Policy levers for low carbon fuels

- REA Transport Fuels
- 3rd Dec 2019 – Osborne Clarke

LowCVP
Low Carbon Vehicle Partnership
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Managing Director

LowCVP is a unique public-private membership organisation tasked with **"accelerating the shift to low carbon road transport"** in the UK.

LowCVP Low Carbon Vehicle Partnership

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- Government & Public Bodies
- Fuel Suppliers
- Technology Suppliers
- Automotive Manufacturers
- Fleet Operators
- Environmental & Academia

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Working together – to build evidence, stimulate innovation, create robust policies and change the market to meet environmental objectives

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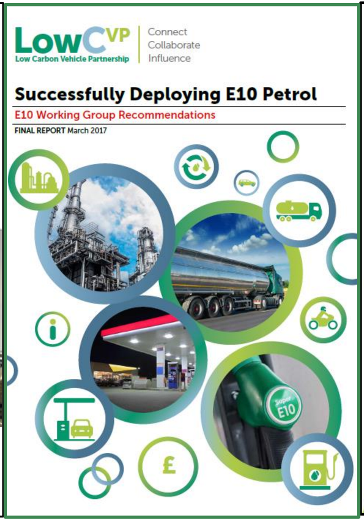
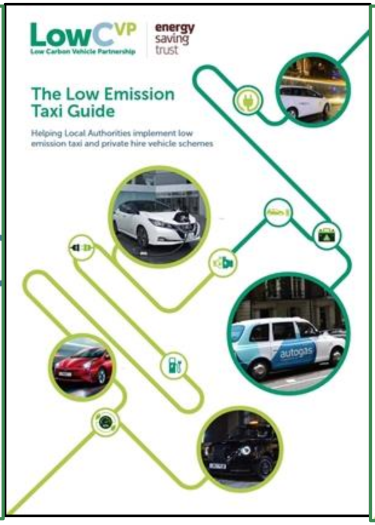
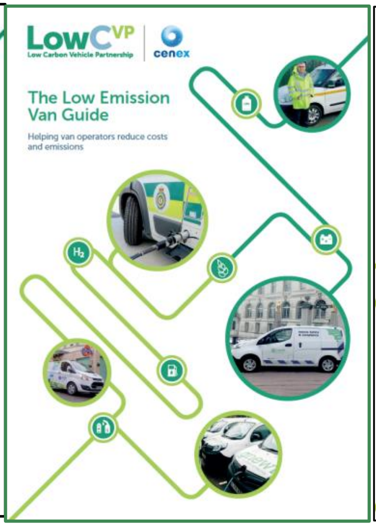
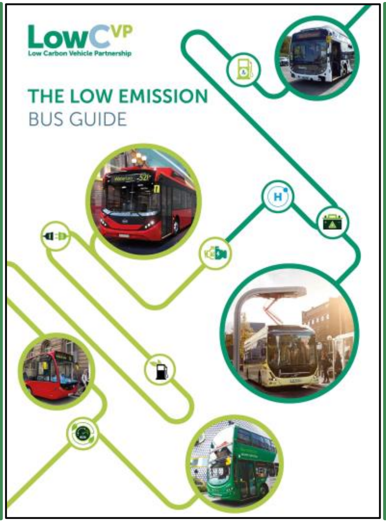
- Creating communities with shared goals
- Understanding and evidence based research
- Influencing policy and information
- Accelerating the market









Two environmental challenges facing us all right now

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Climate Change

Vehicles in use don't make carbon – Fuels & Energy do

Urban Air quality

Fuels in use don't make urban Emissions – Vehicles do

System Efficiency reduces both

Policy opportunities

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- Carbon reporting – company requirements and CSR agenda
- Operator information (LowCVP Fuels guide)
- Renewable fuel supply requirements – RTFO
- Voluntary Freight GHG reduction commitment (15% by 2025)
- The Alternative Fuel Labelling and Greenhouse Gas Emissions Regulations 2019
- Fuel Duty??
- Bus Service Operators Grant (BSOG)

Key is Policy clarity – Road to Zero (tailpipe), Net Zero (GHG) and Zero (tailpipe emissions) HGV options for the future

No doubt we're heading to zero, but when and what now?

