Balfour Beatty

Position paper Hydrotreated Vegetable Oil (HVO) and Gas to Liquid (GTL)

Introduction

Balfour Beatty's objective when it comes to the fuel we use is to phase out diesel and other fossil fuels in all of our operations as quickly as possible. This is in line with our net zero target for our Scope 1, 2 and 3 emissions by 2050 as set out in our Sustainability Strategy, Building New Futures and our Carbon Reduction Plan[1], which sets out our three step plan focusing on efficiency, electrification and then alternative fuels. As also set out in this Strategy, we are determined to act responsibly and to always consider the full implications of our actions. This includes making sure that we are not solving one environmental challenge and creating another.

HVO (Hydrotreated Vegetable Oils) and GTL (Gas to Liquid) fuels have been widely marketed as a sustainable solution to fossil fuels, reducing localised air pollution and their impact on climate change. These claims are attractive to the construction sector as it tries to reduce the carbon emissions from its operations, as the sector is reliant on heavy plant, with only a limited availability of electric, hybrid and hydrogen powered alternatives. As a consequence, a number of our customers and supply chain partners are exploring or have committed to HVO and GTL.

While Balfour Beatty is looking closely at HVO potential, there are serious issues that need to be ironed out before we think they could be committed to, particularly in terms of full traceability and carbon footprint claims. At the heart of our concerns is the fact that, at the moment, the supply chains in this area are complex and opaque[2], with insufficient information provided about the sources, transportation and production methods. Given supplies of HVO from sustainable sources are currently limited, there is a strong likelihood that a sharp increase in demand could drive an increase in palm oil derived HVO or palm oil used as a livestock feed alternative, contributing to further global deforestation. Even sustainably certified schemes have limitations in this area, as they do not take into consideration the significant impact of these indirect land-use changes or the full lifecycle footprint.

Balfour Beatty takes its environmental responsibilities seriously and, given its size and purchasing power, recognises its unique position to drive truly sustainable outcomes in the construction sector. We are committed to ensuring that our sustainability, governance and transparency processes are enforced. This means that we must take into account all of the environmental, economic and social aspects of HVO before we could agree to any wider-scale use in our operations. Indeed, we agree with the Royal Academy of Engineering:

"The carbon footprint and other sustainability aspects of biofuels should be evaluated on a life cycle basis across full supply chains to avoid shifting the burdens from one part of the life cycle or supply chain to another."[3]

We stated in 2022, that until we have understood all the potential impacts, Balfour Beatty will not be making a commitment to HVO. We also committed to keep this position under review. The Supply Chain Sustainability School, of which Balfour Beatty is a funding partner, commissioned Action Sustainability to produce the report 'Responsible Sourcing of HVO: A Comprehensive Guide'[4], published in June 2024. This guide provides an impartial overview with the objective of helping partners understand the sustainability opportunities and challenges of using HVO as an alternative to fossil diesel, offering advice on managing risks in the HVO supply chain.

The research included a thorough literature review and stakeholder discussions, examining HVOs' sustainability impacts, market size, and risk mitigation. While the guide has further deepened our understanding of HVO and their production and procurement, it has not conclusively shown that the production of HVO use does not increase climate emissions in other regions, particularly in the light of forecasted demand compared to available supply. Therefore, Balfour Beatty is not changing our position on HVO. We will continue to assess all the key data and information that is published on HVO.

Electric telehandler

[1] www.balfourbeatty.com/CarbonReductionPlan2023
[2] https://www.nnfcc.co.uk/files/mydocs/UCO%20Report.pdf
[3] https://www.raeng.org.uk/publications/reports/biofuels
[4] https://landing.actionsustainability.com/responsible-sourcing-hvo/download.html

Given that the ultimate source of many HVOs in particular is uncertain, even in those that are said to be sustainably sourced, and the real risk that significant increase in use on construction sites across the country could be causing increased carbon emissions in other parts of the world due to land use change, we encourage the Government to undertake a review of their use in the UK and to set clearer requirements around their use on publicly funded schemes.

