. This means that prices are not publicly available. Prices through negotiated contracts vary depending on contracted volume and supplier but tend to track close to the cost of fossil diesel when federal and state incentives are added

One example that we can disclose data for is City of Portland fueling costs. The City of Portland has used blends of renewable diesel from 75-99% since 2015. CityFleet has a negotiated

contract for renewable diesel, which generally has had a lower price per gallon than petroleum diesel. Figure 4 shows the cost advantage of renewable diesel.

Figure 4. CityFleet fuel costs per gallon



Source: Portland CityFleet. The data reported for renewable diesel is the standard diesel fuel product purchased through the City's fuel contract and delivered to the City of Portland fleets. The City has been able to obtain renewable diesel 75-99% of the time. Sometimes this product is unavailable and thus the data includes a small share of petroleum diesel fuel. The data for external diesel fueling, means diesel fuel purchased outside of the City's fuel contract from retail fueling stations. In most cases external diesel fueling is B5.

Some entities have privately disclosed similar pricing and other entities have shared that their pricing is pegged to the cost of B5/petroleum diesel blend.

The intent of the RFS update is to bring renewable fuels to retail fuel stations, which will help create more transparency of costs and increased use. The RFS is intended to create certainty for demand for renewable diesel to help direct more supply and stabilize prices, just as has happened with biodiesel since the first RFS was adopted in 2006.

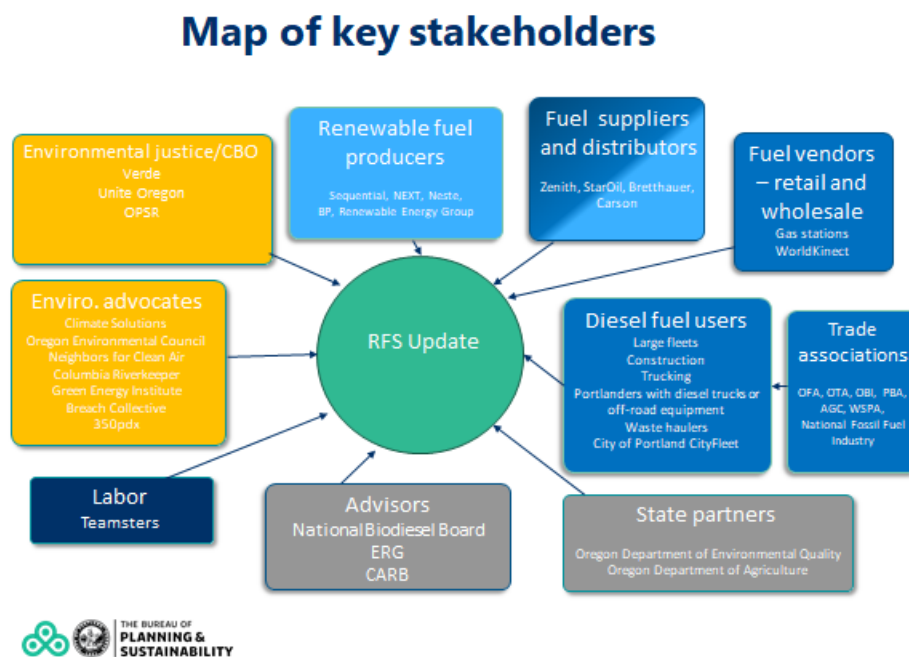
The uncertainty of fuel supply and price are why BPS proposes to phase in higher renewable fuel blends in the later years. Costs will remain speculative, so BPS intends to convene an advisory group of producers and suppliers to monitor supply and price throughout the phase-in schedule. And, as noted above, the code will continue to allow for immediate course correction, through interim rule authority, should supply of renewable diesel fail to materialize by 2025-2026.

## 6. Stakeholder engagement

BPS has engaged with numerous parties since 2018 to develop the code amendment process. Figure 5 below shows a map of stakeholders.

- Blue stakeholders are those most directly impacted by the code amendments.
- Yellow stakeholders represent environmental justice and community-based organizations, along with more historically privileged advocates in the environmental community.
- Gray stakeholders represent state partners and advisors.
- Labor is called out specifically due to its unique role in the ecosystem.

