NESTE

Statement of Matt Leuck
Technical Services Manager, Neste US
Senate Energy and Natural Resources Committee Hearing to Consider Pending Legislation

July 28, 2022

Senator Heinrich, Senator Barrasso, and Members of the Committee:

My name is Matt Leuck. I am the Technical Services Manager at Neste US based in Houston, Texas. I appreciate the invitation to discuss S. 4038, the *Renewable Diesel and Sustainable Aviation Fuel Parity Act of 2022* and specifically why this legislation is important to expanding availability of low-carbon fuels for long-distance and heavy-duty vehicles.

Who is Neste?

Neste is the leading producer of such fuels. We are the world's largest producer of renewable diesel and sustainable aviation fuel, with an annual production of more than 1 billion gallons of renewable products. Our ongoing Singapore expansion project, and the pending establishment of a joint venture in California, will increase our total production capacity to more than 1.8 billion gallons by the end of 2023 and make us the only provider of renewable products with a production footprint on three continents.

Roughly one-third of our globally-produced renewable diesel volumes are sold and consumed in North America, with the majority of those gallons driven to California thanks to the state's long-standing Low Carbon Fuel Standard. To put that quantity into perspective, in 2020, 16% of California's diesel demand was met by renewable diesel and 40% of that renewable diesel was produced by Neste. Our product accounts for just over 6% of the state's total diesel pool.

Those gallons make a meaningful climate impact – last year, our renewable products enabled American cities and businesses to keep 3.3 million tons of new greenhouse gas emissions out of the atmosphere. In just one example, the Twin Rivers Unified School District near Sacramento achieved a major milestone in its climate action plan by switching 75 diesel-powered school buses to run on renewable diesel fuel provided by Neste. As a result, the district's fleet is now fully fossil-free – one of the cleanest in the country. Because renewable diesel is a drop-in fuel, Twin Rivers was essentially able to achieve this remarkable milestone overnight.

By simply changing fuels, Twin Rivers – the 28th largest school district in California with 26,000 students – will realize a 75% reduction in lifecycle greenhouse gas emissions from its diesel fleet of school buses. Importantly, switching to renewable diesel did not increase costs to the school district – or its taxpayers. Since the switch, Twin Rivers is keeping more than 520 metric tons of CO_2 out of the atmosphere each year – the equivalent of planting two dozen trees every day.

What is Renewable Diesel?

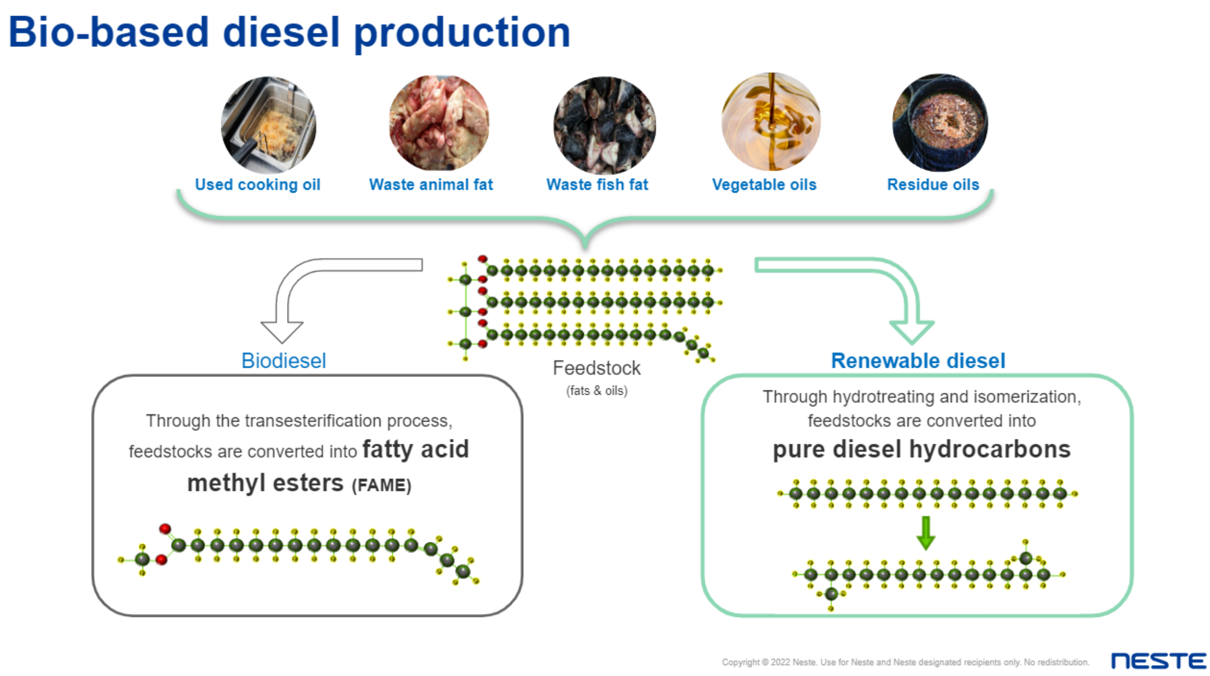
Renewable diesel is a hydrocarbon fuel that is fully fungible with fossil-based diesel fuels and can be blended with no issues at any rate up to 100%. It is important to recognize how renewable diesel – the product we produce and the subject of the labeling reform in S. 4038 – relates to fossil diesel and differs from conventional biodiesel.