Combustion fuels will need to decarbonise

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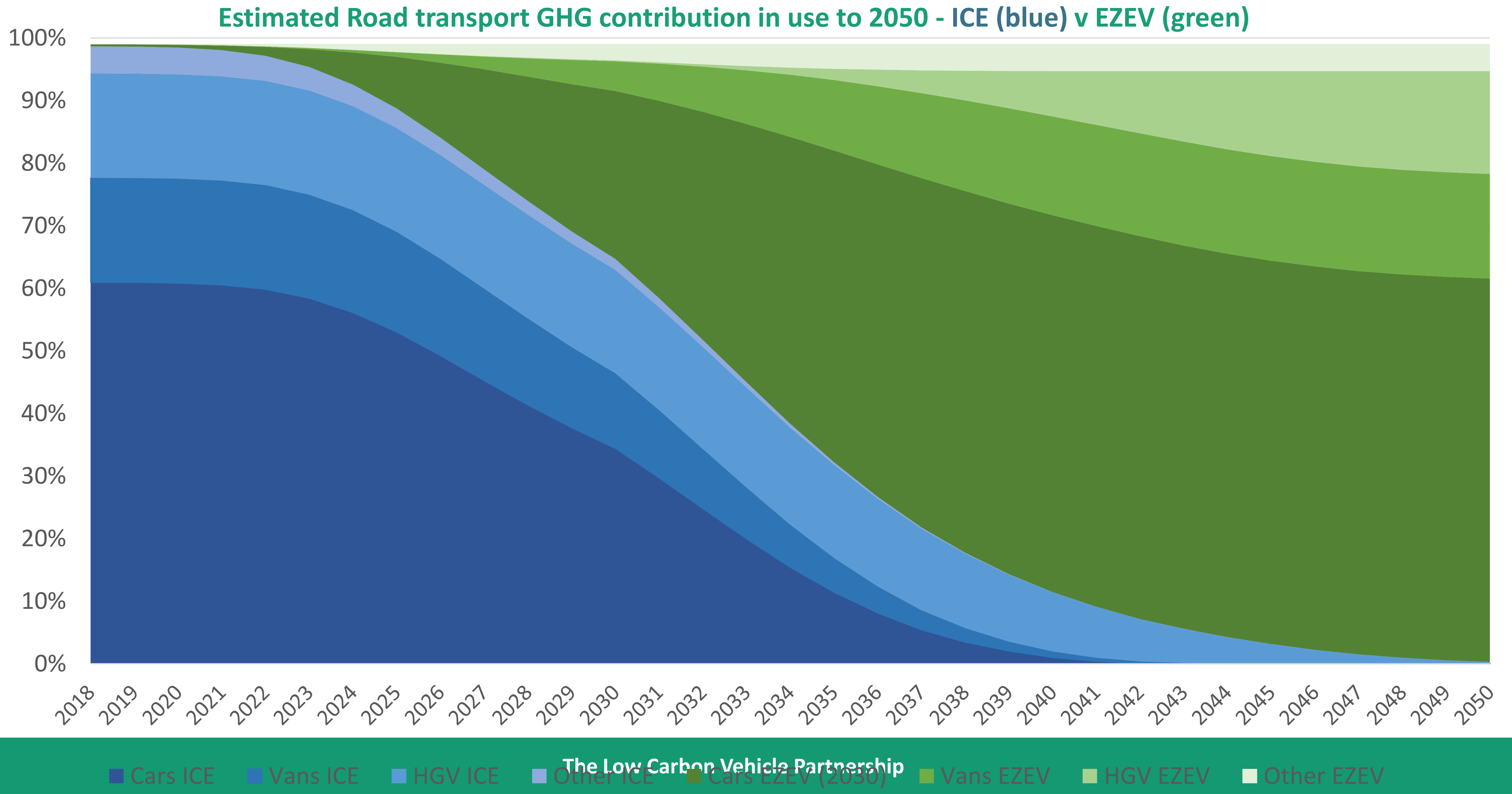