Although we are not adopting HVO until such a point that these issues have been resolved beyond doubt, we are committed to reducing our carbon footprint as quickly as possible by other means and innovations, with the intention of fast-tracking better solutions as they emerge, as outlined in more detail in the following pages.

We are working collaboratively with our customers and supply chain partners on this issue to understand their priorities and approaches.

Why Balfour Beatty has chosen not to promote HVO use at this time

Over the last five years, several companies have promoted HVO and GTL as alternatives to red diesel and diesel. Both HVO and GTL are paraffinic fuels that are marketed as a 'sustainable' diesel substitutes which provide a significant reduction in nitrogen oxides (NOx), particulate matter (PM) and CO2 emissions.

HVO

- HVO which is made from waste materials and vegetable oils is marketed as offering:
  - significant greenhouse gas (GHG) reductions.
  - improved storage properties.
  - derivation from renewable sources.
  - functionality almost identical to fossil diesel so can be used as a drop-in alternative to fossil diesel without needing to amend infrastructure or clean out existing stock.
- Although HVO can be produced through several processes, such as hydrocracking, perhaps the most common is hydrodeoxygenation. In this process, hydrogen is added to either waste materials and vegetable oils including used cooking oils much of which is sourced in Asia where palm oil is widely used and grown. At the end of its life used cooking oil has been normally used as animal feedstock. There is a high risk that the resulting increase in demand for used cooking oil is causing deforestation and the draining of peatland and marshland in countries such as Malaysia and Indonesia where farmers are having to grow palm oil to produce animal feedstock. Such displacement activity has an extremely damaging impact on the environment[5]: these areas store large amounts of carbon, so clearing them would lead to a significant increase in carbon emissions in those countries. EU research[6] indicates that once the effects of land use change and draining of peatland are accounted for, the GHG impact of palm-oil derived HVO could be up to 3 times greater than standard fossil fuel diesel. Furthermore, HVO requires more vegetable oil than other methods of biodiesel production. As a consequence, in 2020 the EU agreed to phase out biofuels with a high risk of indirect land-use change by 2030.
- At the moment, HVO supply chains are complex and opaque. Even HVO sourced from the EU is often blended with palm oil imported into the EU for processing and the environmental NGO Transport & Environment[7] has warned of the fraudulent mislabelling in the feedstock country of origin in order to meet the surge in demand:

  "There are certain risks that [biofuel promotion policies]... could inadvertently cause the uptake of alternative fuels that are worse than [conventional] fossil fuels"... "Crop-based biofuels do not provide significant carbon reductions compared to fossil fuels, in most cases actually resulting in much higher emissions."
- It is not just the source and production of HVO that concern us, but the transportation of such products across the world, the carbon footprint of which needs to be taken into consideration.
- Although HVO can be used in conventional diesel engines with no compatibility issues, it may not be compatible with fuel systems. Any fuel facing nitrile components such as hoses and seals may therefore need to be changed.

GTL

- GTL is a synthetic paraffinic fuel produced from natural gas and its improved combustion properties are marketed as helping:
  - to reduce emissions of regulated pollutants.
  - improve local air quality.
- It can be used as a direct replacement for conventional diesel fuels in heavy-duty and light-duty engines meaning that engine modifications, new infrastructure or vehicle investment are not required. However, when assessing full lifecycle carbon emissions of the fuel including their production, the environmental benefits are less obvious.
- The process of converting the gaseous fuel into a liquid is highly energy intensive[8]. Assessments have indicated that an increase of up to 20% in greenhouse gas emissions compared to conventional diesel is borne out of the energy intensive production process.

