

The Green Pages

NEW FUELS GUIDE



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Transforming clean energy innovation in Birmingham

Tyseley Energy Park (TEP) is situated on the site of one of the oldest companies in Birmingham. It is set to become the energy, waste, and transport focus for the city of Birmingham, showing how novel energy technologies can form an innovative industrial ecology.

Through the various activities taking place on site, TEP is reducing emissions, integrating low carbon technologies, incubating SMEs, and working with partners to develop the innovations needed for a greener, cleaner, healthier Birmingham.

300-YEARS OF CONTINUOUS INNOVATION

TEP is a part of Webster & Horsfall, a leading provider of specialist wire and wire rope related solutions. A family run business established in 1720, Webster & Horsfall manufactured armoured wire for the first successful transatlantic telegraph cable in 1866. The company went on to manufacture spring wire for aeroplanes and cars, and by the end of the Second World War it had more than 1,000 employees.



industrial area of Tyseley where the factory is situated faced social and economic challenges, which required substantial investment and regeneration to overcome.

In 2010 the board, comprised of sixth generation Horsfall family members, began consolidating the business into a smaller footprint, focusing on producing high-quality, low-volume wire for niche markets for springs and pipe-bending equipment. This enabled its old assets (empty sheds and factory buildings with industrial use planning permissions) to be released for redevelopment on a rebranded Tyseley Energy Park (TEP).



The Master Plan

PHASE ONE: 10MW WASTE WOOD BIOMASS POWER PLANT

On the first phase of Tyseley Energy Park, £47 million was invested into a 10MW waste wood biomass power plant. This plant supplies Webster & Horsfall's manufacturing operation and tenants across the sixteen-acre site with renewable electricity. This provides the foundations for a decentralised controllable distributed energy system in this location.

The biomass power plant has created 19 new jobs and diverted 72,000 tonnes of waste wood from going to landfill. The sustainable power generated is equivalent to the amount required to power 17,000 local homes.

Continued overleaf



PHASE TWO: THE UK'S FIRST LOW AND ZERO CARBON REFUELLING STATION

Strategically located between the city centre and Birmingham airport, this station supplies public and commercial vehicles with a range of sustainable fuels that reduce emissions. The fuels that will be available include: commercial scale electric chargers, compressed natural gas from CNG Fuels and drop-in biodiesels with reduced emissions such as Shell GTL fuel from Certas Energy.

This low and zero carbon refuelling station is also home to the UK's largest green hydrogen refuelling station. Commissioned in 2021, the ITM Power Hydrogen refuelling station takes power from a dedicated offshore wind turbine and generates zero carbon, fuel cell grade hydrogen.



The site comprises:

- A car refueller, operating at both 700 bar and 350 bar
- Two bus refuellers operating at 350 bar
- A tube trailer refueller operating at up to 450 bar.

The site can generate over a tonne of hydrogen per day. Enough to fuel up to 40 buses a day.

The hydrogen created on the TEP site is also being used to support two research projects, led by the Energy Research Accelerator (ERA), that are supporting the new creation of a hydrogen economy across the Midlands

- HyDex – a three-year programme that will support SMEs in accelerating the development of new hydrogen products, transitioning from declining

industrial sectors, demonstrating the viability of new products, training, and re-skilling. HyDex will also work with local government and local authorities to support the creation of a market for low-carbon hydrogen solutions as part of the net zero transition.

- H2GVMids – a project that is striving to make clean, hydrogen powered heavy goods vehicles (HGVs) a reality on UK roads. The H2GVMids project involves identifying all the necessary infrastructure, including hydrogen refuelling stations, developing the business case and delivery system, and establishing a trial lease system for truck operators.

PHASE THREE: ENERGY FROM WASTE

As part of a relentless drive to make industry in the city greener, the next generation of waste reprocessing technologies will be developed on phase three. The type of operation under consideration includes an AD facility and a vertical farming unit. CO2 could be captured at the biomass facility and used within the vertical farming unit to aid photosynthesis. A symbiotic exchange of organic waste feedstock from AD could also provide a nutritional digestate for an urban farm fertiliser. The biogas generated during AD could either be fed directly to the gas grid, burned on site to generate more clean energy or diverted to the refuelling station as a potential biofuel, after upgraded.