ULEVs, ULCFs and transport solutions

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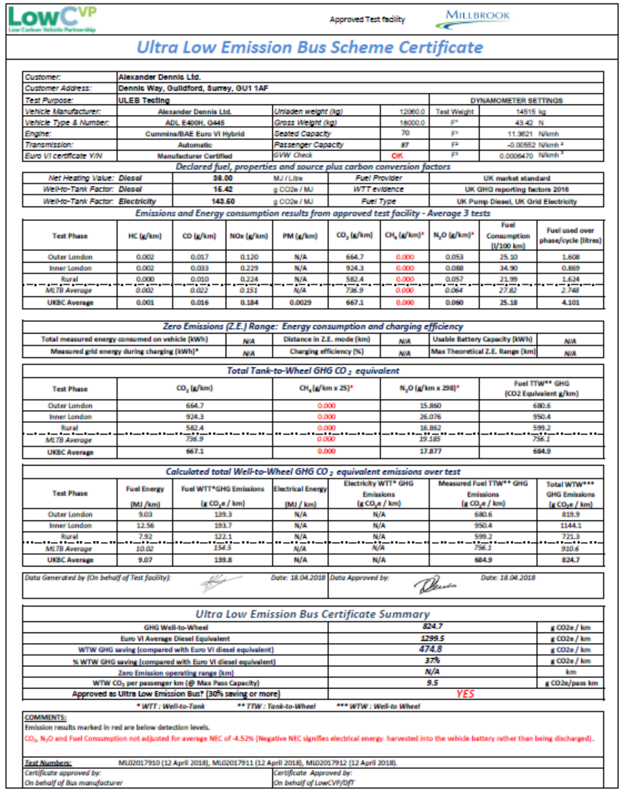
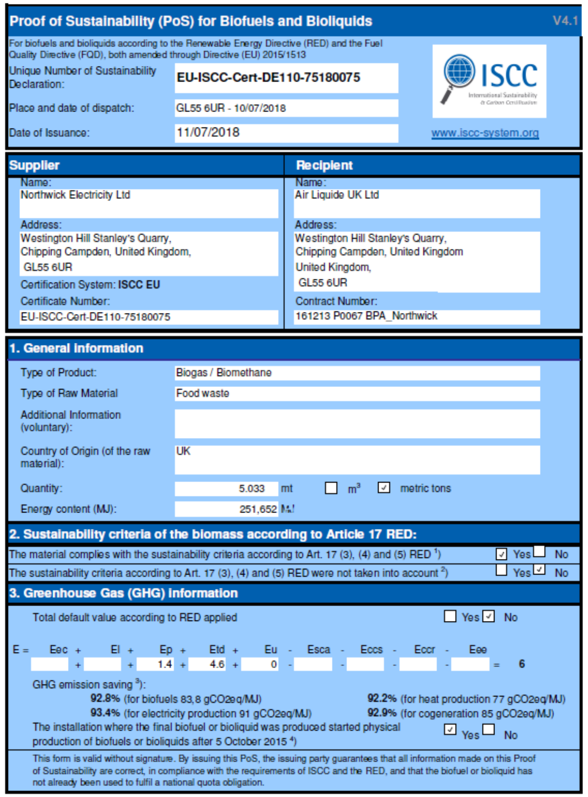
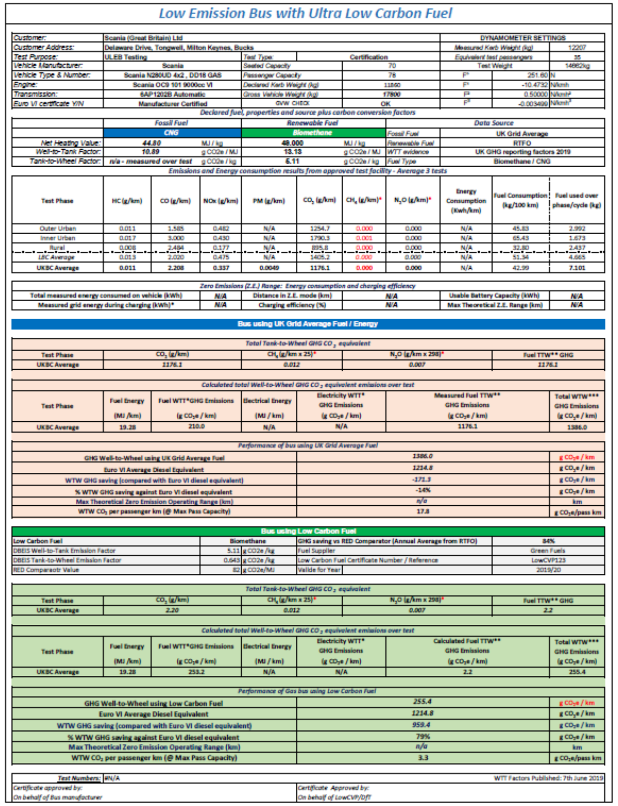
Clean and Efficient vehicles + Low carbon fuels/energy = Low Carbon Transport