Figure 5. Map of stakeholders in the RFS code amendment process



## 7. Project timeline

- 2006 – City of Portland adopts Renewable Fuel Standard (RFS)
- 2007 – State of Oregon implements same standard statewide.
- 2017 – City Council adopts 100 Percent Renewable Energy Resolution.
- 2019 – 2021 – City staff track statewide legislative efforts and conduct policy research.
- January 2020 – City Council directs Bureau of Planning and Sustainability to align the RFS to meet the City’s 100% renewable energy resolution.
- June 2020 – City Council adopts Climate Emergency Declaration.
- 2021 – 2022 - City staff work with consultant to conduct extensive fuel research, interviews, and stakeholder engagement to guide policy development., including:
  - Industry stakeholder workshop (September 2021)
  - Environmental advocates and other community-based organizations are provided opportunities to offer input in policy development through asynchronous learning and interviews (Winter 2022)
  - Further one on one meetings with engaged stakeholders review policy drafts (Spring 2022)
  - Public stakeholder meetings and economic opportunities showcase to correspond with public comment period (Summer 2022)
- Early 2022 – Code amendments drafted.
- May-June 2022 – Early engagement on code amendment drafts.
- August-September 2022 – Draft policy available for public comment.
- Fall 2022 – City Council legislative process.

## Endnotes

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<sup>1</sup> [Portland City Code Chapter 16.60 Motor Vehicle Fuels.](#)

<sup>2</sup> [Oregon Clean Fuels Program, California Low Carbon Fuel Standard.](#)

<sup>3</sup> US Energy Information Administration long-term forecast for overall diesel demand (which includes biofuels) is flat. Oregon Department of Transportation (ODOT) medium-term forecast shows flat demand for diesel in the short term. DEQ Office of Economic Analysis (Oregon Clean Fuels Program) short-term forecasts project robust growth of biofuels. Documented by BPS staff as part of the fossil fuel terminal zoning amendments remand response.

<sup>4</sup> The one percent of petroleum diesel remaining allows fuel importers and suppliers to take advantage of federal fossil fuel blending credits

<sup>5</sup> NTEA-The Association For The Work Truck Industry. "Aging Trucks Create More Service Opportunities", (2019) Accessed on June 8, 2022 from [Aging trucks create more service opportunities \(ntea.com\)](#)

<sup>6</sup> IPCC Sixth Assessment Report, The Summary for Policymakers of the IPCC Working Group III report, Climate Change 2022: Mitigation of climate change, <https://www.ipcc.ch/report/ar6/wg3/>, 2022. And, "Why Half a Degree of Global Warming Is a Big Deal," <https://www.nytimes.com/interactive/2018/10/07/climate/ipcc-report-half-degree.html>

<sup>7</sup> U.S. Environmental Protection Agency, "2014 NATA: National Air Toxics Assessment," 2014, accessed on June 8, 2022, [2014 NATA: Assessment Results | US EPA](#)

<sup>8</sup> Oregon Department of Transportation, "2014 Vehicle County Registration," 2015, [Oregon motor vehicle registrations by county as of ... - 2014 | Oregon State Library](#); Environmental Protection Agency, "2014 National Emissions Inventory Data," 2015, accessed on June 8, 2022 [2014 NATA: Assessment Results | US EPA](#)

<sup>9</sup> California Office of Environmental Health Hazard Assessment, "Prioritization of Toxic Air Contaminants - Children's Environmental Health Protection Act," October 2001, accessed on June 8, 2022, at <https://oehha.ca.gov/air/report/document-available-prioritization-toxic-air-contaminants-childrens-environmental-health>

<sup>10</sup> Renewable diesel production facilities in PNW include: 1) Cherry Point, WA. (South of Bellingham). BP-owned. A \$45 million dollar investment is expected to double the refinery's renewable diesel production capability to an estimated 2.6 million barrels a year. Available 2022. 2) Port Westward, Oregon facility is in permitting stage. If permitted, it will be capable of producing more than 37,500 barrels a day at initial start-up, growing to more than 50,000 barrels a day at full capacity. Available 2024.

<sup>11</sup> The code has labeling and disclosure requirements. Fuel retailers must label and disclose what they are selling, so consumers are clearly aware of what products and blends they're purchasing at the pump.

<sup>12</sup> Much of the content about carbon intensity comes from the Oregon Clean Fuels Program.