Diesel fuel is a homogeneous mixture with elemental composition primarily of carbon and hydrogen, commonly referred to as hydrocarbons. While both renewable diesel and biodiesel can be made from the same feedstocks, the final products are not identical. The feedstocks used for bio-based fuels – used cooking oil, waste fish oil, tallow, technical corn oil, etc – all contain fatty acids (triglycerides) which are essentially three hydrocarbon molecules bonded together by other carbon, hydrogen and oxygen atoms. The goal of any fuel production is to break apart these fatty acids and isolate the hydrocarbon molecules.

When producing renewable diesel, the feedstocks previously mentioned are put into a two-step process. First is hydrotreating, where the feedstocks are reacted with hydrogen and catalyst material to break apart the triglycerides. One key advantage is the oxygen atoms from the fatty acid are removed (they bond with excess hydrogen to produce water that goes to a treatment facility) and this means the fuel molecules produced are pure hydrocarbons. Additionally, another “byproduct” of this production method is renewable propane. Hydrotreating also removes any impurities (sulfur, nitrogen, metals, etc) that might be in the feedstock stream. The second thing that happens is any irregularities (chemical double bonds) in the feedstock are corrected and the final product is a purely paraffinic, “fully saturated” hydrocarbon. From there these hydrocarbons are sent to an isomerization unit where the shape of the molecule is changed to allow for better, and precisely controlled, cold weather performance.

To produce biodiesel, a different process called transesterification is used. This is a chemical reaction using feedstock, an alcohol (e.g. ethanol) and an acid catalyst. This process will break the bonds of the triglyceride, but it is not able to remove the oxygen from the resulting fuel molecule. This is why biodiesel is not a hydrocarbon; it is a fatty acid methyl ester (FAME). While biodiesel fuel is able to power a diesel engine, it is not typically approved for use as a neat, or 100%, fuel. Nearly every engine manufacturer has a FAME biodiesel blend limit of 20% (B20) and any higher concentration can void warranties, cause engine damage via deposit formation, shorten storage life, and provide less than ideal performance characteristics during cold weather operation. For these reasons, the ASTM D975 diesel fuel specification only allows for 5% biodiesel to be blended into the final product that goes to market. There is another ASTM specification, D7467, that covers blends from 6% to 20% biodiesel (B6-B20), and D6751 which governs B100, but there is no ASTM specification for biodiesel fuel blends from B21-B99.

All of this means renewable diesel is a pure hydrocarbon fuel that meets the same ASTM D975 specification fossil diesel is required to meet. It is nearly contaminant-free by nature of the refining process (if you didn’t put it in to start, you don’t have to take it out); its paraffinic molecules are extremely stable and provide great storage life; and its higher cetane and aromatic-free makeup can lead to cleaner combustion and lower emissions.