Certified ULEVs, Representative Testing, Emissions and Energy use

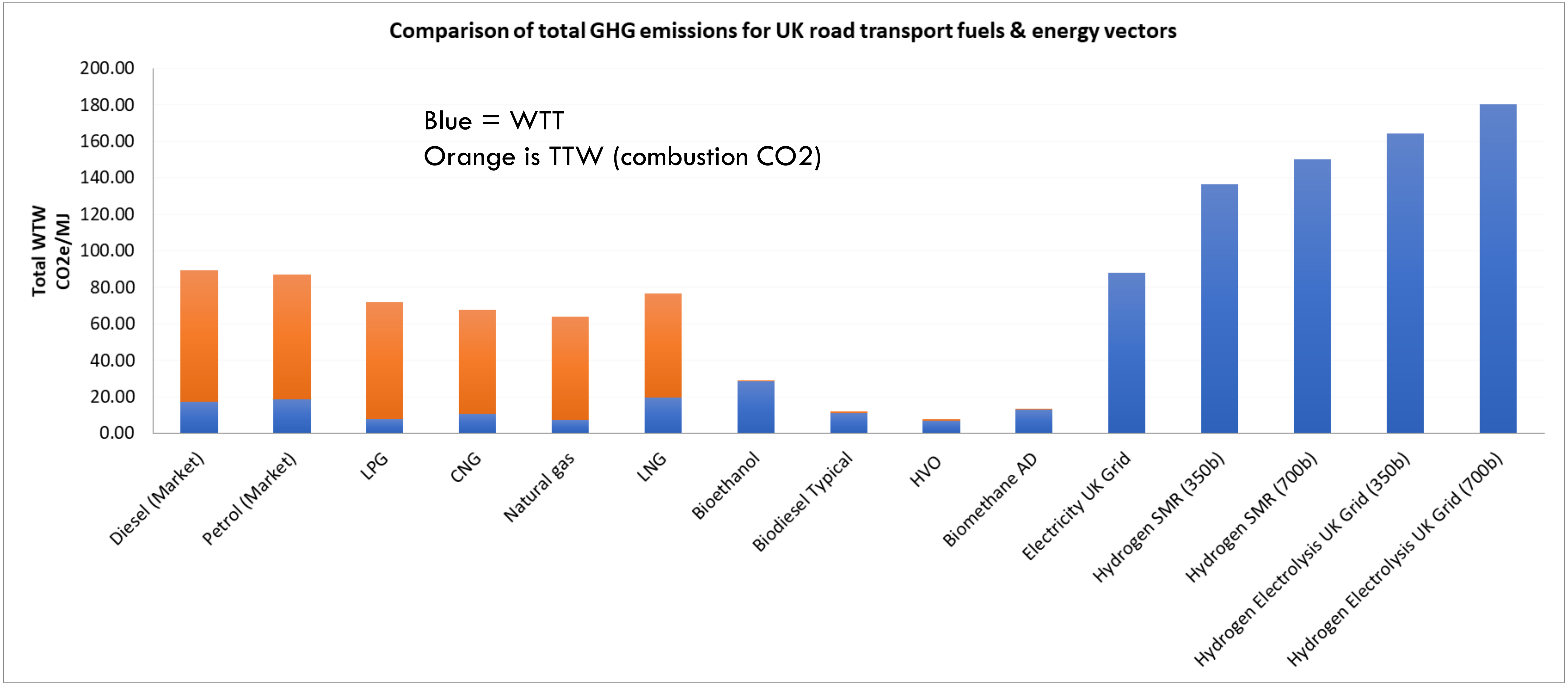
Ultra Low Carbon Fuel assurance scheme, Well-to-Tank factors







CO_2 of Fuels (WTT and TTW) per unit Energy (MJ)



