

# The Green Pages

## NEW FUELS GUIDE



AUTUMN 22 • ISSUE 11

## Confused about some of the terminology surrounding alternative fuels? Clarity is on its way

The RTFA is the trade body for UK producers of renewable and low carbon fuels, established in Autumn 2020. Gaynor Hartnell, Chief Executive of the Renewable Transport Fuels Association (RTFA) explains what motivated her to bring others together to produce a glossary of low carbon fuels terms.



There's no doubt that alternative fuels is a rapidly evolving area. Indeed, it's moving so quickly that not even those in the field can be confident that there is a common understanding of the various terms and acronyms used. It's all too easy to find oneself talking at cross purposes with others, for whom transport fuels are their day job, and for those for whom this is not their day job it must be a minefield.

This hit me full on, when working with a consultant who was helping the RTFA biodiesel manufacturer members put together our case that the UK should maintain the anti-dumping and anti-subsidy tariffs on biodiesel coming from the US. The consultant concerned was an expert in trade remedies, and the actual commodities concerned were relatively unimportant to him. Current cases under consideration are as diverse as aluminium extrusions from China and rainbow trout from Turkey, but the economic principles underlying an assessment of whether UK producers of these commodities are at risk from dumped or subsidised imports, are common to all. I set about defining 12 terms for him, and soon realised that even in this short list it wasn't an easy task. It included the terms "drop in" fuel, biodiesel, blend wall, FAME, HVO, paraffinic diesel and renewable diesel.

### WE NEED COMMON TERMINOLOGY

It got me thinking; and I made a suggestion at a Zemo Partnership Fuels Working Group that there should be a common terminology, or glossary, in order to make the subject matter more accessible to the uninitiated and to prevent people talking at cross purposes. I gave a couple of examples of the same term different meaning things.

For example; synthetic fuel is defined in the Collins dictionary as "fuel in the form of liquid or gas (synthetic natural gas) manufactured from coal or in the form of oil extracted from shale or tar sands" whereas in the UK's Low Carbon Fuels Strategy it says "A fuel which is produced from a mix of hydrogen and a nitrogen or carbon source (e.g. carbon monoxide or carbon dioxide). A synthetic fuel can also be classed as a renewable fuel if the hydrogen is produced from a renewable source and any carbon source used is from a renewable or unavoidable carbon stream, for example an industrial process where carbon dioxide would otherwise be vented into the atmosphere."

I proposed that what is needed is something that was detailed enough to aid understanding, but not to be the go-to source for legal / technical definitions. The idea was met with enthusiasm, and

some high calibre individuals from key organisations volunteered to sit on a review group. They included UKPIA's Chris Gould, SMMT's Nick Lowe and the chair of its fuels working group Paul Lacey, Nik Hill from Ricardo and Steve Sapsford, consultant to Coryton Fuels amongst others.

We worked at it over the spring and early summer, and the first draft of our glossary totalled 49 terms for liquid fuels and 13 for gaseous fuels.

We've confined ourselves to road fuels, and will probably leave it there for the foreseeable future.

So if there's a term you've come across that's ambiguous, or you want to check that your understanding of it corresponds that of other people, you'll know where to go.

INSITE magazine will publish a tear-out version of the glossary in the Winter edition.

[www.rtfa.org.uk](http://www.rtfa.org.uk)



# H<sub>2</sub> vehicles to exceed one million in 2027



The number of hydrogen vehicles in service globally will exceed one million in 2027, from just over 60,000 in 2022, according to a new study.

The report by Juniper Research, which provides analytical services to the global hi-tech communications sector, identified hydrogen vehicles as an increasingly viable alternative to battery electric vehicles (BEVs). It found that the potential for enhanced range and rapid refuelling compared favourably with BEVs, reducing customer anxieties around BEV ownership.

The report says the limitations of EVs are highlighted by the existence of hybrid vehicles in many commercial sectors. Buses, trains, and trucks are widely available as diesel-electric hybrids; proving that based on current technology, EVs are not up to the task of providing a mass transit solution.

Additionally, hydrogen is being touted as an alternative to EVs because EVs use large, heavy, expensive batteries that require rare earth metals such as cobalt, nickel, and lithium. As much as hydrogen requires platinum in the production process, it is needed only in production centres and in minimum quantities. Research on finding an alternative to platinum is also at an advanced stage.