PHASE FOUR: BIRMINGHAM ENERGY INNOVATION CENTRE

The University of Birmingham's £7 million Birmingham Energy Innovation Centre (BEIC) has been funded by the Greater Birmingham & Solihull Local Enterprise Partnership (GBSLEP). Opened in July 2021, it is the home of R&D, benchmarking and validation,



business support, manufacturing systems integration and modelling expertise across the (public/private/academic) energy, waste, and transportation systems sectors; all in the one facility.

Working with existing energy and transportation system stakeholders, the BEIC is stimulating collaborative research and development projects to overcome local energy and low carbon transport challenges. This demonstrates new and emerging technologies.

By supporting the development and deployment of these new technologies at scale, the BEIC is helping decarbonise electricity and heat and improve the environmental performance of the city as it seeks to achieve net zero CO2 emissions by 2030.

PHASE FIVE: INCUBATING LOW CARBON FOCUSED SME'S

TEP has created an environment where SME's can drive the commercialisation of their innovative energy-related technologies and services. From testing an innovative idea, to tailored incubation programmes and commercial demonstrators, TEP offers varying levels of support dependent on the maturity of each business and technology readiness.



Climate Innovation Platform

The University of Birmingham and Energy Systems Catapult are delivering the Climate Innovation Platform (CIP). Supported by HSBC UK and part-funded by the European Regional Development Fund, CIP offers businesses a package of tailored support to drive the commercialisation of innovative energy products and services. Over the course of a four-year incubation programme CIP will support 100 SMEs.

Energy Transition Centre

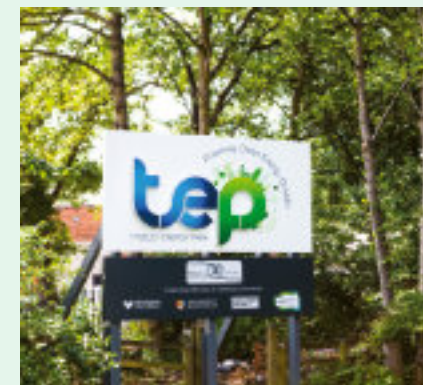
Funded by the Greater Birmingham and Solihull Local Enterprise Partnership the ETC offers newly refurbished office, laboratory, and industrial units for businesses. By clustering this activity at TEP the intention is to enable a pathway for businesses to improve their competitiveness, develop collaborative opportunities and deploy game changing low carbon technologies across the region.

FUTURE ROAD MAP

There is still plenty of space on the existing site for further developments, TEP is working with Birmingham City Council and Jacobs to develop a Clean Energy Masterplan for the surrounding area with plans to extend green growth across Birmingham over the coming years.

NATIONAL CENTRE FOR THE DECARBONISATION OF HEAT

The decarbonisation of heat is the major energy challenge that the UK faces over the coming decades. The West Midlands region recognises this, and so the University of Birmingham, Manufacturing



Technology Centre, Energy Systems Catapult, and the Energy Research Accelerator have submitted a substantial bid to build a National Centre for Decarbonised Heat (NCDH).

Based at TEP, the NCDH will enable the rapid scaling up of manufacturing, skills and deployment of heat solutions; all necessary to meet carbon reduction targets.

The NCDH will create new programmes designed to allow Britain to clear the industrial and commercial roadblocks to the rapid growth of promising technologies and business models. This, in turn, would create tens of thousands of skilled jobs.

GREEN MOBILITY HUB

With a clean air zone now introduced, and the Commonwealth Games arriving in the summer of 2022, TEP has identified an opportunity to showcase Birmingham's green ambitions to the outside world, whilst taking advantage of Tyseley's first-class transportation network.

TEP is planning to create a Green Mobility Hub that will combine multiple transport services, harness innovation in transportation, and promote new forms of energy and energy systems to support reductions in carbon emissions. The mobility hub will act as a demonstrator, showcasing a new and sustainable way our cities, towns or regions operate.

The hub will provide several services including, but not limited to:

- EV Charging
- Co Working Office Space
- First and Last mile delivery
- Bike Share, Car Club, and other mobility services
- Amenities

These are just a few initiatives underway at TEP driven by the need for the UK to meet European emission standards, improve air quality and to meet climate change commitments.

<https://www.tyseleyenergy.co.uk/>

MFG to open 60 EV hubs in 2022

Investing over £50 million



Motor Fuel Group (MFG), the market leading independent forecourt operator with over 900 sites across Great Britain, is pleased to announce its EV investment plans for 2022.