7.5t Truck in use – Typical energy consumption

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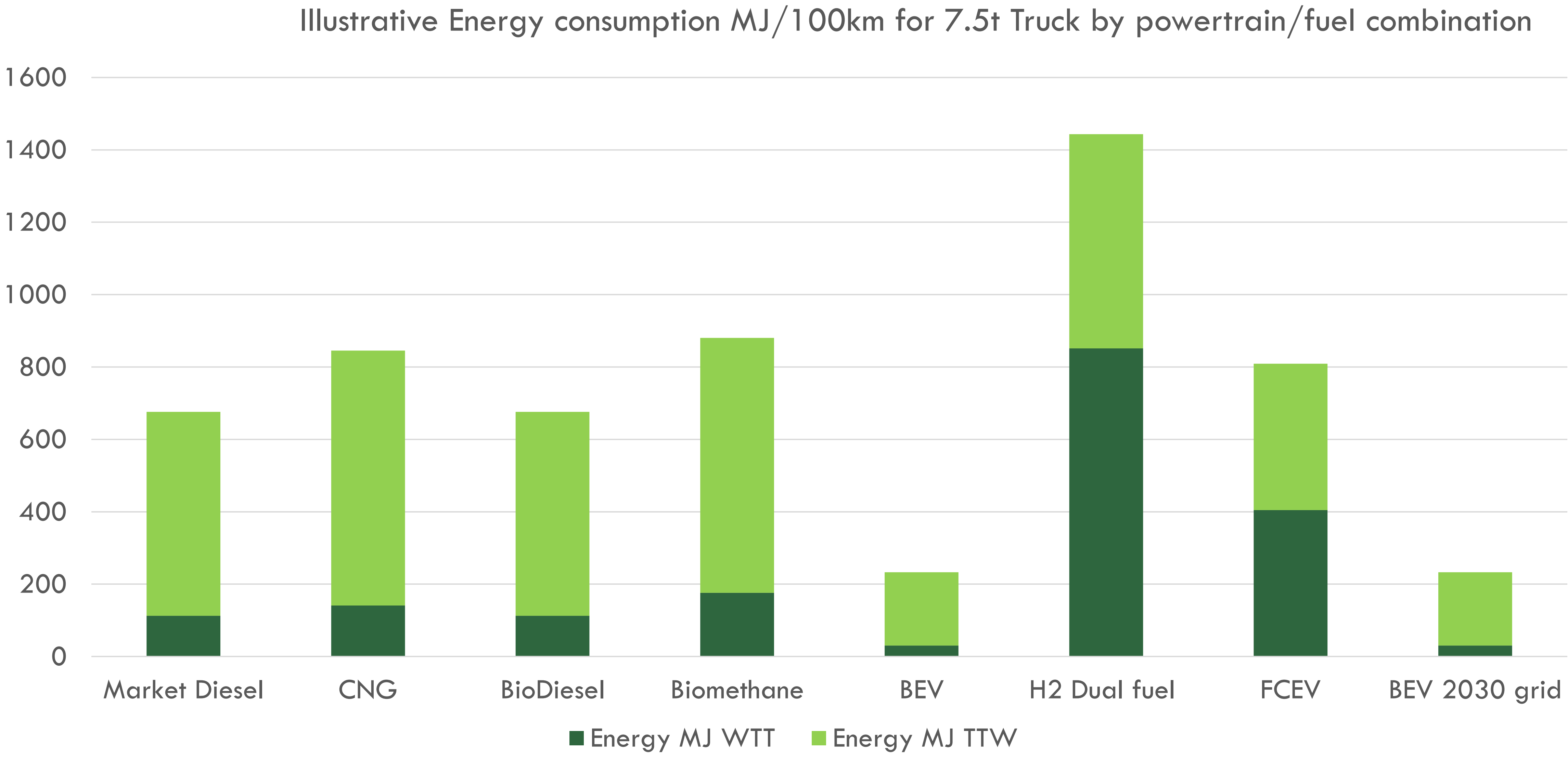
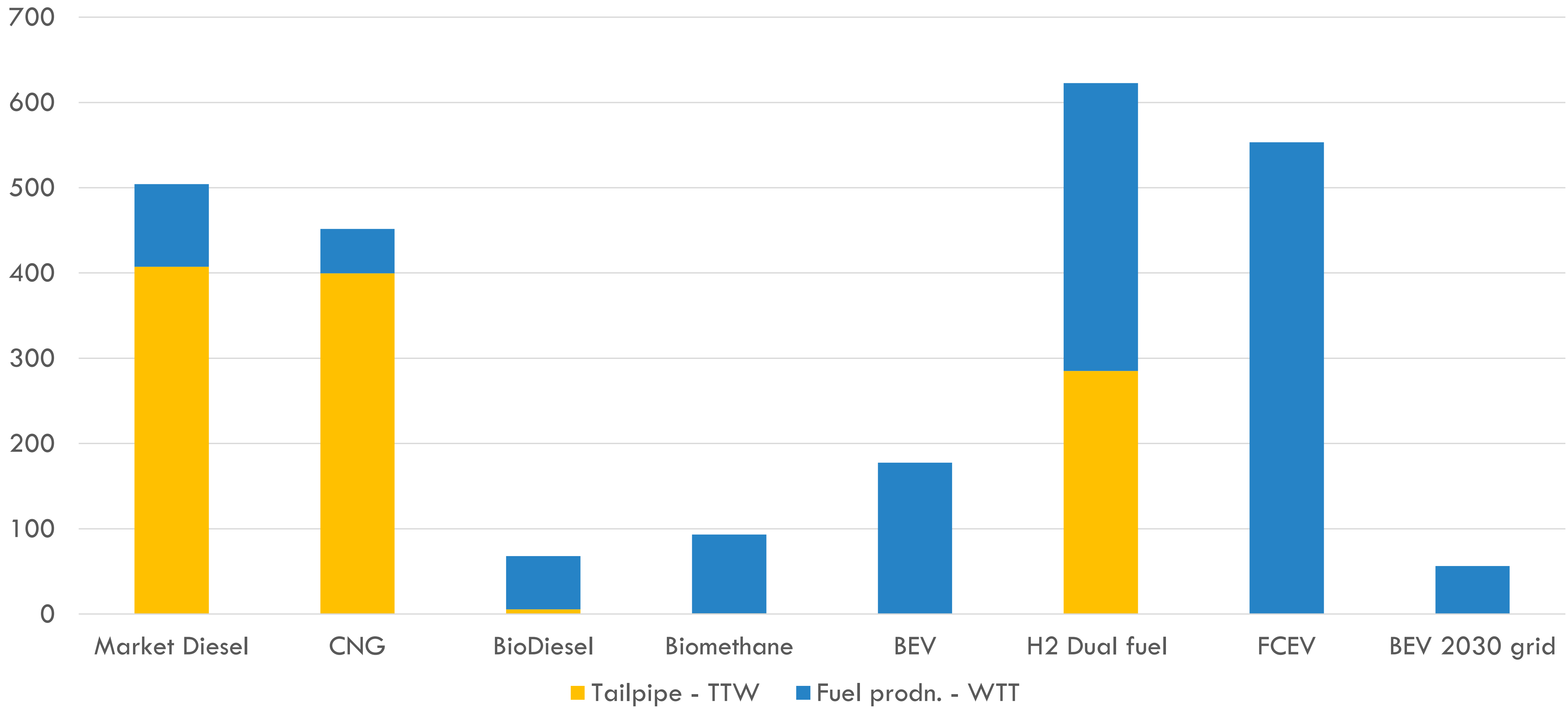