Juniper Research defines hydrogen vehicles as vehicles that use hydrogen propulsion systems as their onboard fuel. The chemical energy of hydrogen and oxygen reacts with the fuel cell and converts the energy to electricity.

## ADVANTAGES OVER EV

The rare metals used in EVs are required for every EV battery, says the report. The advantages hydrogen vehicles have over electric vehicles include:

- Hydrogen should be able to be pumped using the existing network of petrol stations.
- Hydrogen vehicles can achieve longer distances, as they densely pack their energy storage.



- Filling up a hydrogen vehicle takes a few minutes compared to EVs, which can currently take eight hours.

The report claims that major vehicle manufacturers, including BMW and Audi, believe that a change in the political atmosphere could favour hydrogen vehicles over EVs. They are presently developing hydrogen fuel cell passenger vehicle prototypes in addition to their battery cars, as part of preparations to phase out fossil fuels.

Before this, Japanese carmakers Toyota, Nissan, Honda and Hyundai were the only manufacturers developing and pushing for hydrogen fuel cell cars for years. Moreover, China is expanding its hydrogen fuelling infrastructure, and the EU wants to build more hydrogen fuelling stations for commercial vehicles. The future of hydrogen vehicles is expected to be expansive based on the latest developments

The research forecasts that the consumer market will lead the hydrogen vehicles space, with consumer vehicles accounting for over 60% of hydrogen vehicles in service globally in 2027.

The report identified the nascent development stage of many commercial vehicle types and the high average cost of hydrogen-powered commercial vehicles, at over \$70,000 globally in 2022, as key factors limiting adoption.

Research co-author Olivia Williams explained;

*“Manufacturers will need to make hydrogen vehicles more affordable to become viable for fleets, but increased range and suitability for heavy goods transport will ultimately drive growth and economies of scale.”*

Additionally, the report identified the low availability of fuelling infrastructure as a key challenge for wider adoption, but highlighted heavy industry investment as key to reducing this concern over the next five years. The report recommends that infrastructure vendors provide ‘green’ hydrogen, produced using renewable energy sources, to best take advantage of concerns around the environment driving the adoption of alternative fuels.

# bp and BOC explore UK hydrogen infrastructure network to accelerate the decarbonisation of UK road freight

bp and BOC, have completed a detailed joint feasibility study, exploring designs for a potential hydrogen distribution and supply network for heavy duty transportation in the UK.

The study provided important technical insights into requirements and options for hydrogen distribution, station design considerations, and dispensing costs for heavy duty transport applications.

The study concluded that, in the near-term, distribution of hydrogen as compressed gas via road trailer is the best option to stimulate the UK market for hydrogen fuel for heavy duty transport. Over the longer term, as the market expands into new geographies, both liquid and gaseous hydrogen have potential to play a role.

bp and BOC are now exploring opportunities to collaborate to design and deploy an initial network for heavy duty transport hydrogen refuelling infrastructure in the UK. Reducing emissions from heavy duty transportation can make an important contribution to meeting the UK’s climate goals. Whilst responsible for just 5% of vehicle miles, HGVs accounted for around 16% of UK road transport tailpipe emissions in 2019.

Richard Harding, Senior Vice President Portfolio & Integration, bp said;

*“Our customers in hard-to-abate sectors, such as heavy-duty transport, are demanding low carbon alternative fuels. They need and want to decarbonise. Cutting HGV emissions requires new infrastructure, and by bringing together our technical expertise, understanding of the supply chain, and insights from our customers, I am confident that together we can do more to drive change at pace for our customers.”*



Jim Mercer, Business President, BOC UK & Ireland said;

*“If we are to meet net zero targets, tackling road freight emissions needs to happen now. This study shows us the optimal ways in which hydrogen can be used to help decarbonise the UK freight sector and deliver a hydrogen refuelling network for the UK’s HGVs.”*

## IN ADDITION:

- bp is looking to invest up to £18 billion in the UK through to the end of 2030, delivering our energy, while accelerating the transition to cleaner energy.
- They are developing a network of up to 25 hydrogen refuelling stations across the UK by 2030.
- bp plans to build H2Teesside, a 1GW blue hydrogen production facility integrated with carbon capture and storage to help decarbonise heavy industry on Teesside.

