
These FAQs have been prepared to support the launch of Cleanaway's HVO100 demonstration.

For more information, please visit www.cleanaway.com.au/renewable-fuel/

1. What is the HVO100 demonstration?

Cleanaway is excited to be using a renewable diesel known as HVO100, in two of our vehicles, a front lift commercial truck and side lift municipal truck operating out of our south metro depot in Dandenong.

This alternative to fossil fuel takes used cooking oil to create a circular, lower carbon diesel that is made from 100% renewable raw material. Using HVO100 instead of fossil fuel reduces greenhouse gas (GHG) emissions by 91% (for methodology, see section on Sustainability; Life Cycle Assessment).

2. What is HVO100 exactly?

HVO100 is hydrotreated vegetable oil and it's made from used oils and fats, such as used cooking oil. It is a renewable diesel and reduces greenhouse gas emissions from the truck by 91% compared to fossil fuel. HVO100 can be used as a drop-in alternative to fossil diesel without the need to modify existing infrastructure.

HVO100 achieves a real emissions reduction. While CO₂ is emitted when HVO100 is combusted, this CO₂ is biogenic in nature – CO₂ that results from biogenic carbon sources are "[assumed to experience update and release within 100 years through photosynthesis](#)," (Source: Engage Vic Gov. page 40) and therefore this CO₂ is not counted in the national gas accounts.

When biogenic carbon sources are combusted, the resulting gas does not contribute new carbon into the existing carbon cycle. Burning fossil fuels, on the other hand, introduces new carbon that would have otherwise remained immobile in the subsurface into the atmospheric cycle.

That the combustion of HVO100 leads to real reductions in reportable emissions is significant in comparison to offsetting these hard-to-abate emissions.

3. What is Cleanaway seeking to achieve with this demonstration?

The heavy vehicle industry is a major contributor of greenhouse gas emissions in Australia. In 2022 the transport sector accounted for 19% of the country's total emissions (source: [DCCEEW](#)). Cleanaway sees HVO100 as a readily available, scalable and affordable option to reduce structural emissions. This program seeks to demonstrate the performance of HVO100 in our heavy vehicles to encourage a broader conversation about its use in Australia and improve commercial conditions to drive scale.

Supportive conditions would include:

- Relevant legislation and regulations to allow road use
- Rules around import
- Pricing excise
- State and federal incentives
- Increased usage by other heavy vehicle operators
- Increased demand from customers seeking to reduce Scope 3 emissions
- More OEMs approved HVO100 use in their engines.

4. How does HVO100 compare to fossil diesel?

HVO100 has a similar chemical composition as fossil diesel and because it is a diesel product it is considered suitable for all diesel vehicles and engines. It can also be blended with other diesel fuels. It has the [same high performance as regular diesel but produces 91% less greenhouse gas emissions](#).

5. What is Neste MY Renewable Diesel and how is it made?

Cleanaway's partner in this demonstration, Neste, is a manufacturer of a traceable HVO100 product, made from 100% renewable raw material.

Neste has patented the NEXBTL™ process to produce HVO which is an already mature commercial scale manufacturing process. Hydrogen is used to remove oxygen from, for example, triglyceride vegetable oil molecules and to split the triglyceride into three separate chains, thus creating hydrocarbons that are similar to existing diesel fuel components. This allows blending in any desired ratio without any concerns regarding fuel quality.

6. What assurance do you have about the provenance of the HVO100 feedstock?

The reason we have chosen to source Neste MY Renewable Diesel is their commitment to traceability and sustainability, underpinned by their rigorous Supplier Code of Conduct and Neste Responsible Sourcing Principle. [You can find more information about Neste's sustainability policies here.](#)

A document outlining the sustainability criteria is attached to feedstock which includes name of raw material, country of origin, certification, CO2 value. This sustainability criteria is part of the traceability process. Neste pride themselves on sourcing 100% renewable raw material and audit their suppliers regularly.

7. Is Neste MY Renewable Diesel the same as biodiesel?

No. HVO100 and biodiesel are two different fuels. The Neste MY Renewable Diesel in our demonstration uses renewable raw materials and suppliers meet strict sustainability criteria. The production process is also different.

Biodiesel is lower grade fuel based on fatty acid methyl ester (FAME). It's made from a reaction between the fats and an alcohol. Biodiesel feedstock is not held to the same standard of traceability and sustainability, because it is a lower grade of fuel, and it does not reduce carbon emissions to the same degree. Biodiesel also requires engine modifications and/or increased servicing.