Why not electrify instead?

Heavy-duty and long-distance vehicles are more difficult to decarbonize through electrification than light-duty transportation. While air- and watercraft are particularly challenging due to their distance traveled and weight considerations, long-distance electric truck transportation requires costly charging infrastructure that is not yet available. Likewise, critical heavy equipment needed when electric power is unavailable and large, diesel-powered fleets currently in operation will continue to require liquid fuels for decades to come.

From a climate perspective, that may not be a bad thing if the liquid fuel is renewable diesel. In some heavy-duty applications renewable diesel is as environmentally-friendly, or even moreso, than electrification. A recent study by Stillwater Associates LLC showed that fueling diesel vehicles with 100% renewable diesel resulted in three times larger cumulative GHG reductions by 2032 than EV scenarios.[1] The study examined medium and heavy-duty trucks operating in 10 Northeastern states (Connecticut, Delaware, Massachusetts, Maryland, Maine, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont) that have adopted California's low emission (LEV) and zero emission vehicle (ZEV) regulations.

Attaining those three times larger GHG reductions through new diesel engines and renewable diesel costs about a third of what it would to electrify the same fleets. The Stillwater study found:

> *"On a cumulative fleet conversion cost basis, turning over a medium and heavy-duty fleet of 10,000 vehicles in the region over to EV carries a price tag more than three*

---

[1] Stillwater Associates LLC, *Environmental Benefits of Medium- and HeavyDuty Zero Emission Vehicles Compared with Clean Bio- & Renewable-Fueled Vehicles 2022-2032* (July 19, 2022) https://dieselforum.egnyte.com/dl/MWHPcRW4e6

times higher than the equivalent cost for new technology diesel vehicles. The incremental EV cost for Class 7/8 vehicles is $250,000 for the vehicle and $45,000 for charging infrastructure." [2]

Not only do advanced technology diesel engines paired with renewable diesel fuel offer a more immediate greenhouse gas emissions reduction compared to EVs, they also reduce other criteria air pollutants. The same study found 98% particulate matter (PM) reductions for new diesel engines compared to EV's 95% PM reductions assuming power from U.S. average grid mix.[3]

In other words, some solutions are better suited to some problems than others – there is a need for all of them – and robust public policy can ensure options for customers to make cleaner changes sooner. As every fleet owner and equipment operator makes those choices, Neste and other renewable diesel producers will continue to offer a "today" solution to help meet science-based decarbonization goals.

Why does labeling matter?

While Neste welcomes the transparency S. 4038 would bring to the growing renewable diesel and sustainable aviation fuel markets through Energy Information Administration (EIA) reporting, the increased access to existing liquid fuel infrastructure the bill would bring through updating fuel dispenser labeling requirements is especially beneficial to the future of low-carbon liquid fuels.

As required by the Energy Independence and Security Act of 2007 (EISA07), the Federal Trade Commission (FTC) promulgated rules for the labeling of "biomass-based diesel." Those rules define "biomass-based diesel" as any "diesel fuel <u>substitute</u> produced from non-petroleum renewable resources that meets the registration requirements for fuels and fuel additives established by the [US EPA]... (emphasis added)".[4] At the time of promulgation of the first biodiesel amendments to the rule in 2008, and still today, fatty-acid methyl ester (FAME) biodiesel existed as the primary substitute for diesel fuel and is almost exclusively blended with diesel for on road use and for sale at retail pumps.

In layman's terms, switching to renewable diesel may be thought of as substituting a cleaner fuel for a dirtier one. But unlike FAME biodiesel, as defined by Section 205 of EISA07, renewable diesel that meets the same ASTM D975 standard as fossil diesel is not a *substitute* for diesel; it is chemically diesel fuel made without fossil feedstock.

Diesel fuels can, and very often do, enter a terminal from multiple sources including multiple refineries sharing a pipeline network. Renewable diesel as a hydrocarbon oil and approved for transport on the pipeline can utilize the same network. Because multiple sources are co-mingled in the pipeline, a separate labeling requirement for some of the products creates logistical obstacles and unnecessarily limits the inclusion of renewable diesel into the distribution system.