- bp has partnered with Aberdeen City Council to deliver a scalable green hydrogen production, storage and distribution facility, powered by renewable energy.
- BOC is the UK’s leading supplier of hydrogen, operating the UK’s largest independently owned hydrogen production plant in Teesside
- BOC has more than 100 years’ experience in hydrogen production, and is now leading the UK and Ireland’s drive to deliver commercially viable hydrogen transport.
- BOC works with local authorities and transport organisations across the country on hydrogen storage and distribution, and operates one of Europe’s largest and highest performing hydrogen refuelling stations, in Kittybrewster.

# 30% of second hand car sales electric by 2030

Research carried out by LV= General Insurance predicts that almost a third of second-hand car sales will be electric by 2030.



By 2030 the UK will have a thriving second-hand market for battery electric cars (BEVs), with almost a third of annual used car sales being BEVs, according to new analysis and modelling by the insurance company.

The research compared current sales of new electric cars with petrol/diesel vehicles, using data from the Department for Transport and DVLA. This sales data was then used to model expected changes in the number of electric car sales and petrol car registrations over the next decade, based on current growth rates.

By factoring-in both the number of used cars being sold on and the number being taken off the road according to the Department for Transport and DVLA data, projections then estimated the expected changes in the second-hand market leading up to 2030.

In 2021, BEVs made up just 1.3% of the total number of cars on the road (under 400,000). While this is expected to exceed one million in 2023, this will still

only equate to 3.1% of total cars. By 2025, the figure will double to approximately 6% and then treble to 19% by 2030 (6.4 million cars). However, with the Government's Zero Emission Vehicle (ZEV) Mandate due to be introduced in 2024, which will require manufacturers to sell a certain number of electric cars each year, it is possible this figure could be higher.

## SECOND-HAND NEEDED

The need for a healthy and robust second-hand market for electric cars is clear. Purchase information shows the majority of people now opt for a second-hand rather than new car. SMMT data reveals 7,530,956 used cars were bought last year, compared to 1,647,181 new vehicles.

In 2021, BEVs made up only 2% of the total second-hand car market (ICE and EVs), with 129,032 sold. The number of second-hand BEVs sold annually is expected to see a steady increase over the next few years, but it won't be until 2026 when there will be over one million

on the road (approx. 1,238,301) equating to 15% of the second-hand annual sales market. By 2030 however, this figure will rise to over three million and BEVs will account for 31% of all annual used car sales. The expected increase in used electric cars will likely drive competition and make electric cars more affordable.

Gill Nowell, Head of EV at LV= General Insurance said:

*"While the average annual running costs of electric cars are significantly cheaper than petrol or diesel cars, the sticker price remains one of the big barriers for drivers considering making the switch, which is why these projections for a thriving second hand market by 2030 are so encouraging. The rapid development of the second-hand market is so important and can't come quickly enough. The more electric cars on the road, the more upfront costs will come down, creating competition in the market and ultimately meeting our goals of making the nation's roads greener."*

# Data centre installing hydrogen-ready fuel cell to provide clean energy

Teledata will be installing a scalable 1.2MW hydrogen-ready fuel cell microgrid to provide clean energy to its Wythenshawe facility.

Working with energy providers Conrad Energy, Electricity North West (Construction & Maintenance) Ltd and Bloom Energy, Teledata will be the first data centre in the UK to deploy fuel cell technology. It's a move which will see the firm reduce greenhouse gas emissions through a cleaner, hydrogen ready fuel supply, whilst also boosting the resilience of the data centre via a second power feed into the facility.

Fuel cells work by converting fuel such as natural gas, biogas, and hydrogen, or a blend of fuels, into electricity through an electrochemical process that requires no combustion; avoiding the emissions normally associated with burning this type of fuel.

Solid oxide fuel cell technology converts fuel into electricity through an electrochemical process without combustion, at high efficiency. The fuel cells consist of three parts – an electrolyte, an anode and a cathode and electrical ions move through the electrolyte in a fuel cell. An electrochemical reaction converts fuel such as natural gas, biogas or hydrogen, into electricity without combustion.

Warmed air enters the cathode side of the fuel cell, while steam mixes with fuel entering the anode side to produce reformed fuel. As the reformed fuel crosses the anode, it attracts oxygen ions from the cathode. The oxygen ions



combine with the reformed fuel to produce electricity – and clean, affordable, highly reliable, always-on power.

Teledata will be working with Conrad Energy on the power project, who will fully fund the fuel cell installation, which is provided by Bloom Energy.

