

THIS IS ENERGY & ENVIRONMENT

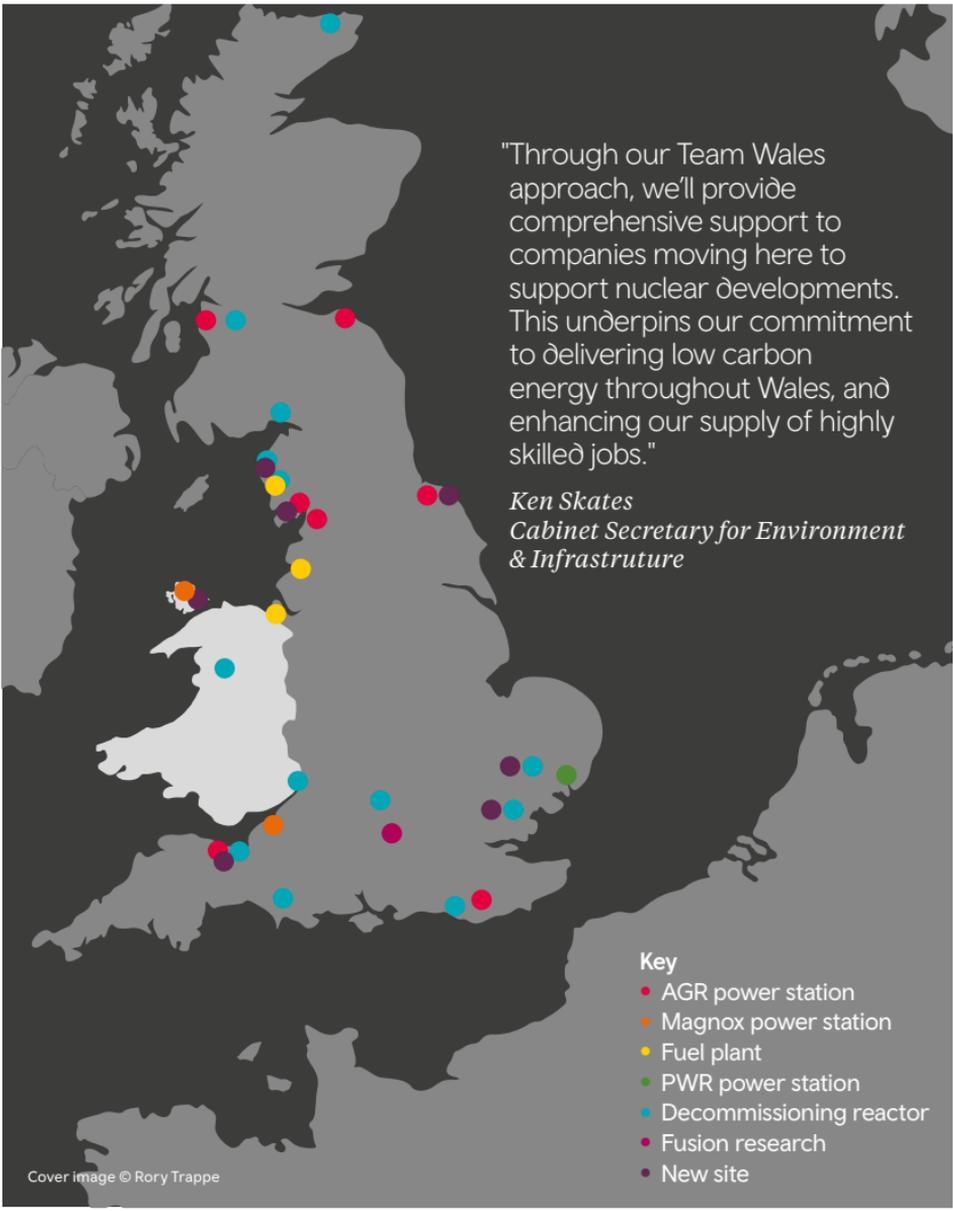
Nuclear Energy



NUC LEAR



Cymru
Wales

A map of Wales is shown in a dark grey silhouette against a lighter grey background. The map is populated with numerous small, colored circular markers. A white silhouette of a dragon is overlaid on the western part of the map. The markers are distributed across the country, with a higher concentration in the central and southern regions. The colors of the markers correspond to the key provided in the bottom right corner.

"Through our Team Wales approach, we'll provide comprehensive support to companies moving here to support nuclear developments. This underpins our commitment to delivering low carbon energy throughout Wales, and enhancing our supply of highly skilled jobs."

*Ken Skates
Cabinet Secretary for Environment
& Infrastructure*

Key

- AGR power station
- Magnox power station
- Fuel plant
- PWR power station
- Decommissioning reactor
- Fusion research
- New site

T H I S I S N U C L E A R E N E R G Y

We have a clear ambition in Wales, to create a sustainable, low carbon future.

Wales is situated on the Western edge of the United Kingdom, and has a population of 3 million, with direct access to over 60 million people within the rest of the UK. Additionally, you will have access to a supportive devolved government, which has the ability to make things happen quickly.

The UK's National Infrastructure Plan for 2016-21, highlights over £500 billion planned public and private investments, within

728 projects. Energy and environment related projects, play an important part of this mix; with over 230 planned projects, with an associated spend of £285 billion.

