



HVO: A NEW TOOL TO TACKLE SUSTAINABILITY CHALLENGES

Across the world, focus on reducing materials handling equipment fuel emissions is intensifying. Sometimes to meet corporate environmental objectives, and often hastened by local emissions standards and regulations.

For tough industrial materials handling applications, where diesel fuel has been the go-to fuel source for decades, this presents challenges. Interest in fleet electrification and advanced power sources such as hydrogen is growing, but overnight adoption is usually impossible. Introducing a fleet of trucks with zero tailpipe emissions requires investment, in new equipment, charging methods, and site infrastructure. In the case of port terminals, it requires planning in and out of the fence to ensure the smooth transition of goods. Depending on truck and fleet size, this can take years to plan and implement. It also relies on suitable grid supply being available.

What's more, for some of the biggest trucks, alternatively powered options are not yet widely commercially available. And securing investment for technologies that are not yet seen as tried and proven can be complex.

Achieving zero emissions operations may be the end goal. However, what is now clear is that there are options that are available right now for businesses keen to reduce their truck emissions as part of the journey to greener operations.

This paper discusses one such solution – HVO 100. This fuel type makes it possible to significantly reduce the tailpipe emissions from trucks previously using diesel, while limiting impact on performance.



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// GET TO KNOW HVO

HVO 100 is a bio-based, renewable, liquid fuel diesel alternative that meets the standard EN15940 for paraffinic fuels.

Produced from renewable materials, such as vegetable oils and animal fats, treated through a hydrotreatment process, HVO 100 is almost chemically identical to conventional diesel. The process also removes any esters and contaminants, improving performance.

HVO 100 is reported to:

- Eliminate up to 90% of net greenhouse gas emissions (such as CO₂)*
- Reduce nitrogen oxide (NO_x) particulate matter (PM) and carbon monoxide (CO) emissions
- Lower sulphur dioxide emissions

Subject to costs and the availability of a sustainable supply chain, HVO 100 can be used as a diesel alternative, until equipment is replaced with zero emissions trucks at a later date.

// A SOLUTION FOR NEW AND OLD FLEETS

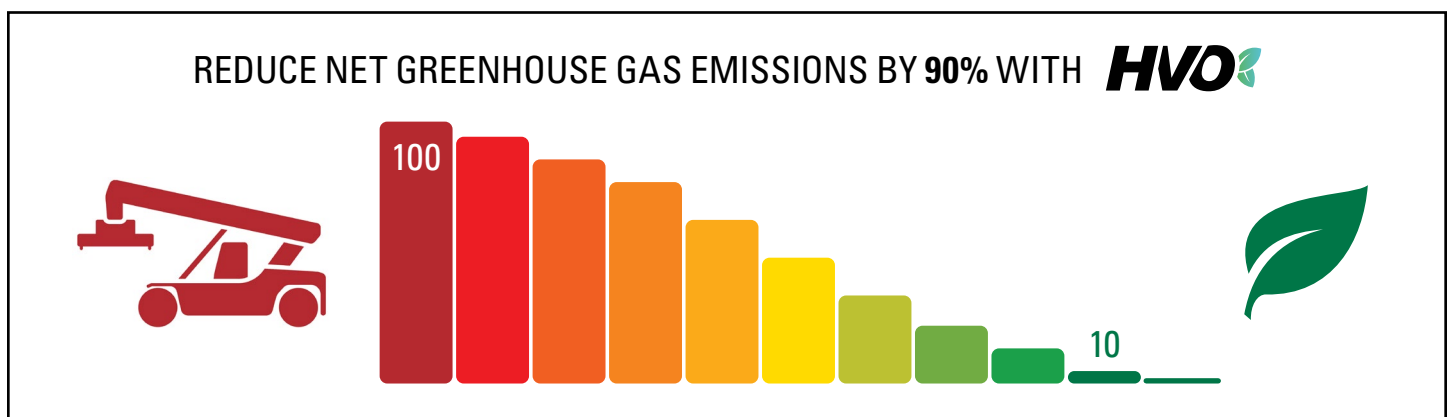
An increasing number of industrial trucks are available that can be fuelled by HVO from new. Trucks already in the field can also be converted easily to accommodate