Matt Edgley, director for Teledata, said;

*"As a data centre provider we are constantly looking for innovative energy solutions to help ensure a cheaper, cleaner, uninterrupted energy supply. We have already reduced our carbon output by over 500 tonnes annually through a number of energy-saving measures including the installation of a 2MW smart energy battery storage system in 2019.*

*"The fuel cell solution not only reduces our carbon emissions through a cleaner, hydrogen-ready fuel supply, but it also gives us a second power feed into the facility from a completely different fuel source. This level of resilience, running in parallel with the existing mains supply, will give our clients even more certainty when hosting business critical equipment at our data centres."*

Mark Kelly, Conrad Energy's Head of Power Solutions, said;

*"The Teledata deal comes hot on the heels of our partnership announcement with Bloom Energy and ENWCML. Forward thinking companies like Teledata recognise the need to future-proof their energy supply whilst taking control of their energy costs."*

Charles Hesketh, ENWCML Market Sector Manager, said;

*"To be able to announce the first collaboration with one of our existing customers so quickly evidences the huge potential fuel cell technology has for the UK energy sector. Not only is it our first project, but also Bloom Energy's first foray into the European market.*

Tim Schweikert, Senior Managing Director of International Business Development at Bloom Energy, said;

*"We are delighted Teledata has selected Bloom's energy platform as their technology of choice to bring clean and resilient power to the UK. Teledata is a progressive leader in the data centre industry, and we look forward to supporting their mission critical infrastructure with clean, always-on power while facilitating a transition to a net-zero future."*

## Brand new H2 and EV testing site



### £5m EV and Hydrogen vehicle testing facility gets go ahead at MIRA Technology Park

A £5m redevelopment scheme, to provide charging and testing infrastructure for electric and hydrogen vehicles, has been given the go ahead at MIRA Technology Park in Leicestershire. The green infrastructure project linked, to a Low Carbon Innovation Hub, will support companies as they focus on developing low carbon technologies.

The investment will be made through a partnership between the Leicester and Leicestershire Enterprise Partnership (LLEP), Hinckley and Bosworth Borough Council (HBBC) and site owner MIRA Technology Park. The new Low Carbon Innovation Hub will entail the £2.5m refurbishment by Horiba MIRA of the existing technology building, which fronts the A5.

This will be supported by a £2.5m investment from the LLEP and HBBC in the installation of electrical vehicle (EV) and hydrogen infrastructure, to aid safe testing and handling of EV and related systems at the Leicestershire Enterprise Zone site.

#### HELPING SCIENTISTS AND ENGINEERS

The charging infrastructure will help engineers and scientists on the site in research and development around battery development, hydrogen fuel cells and other low carbon and alternative fuel technologies.

Andy Reed, LLEP interim chair said:

*"The site offers world-class facilities to the mobility sector. Projects such as this will help it continue bringing in employers and creating quality jobs, while also supporting wider low carbon testing and development."*

A planning application for the project has been approved by Hinckley and Bosworth Borough Council.

Bill Cullen, chief executive of HBBC, said:

*"I welcome this further investment in low-carbon technologies at MIRA Technology Park, which is a world class facility on our doorstep in Hinckley and Bosworth."*

*This will strongly align to the delivery of the council's ambitions around climate change and carbon reduction and boosting local jobs in this sector."*

*"This scheme will be another great example of the impact achieved via the strong collaboration between the council, LLEP and MIRA Technology Park."*

Companies based at the technology park are at the forefront of the latest automotive technologies. It is a location of choice for attracting foreign direct investment.

As well as investment in the development of low carbon technologies, the site has made significant investment in facilities for testing autonomous vehicles.

Tim Nathan, managing director at MIRA Technology Park, said:

*"We're continually investing in maintaining our position as a leading hub for the development of low-carbon technologies and R&D. With the industry undergoing a revolution in mobility technologies, these investments future proof our capability ensuring we can best support businesses across the technology, engineering and advanced manufacturing sectors."*

## Juice Booster 2, the wall charger for on the go

Safe and flexible, this portable charging solution from Juice Technology lets you charge your car everywhere and at any time.

One of the main concerns of EV drivers is running out of energy before reaching their destination or a charging station, a fear also known as "range anxiety". Now, imagine being able to effortlessly charge your car's battery whenever you need it – so that you can just sit back and enjoy the journey. All you need is a portable charging solution that will let you tap into the energy that's available all around you. Enter the Juice Booster 2. With this charger and its range of adapters, you can connect your electric car to any standard household or industrial socket anywhere in the world.