[5] https://ec.europa.eu/energy/sites/ener/files/documents/Final%20Report_GLOBIOM_publication.pdf
[6] https://www.transportenvironment.org/wp-content/uploads/2021/08/Biofuels-briefing-072021.pdf 10 years of EU fuels policy increased EU's reliance on unsustainable biofuels, July 2021
[7] Used Cooking Oil (UCO) as biofuel feedstock in the EU, CE Delft for Transport & Environment, December 2020
[8] http://www.natgas.info/gas-information/what-is-natural-gas/gtl

Balfour Beatty alternatives

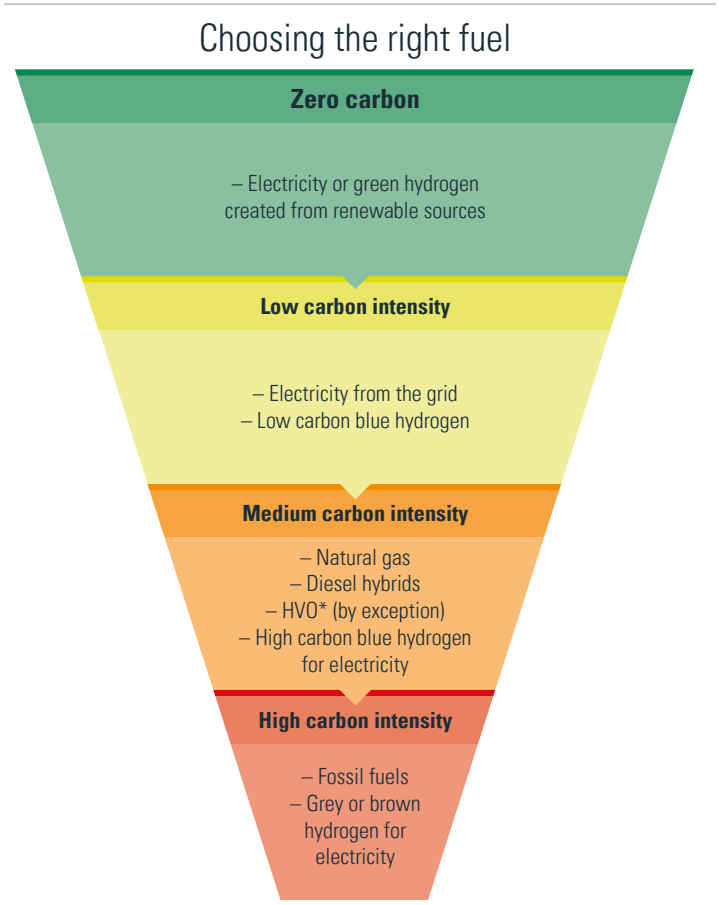
While we are considering how to ensure the traceability and true impact of these products, we are continuing to make progress on decarbonising our plant and fleet in other ways. In line with our Sustainability Strategy, Building New Futures, Balfour Beatty is pursuing the following steps to reduce carbon emissions from its plant and fleet:

- Hiring or procuring the most efficient plant that meets latest engine emission standards (Stage V).
- Using electric, hybrid and hydrogen powered machinery where available. We are also working with our supply chain and supporting innovation to speed up the transition to hydrogen.
- Training operators on the efficient use of the machinery (idling & fuel efficiency), including the launch of the Balfour Beatty Flannery 'Operator Skills Hub' in 2020.
- Using telemetry to monitor fuel use and utilisation.
- Using machine control systems to maximise productivity and minimise the amount of additional work required (preventing over-digging and backfilling etc).
- Retrofitting existing plant with selective catalytic reduction technology (SCRT) – whilst this reduces particulates, NOx, hydrocarbons and carbon monoxide and brings them up to Stage V requirements – it does increase fuel consumption by 3%.
- Using Balfour Beatty power profiler, EcoNet, grid connections and battery systems to minimise the need for diesel powered generators.
- For smaller plant there are a range of fully electric and hybrid solutions that are already on the market. For larger plant Balfour Beatty are seeing the introduction of hybrid plant and expect to see more hydrogen powered plant in the next two to three years.
- Collaborating relentlessly on innovative design, trialling and deployment.