Sustainability

8. What are the total life cycle emissions of Neste MY Renewable Diesel including transport and delivery?

The total lifecycle emissions of Neste MY Renewable Diesel, including collection of feedstocks, transportation, conversion from UCO to Neste MY Renewable Diesel, and its combustion, is 7.46 g CO₂eq/MJ. This is approximately a 91% savings vs. a total life cycle emissions of a landed fossil fuel diesel in Australia which has an estimated emissions of approximately 84.17 g CO₂e/MJ. The life cycle emissions for the conventional fossil fuel diesel includes emissions from extraction, transportation, distribution, and combustion.

Cleanaway's Head of Carbon worked with Neste, Viva Energy and other stakeholders to calculate the life cycle emissions specifically for Cleanaway and this demonstration project.

9. How does Cleanaway calculate the life cycle emissions of Neste MY Renewable Diesel and conventional fossil fuel diesel?

To calculate emissions associated with activities in the life cycle of Neste MY Renewable Diesel and conventional fossil fuel diesel, we employ four sources, including,

- The EU Renewable Energy Directive (RED II) ([Renewable Energy – Recast to 2030 \(RED II\) - European Commission \(europa.eu\)](#)), for emissions associated with the transportation, distribution, and processing of Neste MY Renewable Diesel;
- Australian Petroleum Statistics (APS) FY22 – 23, to set the sources of fossil fuel diesel supply;
- ECOINVENT ([About ecoinvent – ecoinvent](#)) for emissions associated with extraction, transportation, and distribution of conventional fossil fuel diesel; and
- Australian National Greenhouse Accounts Factors (2023) for emissions associated with the combustion of Renewable Diesel (Neste MY Renewable Diesel) and conventional fossil fuel diesel.

10. Does using HVO100 in fleet accrue Australian Carbon Credit Units (ACCU)?

In the future, the use of HVO100 could be used to generate ACCUs under [the land and sea transport method](#), “changing the energy source or the mix of energy sources used by vehicles”. We will explore how ACCUs can help with the economics if we choose to scale the use of HVO100 to decarbonise our wider fleet.

11. How is HVO100 circular if the combusted fuel is released into the atmosphere?

The renewable carbon emitted when HVO100 is combusted re-enters the atmosphere and can be reabsorbed into plants and earth, which contributes to growing new plants, which can go on to become HVO100. See question two for further explanation.

12. What reporting is available for customers who opt into an HVO100-powered service?

For our customers Cleanaway can provide their Scope 3 carbon emissions reporting using emissions factors from NGERs determination 2008.

NGERS is Australia's National Greenhouse and Energy Reporting Scheme. HVO100 is a NGERs reportable emissions reduction solution ([Schedule 1, Part 4](#)).

13. Does Neste MY Renewable Diesel contain palm oil?

The Neste MY Renewable Diesel procured for the fleet demonstration was produced from UCO only.

At Cleanaway, we do not support the use or sale of palm oil derived HVO and will only supply [International Sustainability and Carbon Certification \(ISCC\)](#) verified waste derived product into the market.

14. Does using AdBlu in HVO100 fuel mean the net carbon outcome of HVO100 is negative?

No, AdBlu is an additive used to help clean up the diesel emissions, it is not part of fuel. Combustion engines emit two types of emissions. HVO100 reduces greenhouse gases like CO₂, and AdBlu is used to reduce nitrous oxides (NO_x). A chemical reaction converts the harmful NO_x exhaust gases into nitrogen and water.

Collections and supply

15. Is all the UCO collected by Cleanaway being used to produce HVO100?

No, the UCO collected by Cleanaway goes to our onshore refineries for processing and is then sold as feedstock for HVO100, Sustainable Aviation Fuel (SAF) and to Australian farmers as animal feedstock.

16. Is that the batch that Cleanaway is using?

No, the Neste MY Renewable Diesel batch that Cleanaway is using in the demonstration was not be produced using Cleanaway's supplied UCO. Although, future batches may have been produced using some of Cleanaway's supplied UCO.

17. Why is the UCO processed in Australia and then sent offshore for refining?

Renewable diesel is in its infancy in Australia, so we don't currently have the infrastructure to produce the fossil fuel alternative from end-to-end. To aid in the production of HVO100, in 2023 Cleanaway acquired processing facilities as part of our AEO Scanline acquisition that undertake part of the refinement process before it is sent to Singapore to be completed by Neste. As part of the development of renewable diesel in Australia, we will continue to partner with government and industry as we build the infrastructure to produce HVO100.