---

[2] Ibid
[3] Ibid
[4] 42 U.S.C. 17021(c)(4) incorporating the definition in 42 U.S.C. 13220(f)

By treating renewable diesel as a chemical “substitute” rather than fully fungible diesel fuel, the current labeling regime severely limits renewable diesel’s access to existing pipelines and storage facilities – effectively capping the maximum concentration of renewable diesel entering those systems at 5%. In order to move higher concentration of renewable diesel, refiners and terminal participants must agree to use a fixed concentration of renewable diesel or blend it further downstream. Blending at the terminal level requires segregated tank storage and shipping via trucks or railcars, all of which emits more carbon and costs more than co-mingled pipeline shipments.

Since consumers are not required by original equipment manufacturers (OEMs) and vehicle manufacturers to take any actions based on renewable diesel levels, applying the labeling requirements to renewable diesel is unnecessary, arbitrary, and provides no actionable protection information to the consumer. By correctly identifying renewable diesel without extraneous labeling requirements, renewable diesel may also be utilized in refinery blending (upstream from the terminals) to increase fuel supply flexibility while allowing refiners and subsequently consumers to capture lower costs and better quality fuels.

Alternatively, the inefficiencies caused by leaving the current labeling requirements in place actually harms consumers. The labeling requirements serve as a barrier to entry that discourages the construction of new renewable diesel production capacity, reducing future price competition, while the segregated distribution required increases global carbon emissions because truck and train distribution emits more carbon per product mile than fungible pipeline distribution.

Labeling requirements for FAME biodiesel, as S. 4038 correctly would leave in place, do provide important information to consumers. As described at length above, because of the differences in their chemical composition, biodiesel is subject to blending limits when used in engines while renewable diesel is not. **There is, however, neither a technical reason nor a consumer benefit to maintaining the current labeling requirements for any renewable diesel fuel that meets the ASTM D975 standard.**

Food vs. Fuel

Neste’s industry-leading sustainability requirements mean we always source our feedstocks in a way that protects air, forests, water, and human rights. Importantly, Neste does not source raw materials that compromise food security or contribute to land use change. This is our promise, and it’s non negotiable.

Our promise exceeds the requirements of public policy with respect to the “food versus fuel” discussion. California’s LCFS program, for example, limits the incentive to use certain crops for biofuels by applying indirect land use change penalties on a fuel’s carbon intensity score. This ensures the use of vegetable oils for fuel is not driving land conversion. That’s one reason that, today, soybean meal – not biofuels – is the primary driver of soybean production.

While soybean oil is a leading biofuel feedstock in the United States, Neste has also focused on waste and residue raw materials for over a decade. In 2021, the share of waste and residues increased to 92% of our total renewable raw material inputs globally. In the mid- to longer term, Neste expects to introduce novel vegetable oils derived from advanced, climate smart agricultural practices to its raw material portfolio. These advanced agricultural concepts include: “winter cropping” (i.e. using the full potential of agricultural land to cultivate additional crops without replacing the main crop cultivated on the same land during other seasons), “silvopasture” (e.g. cultivating crops on pasture land alongside cattle), and cultivating crops on severely degraded or abandoned land.

The advanced biofuels industry as a whole continues to move toward even more sustainable and lower carbon intensity feedstocks. Neste and other producers are exploring ways to increase the availability of emerging, even lower-quality waste and residue raw materials, including algae, forestry waste, municipal solid waste and converting power to liquids.

Conclusion

While heavy-duty and long-distance vehicles are more difficult to decarbonize than light-duty transportation in that they cannot easily electrify, there are significant opportunities to decarbonize these sectors fast without the need for additional infrastructure or new equipment. A low carbon fuels-centered approach for these sectors offers significant advantages, and the needed technologies and feedstocks are available. With appropriate policy support – like the labeling reform included in S. 4038 – these sectors can meet science-based decarbonization goals.