7.5t Truck – typical WTW CO_2 g/km for variety of options

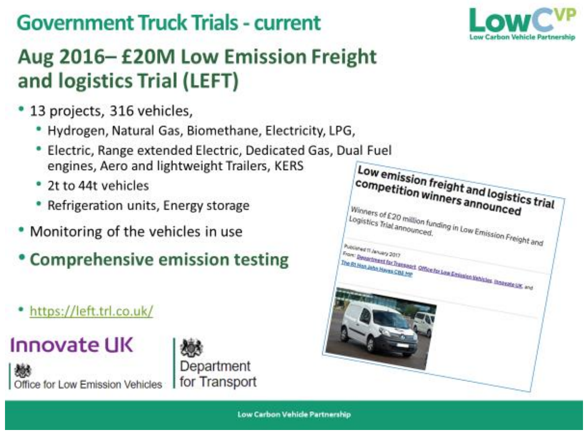


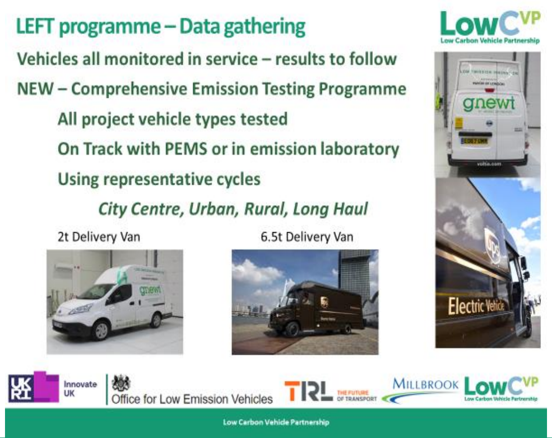
Trucks – example of "joined up" approach

