

RENEWABLE DIESEL

Renewable diesel is a diesel fuel made from oils and fats, such as waste greases, tallow, and palm oil. Major renewable diesel production facilities are located in Finland and Singapore. The United States also has several small plants located in Louisiana.

Renewable diesel vs. biodiesel

Biodiesel and renewable diesel are produced from similar materials, and are both used as alternatives for petroleum diesel. The main difference is how each fuel is made and their resulting chemical makeup. Renewable diesel is produced using a similar process as refining petroleum diesel, creating a fuel that has the same chemical properties as petroleum diesel.

Biodiesel is chemically different than petroleum diesel, but can be readily mixed with and substituted for petroleum diesel.

Drop-in ready

Although only a handful of U.S. diesel manufacturers, such as Mac and Volvo, have made statements supporting use of renewable diesel, other engine manufacturers are unlikely to warn against using renewable diesel as long as it meets the industry standard (ASTM) for petroleum diesel.

Reduces climate and air pollution

Renewable diesel offers the potential to reduce both greenhouse gas emissions and tailpipe pollution. Substituting renewable diesel for petroleum diesel can be very beneficial if the fuel is derived from low-carbon materials or feedstock. According to the California Air Resources Board, renewable diesel can reduce lifecycle greenhouse gas pollution by 15-80 percent compared to petroleum diesel, depending on the feedstocks used to produce the fuel.

Renewable diesel also emits fewer harmful tailpipe pollutants than petroleum diesel. The table below summarizes the results of a 2011 study conducted by University of California Riverside and University of California Davis, comparing the amount of tailpipe pollution reduced between pure renewable diesel (R100) and a 50% blend of renewable diesel and petroleum diesel (R50).

Pollutant	Pollution Reduction From R50 Blend	Pollution Reduction From R100
Particulate Matter (PM)	15%	34%
Nitrous Oxide (NOx)	5%	10%
Carbon Monoxide (CO)	8%	12%

Using renewable diesel instead of petroleum diesel -- in pure or blended form -- can eliminate air pollutants.

Other qualities to consider

Early indications suggest that renewable diesel may have some unique characteristics in comparison to petroleum diesel. These characteristics are likely to vary depending on where the fuel is produced and the fuel's particular feedstock.

What is renewable diesel?

Renewable diesel has the same molecular composition as petroleum diesel and is designed to meet the same ASTM specifications (D975).

Renewable diesel is made by introducing vegetable oils or fats into a refining process that is similar to the distillation process used to refine crude oil into petroleum diesel. This process is referred to as hydrotreating or hydrocracking.

Renewable diesel benefits:

- Ready to use – no vehicle conversion required
- Less air pollution
- Chemically same as petroleum diesel



These findings should be considered preliminary:

- **Cetane value.** Several evaluations have reported cetane values of renewable diesel nearly double that of petroleum diesel. A higher cetane value means the fuel combusts more completely, which can improve the performance of the engine and reduce pollution.
- **Lubricity.** Like ultra-low sulfur diesel, renewable diesel requires additives to meet the ASTM standards for lubricity.
- **Cloud point.** Several evaluations have reported very low cloud point for renewable diesel, making it extremely functional in lower temperatures.
- **Aromatics.** Renewable diesel has lower aromatic content than petroleum diesel, which can reduce the overall toxicity of the fuel and vehicle exhaust.
- **Oxidative stability.** Renewable diesel is reported to have very high oxidative stability, which should allow for extended shelf life.
- **Fuel density.** Renewable diesel is believed to have a lower density than petroleum diesel.
- **Toxicity.** Unlike biodiesel, renewable diesel does not reduce spill and contamination risk. Because of its shared chemical properties, renewable diesel has a toxicity risk similar to that of petroleum diesel.



Contemplating a shift toward alternative fuels?

Let Western Washington Clean Cities be your guide.

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About Western Washington Clean Cities Coalition

Western Washington Clean Cities Coalition is a not-for-profit membership organization dedicated to expanding the use of alternative fuels and advanced vehicle technologies. We provide education, technical expertise, and networking opportunities to help our members transition from petroleum to more sustainable energy choices.

Renewable diesel in Western WA:

Renewable diesel has yet to become readily available in Washington State.

Instead, the fuel is primarily consumed in California, where demand is highest. Due to California's low carbon fuel standard, fuel producers receive credits for selling renewable diesel and other clean fuels with a lower carbon intensity than petroleum diesel and gasoline.