This graphic provides a guide to the carbon intensity of the energy sources currently available. It is a visual representation of 'Our fuel hierarchy' which will shortly be published. Developed by our in-house energy management experts this is an easy-to-understand tool that everyone at Balfour Beatty and our supply chain partners should use to help select the right energy sources for our plant, equipment, vehicle and buildings which account for the vast majority of our scope 1 and 2 emissions.

As part of our commitment to decarbonising our operations, Balfour Beatty also procures 100% renewable, REGO (Renewable Energy Guarantees of Origin) backed electricity to power our sites, depots and offices wherever we are in control of the energy supply. Our Site Mobilisation Hub, which sites are encouraged to use, supports the mobilisation and de-mobilisation of temporary site set ups as efficiently and sustainably as possible, standardising our approach including connections to the grid where there is a mains connection available.

In 2023, the Group generated 173 MWh of renewable electricity through investments in solar and hydrogen technology. Notable examples include, a 320 panel solar PV array at Balfour Beatty's Derby Raynesway depot, which saved 102 MWh and resulted in cost savings of £32,000. Additionally, roof-mounted solar frames at the Canvey Island project displaced 18,907 kWh of energy typically produced by diesel generators.



*based on the 2022 DEFRA average GHG emissions value for HVO fuels, which includes the emissions released during the combustion of fuel. It does not account for the unknown impact of HVO on forest clearance and marshland drainage.

Balfour Beatty

Conclusion

Accepting the environmental claims of HVO and GTL at face value and adopting them when we are aware of wider sustainability concerns which we are not currently able to respond to satisfactorily, would, in our view, send a misleading signal to the market and not be consistent with our Building New Futures Sustainability Strategy.

Although we do not endorse or use these fuels on sites where we control fuel selection, in 2023, we were required to procure HVO and GTL on certain schemes in accordance with client specifications. This made up an extremely small proportion of our overall fuel use. To effectively cater to clients specifying these fuels, we are developing a standard specifically for HVO, to be published before the end of 2024, which we will share across the industry. The standard will ensure that we are mitigating the risks as far as practicable when we are buying HVO for client specified projects, ensuring that client preferences are met while upholding our steadfast commitment to sustainable practices across our operations.

We will continue to work with customers and supply chain partners to develop a fuller understanding of the issues associated with HVO. In the meantime, we continue to prioritise investment and innovation in electrification and hydrogen fuelled construction machinery, which Balfour Beatty sees as a more sustainable transition path. This includes progressive removal of diesel generators and encouraging our clients and projects to plan and invest in temporary electric supplies that can supply cleaner electricity from the grid. We will also continue to explore locally sourced alternative fuels where there is a full, transparent chain of custody. While we are considering how to ensure the traceability and true impact of these products, we are continuing to make progress on decarbonising our plant and fleet in other ways.

Think before you print!

You can find our Sustainability Strategy online at balfourbeatty.com/sustainabilitystrategy

About Balfour Beatty

Balfour Beatty is a leading international infrastructure group with 26,000 employees – 12,000 of them based across the UK. We finance, develop, build, maintain and operate the increasingly complex and critical infrastructure that supports national economies and deliver projects at the heart of local communities.

Balfour Beatty has long been at the forefront of sustainability in the construction and infrastructure industry. In June 2024, we published our evolved Building New Futures Sustainability Strategy, which includes ambitious but attainable targets across six focus areas – climate change, nature positive, resource efficiency, supply chain integrity, community engagement and employee diversity, equity and inclusion. We have worked closely with the Science Based Targets initiative (SBTi) to validate our 2030 target to deliver a 42% reduction in Scope 1 and 2 carbon emissions[9]; and our 2050 target to reduce our Scope 1, 2 and 3 carbon emissions by 90% and use permanent carbon removal and storage to counterbalance the final residual 10% of our emissions.

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[9] Measured against a 2020 baseline and verified by the SBTi