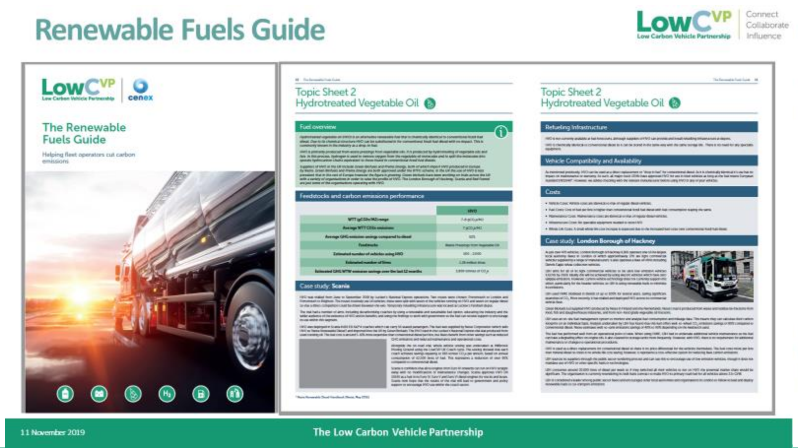
- LowCVP cover aspects across the whole innovation spectrum from designing the programmes for funding to producing reports to promote low carbon in the market and develop market support policy
- The independent assessment and support to government with a view across all carbon impacts (Life Cycle approach) will be critical in delivering the Road to Net Zero for 2050
- Understanding of Vehicles (use patterns and technology), Fuels (production, delivery and storage), Production impacts and future mobility systems is critical

LowCVP TRUCK RELATED PROJECTS

- Setting up LEFT trial Testing/guidance Fuels parameters LCA assessment







Renewable Fuels Guide – coming soon

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The Renewable Fuels Guide

Helping fleet operators cut carbon emissions

Disclaimer
Although we have named specific vehicles in this guide, Cenex and LowCVP do not endorse any particular makes and models. Cost and emissions data are illustrative only; fleets should undertake or commission their own analysis to determine likely financial and environmental performance. All facts and figures are correct at the time of writing (September 2019).

Topic Sheet 3 - Biomethane

Fuel overview

Biomethane is chemically identical to natural gas when used as a renewable and can be easily substituted as a biofuel for natural gas vehicles both CNG and LNG. When used as renewable vehicle fuel in the UK, biomethane is made from a variety of organic waste materials via the process of anaerobic digestion. It requires upgrading to a quality suitable for use in gas vehicles then typically injected into the National Gas Grid for distribution. The RTFO scheme allows biomethane producers to inject biomethane into the grid and an equivalent mass of methane to be extracted from the grid at a refuelling station. Biomethane can be dispensed as compressed biomethane gas (CBG) or liquid biomethane (LBM).

UK suppliers of biomethane include CNG Fuels, Air Liquide and Gas Alliance.

GHG Emissions Performance

The table below shows the GHG emissions performance of the primary feedstocks used for producing biomethane supplied in the UK[2]. Data has been sourced from Government's RTFO statistics and interviews with biofuel suppliers. When a high proportion of biomethane is produced from manure it can achieve a negative GHG emission intensity. This is because methane is released to the atmosphere when manure is stored in the open environment. Methane is twenty five times (by mass) more powerful as a greenhouse gas than carbon dioxide. By using manure as feedstock, methane can be captured giving rise to a carbon neutral or negative biofuel. Currently the RTFO does not report negative renewable fuels, however this is likely to materialise over the next twelve months.

	Biomethane Range
WTW GHG emission intensity	5 - 15 gCO_2e/MJ
WTW GHG emission savings	82% - 94%
Average GHG emission savings	88%
Primary sustainable feedstocks	Food waste, manure, agricultural residues

Current Deployment

Biomethane is relatively widely used in the UK with increasing take up by the freight sector. As the accompanying case studies highlight, it is used by John Lewis Partnership, London Borough of Camden and Kuehne + Nagel. Other fleets include Asda, Howard Tenens, DHL, Ocado, Hermes, DPD, London Borough of Islington, Veolia, and Lawsons building merchants. It is estimated that approximately 400 HDVs operate on biomethane in the UK. Biomethane has been popular in the bus sector due to specific incentives via BSOG requirements to mandate the use of biomethane in gas buses. There are 363 biomethane buses in operation in cities such as Nottingham, Bristol and Reading. Based on current gas vehicles running biomethane, it is estimated that approximately 15,000 tonnes of GHG emissions have been saved over the last 12 months.