HIGHLIGHTS:

- £50 million investment in 2022 on EV chargers across MFG's nationwide portfolio
- 60 EV hubs to open with 350 new Ultra -Rapid 150kW EV Chargers
- Zap-Map survey rated MFG the UK's second favourite public EV charging network after only one year of operation

2022 EV INVESTMENT PLANS

As part of its commitment to invest £400 million in EV infrastructure by 2030, MFG plans to invest over £50 million in 2022 on dual-fuel and EV-only sites across its nationwide portfolio. The investment will see MFG install over 350 Ultra-Rapid 150kW EV Chargers at 60 hubs throughout the UK. Beyond the 60 new hubs scheduled for opening in 2022, MFG will energise a further 20 sites in Q1 2022 that have been completed in the final months of 2021.

MFG hubs will consist of between four and eight Ultra-Rapid 150kW EV Chargers per site. 150kW chargers can add 100 miles range in approximately

10 minutes, subject to the charging capability of individual car batteries. These will be augmented with 300kW+ chargers as vehicle battery technology improves to maintain the fastest charging times across the MFG network. While these charging speeds are beyond the capability of most EV models currently on the market, MFG is investing ahead of the curve to build drivers' confidence in electricity as a fuel source. Supporting the Government's decarbonisation and sustainability agenda and emissions target of being net zero by 2050.

The investment in 2022 builds on the £40 million EV investment undertaken in 2021 which saw MFG significantly boost the national Ultra-Rapid EV charging infrastructure, as well as opening their visionary flagship forecourt in Putney and the North-West of England's first dedicated ultra-rapid EV only site in Manchester. Alongside its investment in EV, MFG made a £50 million investment to improve its retail, food to go, and valeting offer to the consumer in 2021. MFG's investment will continue in the years ahead across its UK wide network.



RESULTS OF ZAP-MAP SURVEY

MFG were delighted to be voted the nation's favourite new network and second favourite overall in the Zap-Map user ratings for public EV charging networks in the UK, in December 2021. Despite only 10 months of operation, MFG's new network received an overall rating of 4.2/5. The survey found that customers rated MFG highly for its fast chargers, facilities on the forecourt and a safe environment. Customers also found MFG's chargers easy and reliable to use with a simple payment service on the MFG EV Power app alongside being Zap-Pay enabled by the start of 2022.

MFG is only in its first year as a CPO and expects to continue to invest to improve service for customers by creating EV hubs with a leading retail offering and valeting services.



DUAL-FUEL STRATEGY

Over the coming decades, MFG will operate a dual fuel strategy; meaning it will continue to provide existing fossil fuel infrastructure whilst placing equal

importance on rolling out ultra-rapid EV charging hubs. On route charging will be a particularly important infrastructure for those drivers who do not have access to 'at home' charging. In England, over 60% of dwellings in cities and urban areas do not have garages or other off-road parking provisions, and so must rely on electricity from publicly accessible networks.

William Bannister, CEO MFG, said;

"We have already invested significantly, and ahead of the curve, on EV charging across our portfolio. We have an ambitious roll-out programme for 2022 which is focused on our network throughout the UK. Our EV sites are modern in design and provide a high-quality retail and consumer experience for the community and for motorists to use whilst charging their vehicles. We look forward to delivering on our strategic plans throughout 2022."



EV charging boost

New building regulations will create greater charging capacity

In the run-up to 2030, when the sale of new petrol and diesel cars will end in the UK, all new buildings, plus those undergoing major renovations, will be required to install electric vehicle charge points – possibly up to **145,000 extra charge points across England each year. This could prove to be a gamechanger in the shift to net zero transportation.**

As well as new homes and non-residential buildings, any undergoing largescale renovations, leaving them with more than 10 parking spaces, will be required to install electric vehicle charge points.



Beresford, chief executive of the National Federation of Builders (NFB) said construction companies would have to foot the bill – while the electricity companies profited!

The NFB said that to achieve planning permission, constructors are required to fund substations so that electricity companies can provide enough load to both new and existing developments.

UK's first low carbon hydrogen production hub

Essar and Progressive Energy have joined forces to deliver the UK's first low carbon hydrogen production hub

Essar Oil and Progressive Energy, developers of HyNet North West, a leading industrial decarbonisation cluster, have joined forces to set up a venture to produce low carbon hydrogen at Essar's Stanlow Refinery in Ellesmere Port, Cheshire.

The joint venture will manufacture hydrogen at the refinery for use across the HyNet region. It will provide Essar Oil UK with low carbon hydrogen to decarbonise its own energy demand in addition to creating a hydrogen economy across North West England and North East Wales.