Portable EV chargers are important, as they have the potential to close gaps in the charging network by enabling e-car drivers to charge their car wherever it is parked. In contrast to charging stations that have to be permanently mounted to a wall, portable charger units offer the same functionality with requiring a fixed installation. Whether it's at a hotel, a roadside restaurant, your workplace or your home, all you need is a socket.

The TÜV-certified Juice Booster 2 is a portable charging station that offers a charging power of up to 22 kilowatts and is compliant with the latest IEC 62752 standards. It enables single, 2 or 3 phase charging of e-cars at a current of up to 32 amps. What's more, this portable EV charger is reliable and safe, intuitive to operate, and suitable for use in any country. The charger is compatible

with all electric cars equipped with a Type 2 or Type 1 charging connection. The five-meter cable and theft-proof lockable adapter means you can charge your car in a variety of locations and positions.

#### SAFE CHARGING – EVERY TIME, EVERYWHERE

Even though household sockets are not designed to deliver the continuously high currents needed for e-car charging, the Juice Booster 2 is completely safe to use. The Juice Booster 2's household adapters are all equipped with the patented Juice Celsius temperature monitoring system, which ensures safe and reliable charging even from normal household sockets. The integrated temperature sensors communicate with the Juice Booster 2 via the Juice Connector plug connection. If the plug detects potential overheating, it immediately transmits a signal to the portable charging station, which then shuts down the charging process in a controlled manner. This prevents any



damage to the power socket or the car's battery. Charging then restarts once the temperature of the overheated pins has dropped to a normal level.

The Juice Booster 2 is equipped to automatically detect the socket input current and set the charging power accordingly. It's also waterproof and dustproof (to protection rating IP 67), and can withstand being driven over by wheel loads of up to three tonnes. The Juice Booster 2 is also a 3-in-1 solution that can cover any and all electric charging applications, whether as a fixed wall-mounted box, a portable charging station, or a Type 2 charging cable for recharging in public spaces.

It is designed and developed by Juice Technology, a Switzerland-based global company that has been trading in the UK since earlier this year and which offers both portable and stationary AC and DC solutions, as well as software for charging electric vehicles.

# Accelerating the move to zero emission mobility in the UK

We are a not-for-profit, independent partnership, jointly funded by government and our members, whose breadth of backgrounds and perspectives make us unique.



We are collaborative, bringing together government, industry, NGOs, experts and the widest range of key stakeholders at the highest levels, with a shared vision of accelerating transport to zero emissions.

We shape government policy, regulation and initiatives, influence business strategy and provide information and advice to those working to reduce emissions, improve air quality, and combat climate change through cleaner mobility.

Active since 2003 as the Low Carbon Vehicle Partnership, we've played a pivotal role successfully delivering the UK's low emission transport targets.

In February this year, acutely aware of the growing climate emergency and that 'low' is now not enough, we relaunched as Zemo Partnership, embracing a bold new chapter and the need for accelerated change to zero emissions.

From personal transport to freight, fleet and fuels, we are determined to create a shift in the way people think about mobility – and steer them towards a future of zero emissions, sustainable transport that's better for all.

**ZEMO PARTNERSHIP'S MISSION IS:**

***"Driving the decisions today that result in practical changes for a cleaner, more sustainable transport world tomorrow".***

**OUR AIMS ARE:**

- To facilitate cross-sectoral engagement between industry and other stakeholders with the aims of:
  - Developing collaborative initiatives that develop the market for low carbon vehicles and fuels
  - Building understanding and consensus regarding the optimal pathways to low carbon road transport
  - Influencing Government and other decision makers on future policy directions and optimal policy mechanisms

- To encourage research, demonstration and commercialisation of low carbon automotive technologies in the UK and help UK businesses to participate in emerging markets
- To contribute towards the setting and achievement of UK Government targets for carbon reduction from the road transport sector
- To coordinate an effective flow of information within and between industry and other stakeholders to:
  - Raise awareness of recent developments and new opportunities
  - Improve knowledge and awareness of key issues
  - Increase stakeholder understanding about the mission of the Partnership and its achievements.

Zemo Partnership reviews its activities, based on the overall objectives, on an annual basis. Progress is reported periodically to the board, which comprises:

- Automotive manufacturers
- Automotive supplier
- Consultant or technology provider or after service
- Fuel or energy supplier
- Transport operators and consumer organisation
- Public sector (including trusts, agencies NDPBs and local government)
- Environmental, academic and other organisations

[www.zemo.org.uk](http://www.zemo.org.uk)

