



Renewable diesel fuels are attractive alternatives to petroleum distillate fuels.

Renewable diesel is a hydrocarbon that is chemically equivalent to petroleum diesel and can be used as a drop-in biofuel. This means that renewable diesel is a completely interchangeable substitute for conventional petroleum-derived hydrocarbons (gasoline, diesel, and jet fuel) and can be used without having to modify the engine's fuel system.

Renewable diesel is produced from biomass feedstock, such as soybean oil, using a hydrogenation process that meets the American Society for Testing and Materials (ASTM) specification D975 for petroleum diesel.



Soybean field ready for harvest

Renewable diesel blends

Renewable diesel can be seamlessly blended with petroleum diesel and/or biodiesel in various ratios.

The federal Renewable Fuel Standard requires that non-petroleum-derived diesel fuels, including renewable diesel, must be blended with at least 1% petroleum fuel. Renewable identification numbers (RINs) are used to show compliance with the standard.

Renewable diesel blended with petroleum fuel is labeled with an R followed by the percentage of the renewable diesel content.

For example, a blend of:

- 20% renewable diesel and 80% petroleum diesel is called R20.
- 20% biodiesel and 80% renewable diesel is called B20R80 to make a 100% biofuel.
- 20% biodiesel, 20% renewable diesel, and 60% petroleum diesel is called B20R20.

What is R99?

A blend of 99% renewable diesel and 1% petroleum diesel is called R99. R99 diesel cuts CO₂ emissions by 50% or more ([NREL](#)).

Other advantages noted by R99 users include:

- Lower mechanical costs of operation.
- Less wear of the diesel particulate filter system on modern diesel trucks and fewer regenerations of the system.
- Improved fuel storage stability.

Is renewable diesel the same as biodiesel?

No. Biodiesel is produced using process is called transesterification, where the feedstock (mainly soybean oil) reacts with an alcohol in the presence of a catalyst like lye.

Biodiesel meets the ASTM specification D6751. It is approved for blending with petroleum diesel/distillate. Most U.S. biodiesel is consumed as blends with petroleum diesel in ratios of 2% (B2), 5% (B5), and 20% (B20).

Much of the petroleum diesel fuel sold in the U.S. contains up to 1% biodiesel because it provides lubrication qualities that can prolong the life of some engine components.



Renewable diesel pipeline

Renewable diesel production

From January 2022 to January 2023, the U.S. capacity for producing renewable diesel and other biofuels increased by 1.25 billion gallons per year – a 71% increase.

Rising targets for state and federal renewable fuel programs and biomass-based diesel tax credits are driving this growth in U.S. renewable diesel capacity.

In January 2023:

- 11 states reported sites with renewable diesel and other biofuels production capacity, up from six states in 2022.
- U.S. production capacity of renewable diesel and other biofuels reached 3 billion gallons per year, surpassing U.S. biodiesel production capacity for the first time.

New and expanded renewable diesel projects

Renewable diesel projects are coming on line around the U.S., including in the Pacific Northwest. Because renewable diesel can be co-processed with petroleum diesel, existing petroleum refineries can be converted for renewable diesel production with only modest retrofits

The BP Cherry Point refinery near Bellingham, WA, now produces 110 million barrels per year of renewable diesel by co-processing petroleum oil with bio feedstocks to produce renewable diesel.



Renewable diesel delivery and pricing

Renewable diesel is widely available in the Pacific Northwest via 10,000-gallon bulk deliveries. It can be transported in petroleum pipelines and sold at retail stations with or without blending with petroleum diesel.

Rack prices for all fuel types are quoted in the Oil Price Information Service for Anacortes, Seattle, Tacoma, Spokane, Pasco, and Portland. As of October 18, 2023:

- R99 cost \$2.99 to \$3.21 per gallon.
- #2 diesel cost \$3.26 to \$3.94 per gallon.

Renewable diesel procurement

Washington has a fuel supply contract (#08721) through the state Dept. of Enterprise Services (DES). Per the [Contract Summary](#), three suppliers provide fuel to seven geographic regions across the state.

To save on contracting costs, city and county agencies may use interlocal agreements to piggyback onto contracts with the state or other agencies. Currently 1,740 agencies have agreements that allow for the use of this and other state contracts ([Organizations with current contract usage agreements](#)).

For more information about fuel contract #08721, contact Shapoor Naveed, DES Contract & Procurement Specialist, at Shapoor.Naveed@des.wa.gov.

References

- [Biodiesel and Renewable Diesel - DOE](#)
- [Biofuels explained - Biodiesel, renewable diesel, and other biofuels - U.S. EIA](#)
- [FAQ Renewable Diesel - Star Oilco](#)
- [Today in energy - EIA](#)
- [U.S. Renewable Diesel Fuel and Other Biofuels Plant Production Capacity](#)



Green Transportation Program
Washington State University
Energy Program
905 Plum Street SE
P.O. Box 43165
Olympia, WA 98504-3165
Copyright © 2024
WSU Energy Program
WSUEEP24-003 - April 2024

Our Mission Statement: Creating Energy Solutions

It is the policy of WSU that no person shall be discriminated against in employment or any program or activity on the basis of race; sex/ gender; sexual orientation; gender identity/expression; religion; age; color; creed; national or ethnic origin; physical; mental or sensory disability, including disability requiring the use of a trained service animal; marital status; genetic information and/or status as an honorably discharged veteran or member of the military.