Natural gas and fuel gases from the refinery will be converted into low carbon hydrogen, with carbon dioxide safely captured and stored offshore in sub-surface reservoirs in Liverpool Bay. The hydrogen production hub will deliver clean energy to industry in the HyNet 'low carbon cluster', as well as to fuel buses, trains and heavy goods vehicles, to heat homes, and to generate electricity when the sun is not shining or the wind blowing.

FROM 2025

The UK's first low carbon hydrogen hub will initially produce 3 terawatt-hours (TWh) of low carbon hydrogen each year from 2025. This will be quickly followed by a facility twice this size giving a total capacity of over 9TWh of hydrogen per annum, equivalent to the energy used for heating across the whole of Liverpool. A total investment of approximately £750m will be committed to deliver the two hydrogen production hubs. Follow on capacity growth is planned to reach 80% of the Government's new target of 5GW of low carbon hydrogen for power, transport, industry and homes by 2030.

The project will use Johnson Matthey's best in class Low Carbon Hydrogen (LCH™) technology. In partnership with SNC-Lavalin, engineering is well



advanced with funding provided by the UK Government's hydrogen supply competition.

The agreement between Essar and Progressive Energy provides the basis to take the project through final development and into construction and operation.

TRANSFORM OUR ENERGY

Chris Manson-Whitton, Director at Progressive Energy said; "We cannot reach net zero without decarbonising industry. Today brings a key milestone in that journey as Progressive Energy and Essar Oil UK sign a Memorandum of Understanding setting out how we will work together to deliver this exciting project at Stanlow Refinery.

"Delivering net zero requires a transformation of our energy system. HyNet offers a once-in-a-generation opportunity to create real change in energy production and consumption, creating a cleaner world for future generations. It will unlock the low carbon hydrogen economy in the North West,

reducing emissions and creating and safeguarding jobs."

Stein Ivar Bye, Chief Executive Officer, Essar Oil UK, commented:

"Essar is committed to innovative growth as a means to create positive impact to both economy and environment. HyNet and hydrogen production is integral to Stanlow's strategy and will set it on a journey to be the UK's first net zero emission refinery with the ambition to avoid emissions of over 2 million tonnes of carbon dioxide to the atmosphere per year, the equivalent of taking nearly a million cars off the road.

"With the support from government to establish the appropriate business incentives, together with Progressive Energy, we are committed to undertaking the development and the financing of its construction.

"Hydrogen has a central role to play in our low carbon energy solution. We are demonstrating that the industry is committed to play its part of the UK's transformational hydrogen strategy."

www.essaroil.co.uk

Shell's first EV hub

Shell replaces fuel pumps with ultra-rapid charge points at first EV hub in London

Shell has opened its first EV charging hub in the UK in Fulham, London, where petrol and diesel pumps at an existing fuel station have been replaced with ultra-rapid charge points. A global pilot, this is the first time the company has converted one of its existing sites to cater solely for electric vehicles.

Shell Fulham features nine high-powered, ultra-rapid 175kW charge points which can charge most vehicles¹ from 0-80% within 10 minutes; three times faster than more widely used 50kW rapid chargers.

Commenting on the new site, István Kapitány, Shell's Global Executive Vice President for Mobility said;

"EV drivers are looking for a charging experience that is as fast, convenient and comfortable as possible. This is exactly what Shell Fulham aims to offer. It joins our growing network of Shell Recharge sites at forecourts and other locations, our ubiquity on-street

charging network, and our Shell Recharge Solutions for homes and businesses as we increasingly help EV drivers to charge wherever they need it. It also gives us all a glimpse into the future of mobility."

Transport Minister Trudy Harrison said;

"It's fantastic to see Shell leading the way with their brand-new charging hub, offering EV drivers an easy and rapid charging experience. With more people making the switch to EVs than ever before, this is exactly the type of facility we need to help make the transition as simple as possible for drivers up and down the country. This Government has committed £2.5bn to vehicle grants and infrastructure to support the switch to EVs. In addition to Government efforts, it is equally encouraging to see businesses support the EV transition; and Shell's new hub is a brilliant example of the UK's huge effort to go-green and reach our important net-zero targets."



Shell Fulham features a sustainable design including a timber canopy with built-in solar panels, and roof and shop windows that employ double glazing with high insulating properties. Like all of Shell's EV chargers in the UK, including those at over 100 Shell forecourts, the chargers at Shell Fulham run on 100% certified renewable electricity².

The hub includes a comfortable seating area, free Wi-Fi, a Costa Coffee cafe and an extensive Little Waitrose & Partners.