18. How much HVO100 does one litre of used cooking oil produce?

As a rule of thumb, 1 litre of UCO turns into approximately 1 litre of HVO100. Yield is approximately 98%, factoring in potential loss, but hydrogen and chemicals are added in, as per Neste's process. Neste is Cleanaway's supplier of HVO100 for this demonstration.

Utilisation of HVO100

19. Is the price of HVO100 prohibitive?

As an innovative new fossil fuel replacement it makes sense that the cost of HVO100 reflects the limited onshore supply but as demand increases and supportive policy conditions develop, we should see more supply into Australia and more suppliers to drive competitive pricing.

20. Who else is using HVO100 in Australia?

HVO100 is already being used in different industries. Marr Contracting is using HVO100 to reduce greenhouse gas emissions from its tower cranes within the construction sector (100% pure – non blended).

McConnell Dowell is trialling using 100% HVO100 on its Franna Cranes. Another example would be the bp and BHP trial of a blended fuel, HVO100 and diesel blend, assisting BHP to reduce carbon emissions from its iron ore operations in Western Australia. Other examples are linked below:

Source: 1. <https://www.marr.com.au/news/australias-construction-industry-takes-first-step-towards-net-zero-with-landmark-transition-to-renewable-diesel/#:~:text=The%20subsequent%20approval%20from%20the,Marr's%20cranes%2C%20which%20are%20currently>

2. https://www.bp.com/en_au/australia/home/media/press-releases/bp-bhp-renewable-fuel-trial.html

3. <https://www.marinebusinessnews.com.au/2023/12/williams-jet-tenders-embraces-sustainability-with-approval-of-hvo100-fuel/>

4. <https://www.mcconnelldowell.com/news/renewable-diesel-trial>

21. Is HVO100 approved for use on Australia roads?

No. For this demonstration, Cleanaway received approval for a Section 13 variation under the *Fuel Quality Standards Act 2000* to enable the fuel to be used in our waste collections vehicles for the period of the demonstration. Key enabling policies and frameworks need to be established in Australia to make HVO100 widely available. This includes the [November 2023 consultation paper that Cleanaway has contributed to](#).

Performance of HVO100

22. What assurance do we have that HVO100 will not inhibit performance in Cleanaway's fleet?

Cleanaway has received confirmation from the OEMs of the trucks included in the demonstration that they have tested Neste's HVO100 on their engines and they have confirmed the use of HVO100 won't jeopardise the warranty.

23. Which vehicle manufacturers have approved Neste MY Renewable Diesel?

Major manufacturers of heavy vehicles such as Volvo Trucks, John Deere, Caterpillar, Scania, Mercedes-Benz, DAF and MAN have approved the use of Neste MY Renewable Diesel. If your brand is not listed, please contact Neste as they are continuously partnering with OEMs to do more testing and approval work around the world.

The future of HVO100

24. How does the use of HVO100 fit in to Cleanaway's decarbonisation roadmap?

Cleanaway is committed to incremental decarbonisation across our fleet and we hope to lead the way for heavy vehicles across Australia by investing in new and emerging technologies.

In 2019 we introduced our first battery powered side lift vehicle. While extensive testing determined that EV could not deliver the same payload and productivity as a diesel-powered truck, battery EV remains an important part of our decarbonisation journey for lighter vehicles.

As part of an Australia-first partnership with Viva, ARENA and other heavy vehicle operators Cleanaway has purchased two green hydrogen trucks, anticipated to come online in mid-2024. While green hydrogen is zero emissions it does require significant capital investment and it will take time to establish the skills and infrastructure for scale. Further into the future we are considering internal combustion hydrogen and opportunities related to our landfills, aligned with our Blueprint 2030 commitments to optimise landfill operations and find low carbon solutions.

25. What is the proposed roll out pending the successful 6-month demonstration?

Cleanaway seeks to incrementally reduce our emissions aligned with budget, customer and operational priorities. The increased use of HVO100 in our fleet relies on supportive government policies to remove barriers to access, compensate for additional costs and partnership with customers seeking to reduce their scope 3 emissions.

26. Is Cleanaway considering manufacturing HVO100 in Australia?

Cleanaway is excited about the potential for HVO100 to reduce emissions from heavy vehicle fleet. As demand increases and with the right policy conditions in place, we would be very supportive of onshore HVO100 manufacturing.

For further enquiries, please contact Mark Biddulph, Head of Corporate Affairs, mark.biddulph@cleanaway.com.au