HVO fuel. This includes engines compliant with Stage III, IV, and V emission standards. Switching to HVO fuel is therefore a realistic option for reducing emissions across an entire fleet straight away. For example, HVO compatible lift trucks from Hyster are available with capacities from 2 tonnes to 52 tonnes, either as standard or with minor seal replacements, depending on the engine manufacturer.

When it comes to older vehicles, with diesel powered trucks there is some concern about the ethanol applied in diesel. Some older engines are unable to deal with the ethanol content that may now be encountered in diesel fuel. This is not an issue when using HVO as a fuel source.

As it is a less widespread fuel type, the cost of HVO is generally a little higher than diesel. Fuel consumption may be greater too. That said, compared to the cost of transitioning to an electric fleet, HVO is an affordable and easily adopted solution to immediately support your company's journey to lower emissions.

HVO also gives businesses fuel flexibility. Engines used for HVO tend to also be operable with diesel. Should HVO supply issues be encountered, simply switch back to diesel temporarily. It is even possible to mix HVO and diesel fuels. Though, of course, the emissions reduction benefits are affected.





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// TAKING ON TOUGH APPLICATIONS

For outdoor applications where cold climates may be encountered, HVO fuel can also withstand temperatures as low as -34 degrees C. As it has less paraffinic elements than traditional diesel, it has less tendency to wax, giving it greater tolerance in cold weather.

For organisations focused on sustainability, HVO fuel not only brings benefits around carbon emissions. It is fossil free, created from renewable sources. It is also bio-degradable and can be absorbed by the ground without damage to the immediate environment. This helps agricultural or forest products applications that are currently using diesel fuel to clean up operations further. There is also no strong fuel smell from burning HVO, which also contributes to a comfortable environment for operators too.

Some applications, such as those in construction materials production and storage, may use trucks at 2-3.5 tonne capacities for fewer hours or less intensively, and often for outdoor operations. At this capacity, HVO is also an effective and affordable alternative to diesel. Though electric lift trucks may suit some operations, the initial purchase price may be 10-30% more expensive at this capacity.





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// MORE THAN JUST SUSTAINABILITY BENEFITS

Perhaps the biggest advantage of using HVO is that it maintains the efficiency and performance of a diesel engine. Durability and toughness are not impacted. Just like diesel powered trucks, the equipment tends to have a long lifetime. Maintenance is also entirely comparable to a truck powered by traditional diesel with no change to service intervals.

It is true that HVO is not so readily available as diesel, though this may change as adoption accelerates. This is the case with many alternative fuels, including hydrogen. However, many bulk fuel suppliers can make HVO readily available, and it is one of the most common biofuels.

It can be stored on site, for use in an on-site fuelling station. HVO is inherently stable and can also be stored for long periods of time. It also overcomes the issues that can be encountered with long term storage of diesel, where microbes can occur which negatively affect truck engines.

// WILL HVO BE RIGHT FOR YOU?


The right power source will always depend on the specific application. Adopting a new fuel source may require preparation and a degree of change. However, when it comes to HVO, this is a simple switch, especially in comparison to implementing electrification on a large scale. In some regions, where electrical grid structure cannot support the electrical draw, HVO may prove useful for years to come. Likewise, electrification may be prohibitively expensive in the immediate future for applications with lower intensity operations.

HVO can provide a useful stop gap to start reducing emissions in the short term, while plans can be made, and capital raised for future transitions to electric and hydrogen power.

Visit www.hyster.com to learn more about reducing your emissions straight away with HVO.

Ask your Hyster dealer to demonstrate HVO live in your equipment or help you to setup an HVO supply.



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