Refueling Infrastructure

Both public access and depot-based refuelling are available for CBG and LBM. For more information refer to the next chapter on biomethane infrastructure.

Vehicle Compatibility and Availability

Gas heavy duty vehicles can run interchangeably on natural gas and biomethane with no impact on fuel consumption or warranty considerations. The engines are either dedicated spark ignition (LNG or CNG) or High-Pressure Direct Injection dual fuel (Volvo – LNG only).

Both CBG and LBM vehicles are available as rigid and artic HGVs up to 44t GVW. Example vehicles include the Iveco Stralis NP, Iveco Eurocargo, two, three and four axle rigids plus 4x2 artics with 280, 340 and 410hp engines, Mercedes Benz Econic, Volvo FH and Volvo FM.

Topic Sheet 3 - Biomethane

Costs

Vehicle Costs: Gas HGVs can cost around 25% more than a conventional diesel equivalent when purchased outright. A number of companies offer gas vehicles on a lease contract.

Fuel Costs: Biomethane is cheaper than diesel on a pence per mile basis, partly driven by the fuel duty. Treasury has committed to maintaining the fuel duty differential between natural gas and diesel through to 2032. This rate difference is 50% lower than conventional diesel. Fleets which have high annual mileages, such a long haul logistics companies, achieve the greatest cost and carbon savings.

Maintenance Costs: Maintenance costs of gas vehicles are 20%-25% more diesel vehicles.

Infrastructure Costs: Costs vary depending on whether fleets use public access or depot refuelling. The capital costs of depot refuelling station can be recovered through lower fuel operating costs. Alternatively, some providers will provide infrastructure and recover costs through the fuel price directly (wet lease).

Case Study: **John Lewis Partnership**

Sustainability is at the core of John Lewis Partnership's (JLP) operation. It has implemented ambitious measures to reduce their carbon emissions, with a target of a zero carbon fleet by 2045.

The commercial vehicle fleet consists of 1,600 vans, 400 light trucks, and 600 heavy duty trucks. JLP is reducing road transport carbon emissions by driving fewer miles, improving fuel efficiency and switching to alternative fuels.

In 2010 JLP and Imperial College London reviewed 30 alternative fuels and technologies. Using criteria covering sustainability, availability and the long-term business case, JLP concluded that biomethane was the best option for its heavy fleet. The process of introducing biomethane began with a trial of one demonstration vehicle. JLP rolled the fuel out gradually over the past eight years and now uses it in 85 Scania P 340 trucks. It has committed to changing the whole fleet of 600 trucks to dedicated gas HDVs fuelled by biomethane by 2028.

The gas trucks cost around 25% more than diesel vehicles to purchase. This is offset by fuel savings, as they are paying around 30-40% less for biomethane than diesel on a pence per mile basis. This means they recover the investment in no more than two years. Over the lifetime of a vehicle the total cost is about 24% lower than an equivalent diesel truck, though payback depends on factors such as fuel price and miles driven.

Vehicles are refuelled with RTFO-approved, and ISCC-certified, methane at the CNG Fuels stations at Leyland and Northampton. The biomethane sourced, which is produced from feedstocks including food waste and manure, can reduce well-to-wheel greenhouse gas emissions by 84%, compared to mineral diesel.

Other fleets using Leyland include Hermes, Argos and HPH Group. CNG Fuels also operate a refuelling station at Crewe and Northampton, and will be opening new sites at Warrington, Erdington, Knowsley, Larkhall and Bellshill between late 2019 and summer 2020.

In total CNG Fuels supplies an annualised amount of more than 10 million kilograms of biomethane. This figure is growing rapidly as existing customers order additional gas trucks and new customers order their first gas trucks. CNG Fuels expects annual growth rates of dispensed volume of biomethane of up to 150%, powering up to 300 vehicles by early 2020.

The carbon intensity of biomethane varies depending on where on the gas grid the stations are connected, with the lowest intensity for stations connected to the high pressure grid. All existing CNG Fuels stations and the majority of their planned stations are on high pressure grid.

The vehicles and refuelling infrastructure have been extremely reliable, helping JLP gas trucks cover over 10 million miles. The organisation now works to encourage other businesses to switch to biomethane by participating in programmes such as TfL's LoCITY to disseminate the benefits to other freight and logistics operators.

Thank you. Any questions?

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Interested in joining the Partnership?

Collaborating to develop the vehicles, energy and supporting infrastructure for future mobility