With more than 130 full or hybrid electric vehicle models now available to buyers, EV sales in the UK are accelerating rapidly. In December 2021, 27,705 EVs were sold, making up 25.5% of all new registrations that month.³ For sales and utilisation of EVs to continue accelerating, investment in charging infrastructure will likewise need to grow apace.

Shell has previously stated an ambition to install 50,000 on-street chargers in the UK by 2025 through Shell-owned company ubitricity, and in July 2021 announced that up to 800 Shell electric vehicle charging points would be installed in as many as 100 Waitrose sites across the UK by 2025.

¹ The speed of charge depends on the vehicle and battery. The 150kW chargers will give the fastest car the vehicle can accept.

² Our renewable electricity is certified by REGOs, meaning that all electricity Shell purchases to supply our Shell Recharge sites is matched with the equivalent amount of units from 100% renewable sources in the UK.

³ Data taken from SMMT: www.smmmt.co.uk/vehicle-data/car-registrations



First mobile testing for hydrogen sites

The UK's first mobile facility for testing dispensed quantity at hydrogen refuelling stations will be built by TÜV SÜD National Engineering Laboratory

TÜV SÜD National Engineering Laboratory has secured Government funding to build the UK's first mobile primary standard facility for testing hydrogen refuelling stations (HRS); to ensure they deliver the correct amount of fuel.

Funded by the Department for Business, Energy & Industrial Strategy (BEIS), through the National Measurement System mechanism, this mobile facility will ensure accurate and consistent measurement of dispensed quantity of fuel at HRS. This will assure drivers of hydrogen fuel cell electric vehicles (FCEVs) that financial transactions are correct, and ensure accurate fiscal measurements for future taxation purposes.

Dr Martin Hanton, Technical Director said;

"The design of petrol and diesel refuelling stations is highly standardised. If hydrogen FCEVs are to become a viable transport choice, then establishing a standardised refuelling infrastructure is crucial. Ensuring the consumer gets what they pay for at the refuelling station necessitates accuracy at the nozzle, not the meter.

We must therefore bring the calibration facility to the refuelling station, and that is precisely what we will do with our new mobile primary standard."

MANDATED INTERNATIONAL STANDARDS

The international accuracy requirements for HRS fuel dispensers are mandated as $\pm 2\%$ for new installations. However, current ranges can be anywhere between $\pm 1 - 10\%$. Furthermore, if a consumer disputes the dispensed volume, trading standards cannot investigate at present, as the UK currently has no traceability chain that is linked to a physical primary standard for hydrogen, or the equipment and skills to test fuel dispensers.

TÜV SÜD National Engineering Laboratory's new mobile facility will provide this measurement traceability for the UK.

Marc MacDonald, Head of Clean Fuels said;

"From our involvement in EU projects such as MetroHyVe, it is clear that the dispensed quantity performance of HRS can be variable, in part due to inconsistency in design. We have seen that compliance with the prevailing regulation (OIML R-139) is possible, but not always achieved, especially if less than a full tank fill is delivered.

We will use our new mobile facility to work with industry and test HRS for compliance with the regulations, which is essential to ensure public support for FCEVs use."

Edinburgh-based hydrogen technology specialist Logan Energy has been selected to construct the mobile



test facility. Chosen for their proven track-record in delivering integrated hydrogen technologies, the company has successfully supported the development and deployment of zero emission technologies throughout the UK and Europe.

It has been involved in a number of ground-breaking projects, including SEAFUEL, a €3.6 million project which aims to demonstrate the sustainable integration of renewable fuels into transportation. Logan Energy will use its extensive industry experience to ensure the facility is equipped to deliver robust and accurate test results.

Bill Ireland, CEO of Logan Energy, said;

"This is an exciting collaboration between two Scotland-based teams and is fantastic recognition of our expertise and experience in delivering hydrogen systems and refuelling stations. This project is all about accuracy in a process that has proved difficult to control. We will be setting industry standards to ensure accuracy when it comes to refuelling vehicles.

As hydrogen becomes more of an everyday experience, consumers can be reassured that they will know they are getting what they are paying for. This is particularly important for large users of fuel such as heavy goods vehicles, buses, and trains where inaccuracies when refuelling can result in much larger errors."

Once completed, the mobile facility will also be used to conduct a research campaign, which will help update industry guidance for the design, construction, modification and maintenance of HRS.

www.tuvsud.com
www.loganenergy.com