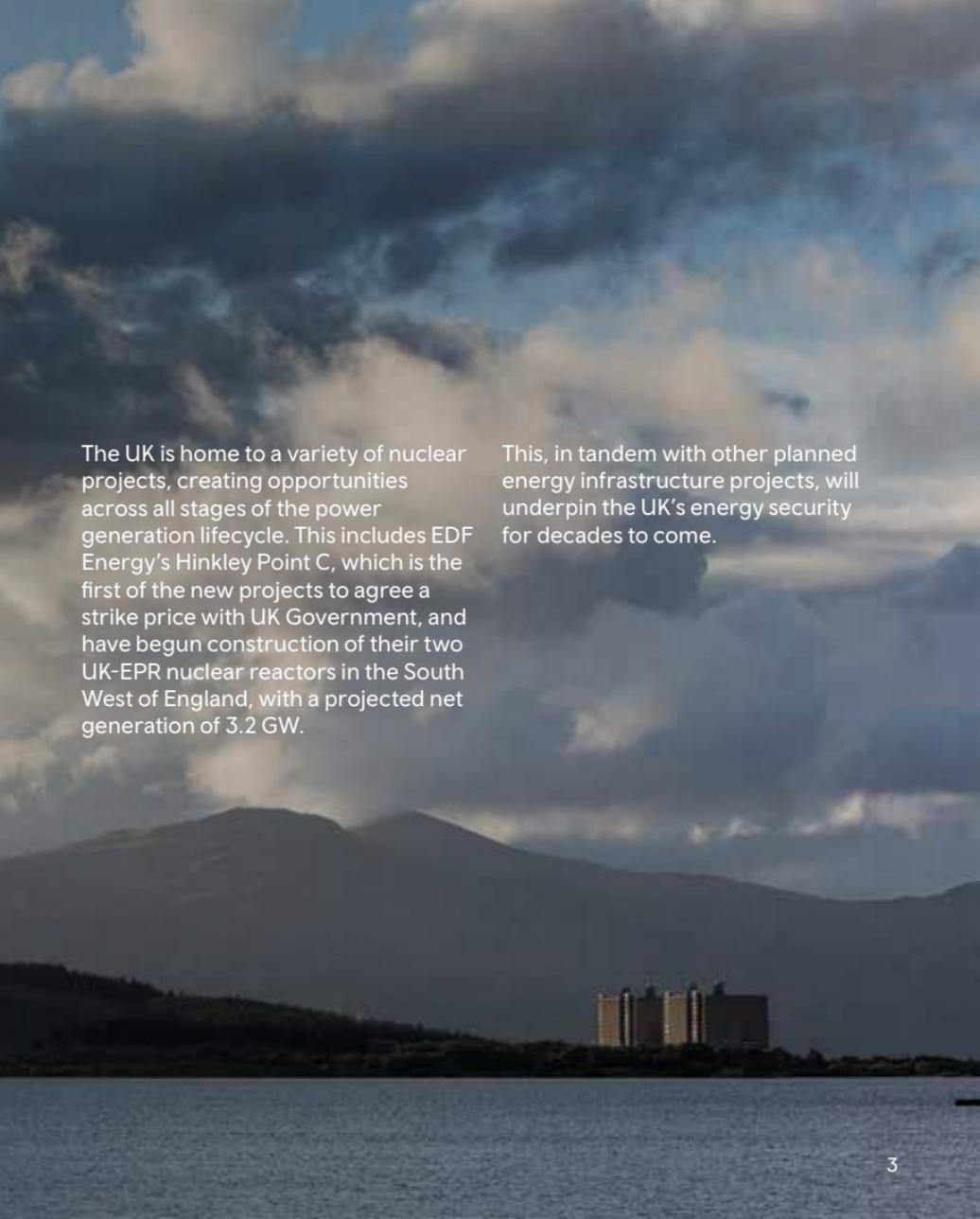
In addition, access to the UK's major nuclear energy locations is swift, which enables hassle free travel by your project partners, to do business with your supply chain and academic partners.

U K N U C L E A R S E C T O R

While most countries continue to debate the future of nuclear energy, the nuclear sector here in the UK, is entering a new era.

The UK Government, has selected 8 sites across the country, to develop a new fleet of nuclear powered generation facilities, one of which is in North West Wales.

Nuclear energy provided over 20% of the UK's energy mix in 2015, and the Nuclear Industry Association (NIA) estimates that the civil nuclear sector provides employment to over 65,000 people throughout the UK supply chain. This is anticipated to grow by a further 25,000, when the planned investments come on-stream.



The UK is home to a variety of nuclear projects, creating opportunities across all stages of the power generation lifecycle. This includes EDF Energy's Hinkley Point C, which is the first of the new projects to agree a strike price with UK Government, and have begun construction of their two UK-EPR nuclear reactors in the South West of England, with a projected net generation of 3.2 GW.

This, in tandem with other planned energy infrastructure projects, will underpin the UK's energy security for decades to come.

W A L E S

From new-build to decommissioning, suppliers are beginning to bid for a diverse range of short and long term contracts, including new build projects, operational support for new plant and waste, and decommissioning support across decommissioned sites.

There are around 1,500 people employed within the civil nuclear sector in Wales, and we have an extensive track record of delivering safe nuclear energy, from our sites at Wylfa and Trawsfynydd in North Wales.

The ongoing decommissioning process at Trawsfynydd, has adopted 'lead and learn' principles, with lessons learnt being extended to other plants in the Nuclear Decommissioning Authority's (NDA) portfolio, across the UK.

Hitachi is investing in a major new plant at Wylfa on Anglesey in North Wales, to be operated by Horizon Nuclear Power. The new £10 billion plant – Wylfa Newydd – is the first of two planned by Hitachi, the second at Oldbury-on-Severn, just across the Welsh border in Gloucestershire.

We have identified the following as key future opportunities within the sector:

- New build.
- Small Modular Reactors (SMRs).
- Ongoing decommissioning across the UK fleet.
- Planned infrastructure investment projects, covering energy, environment and transport.



NEW BUILD WYLF A NEWYDD

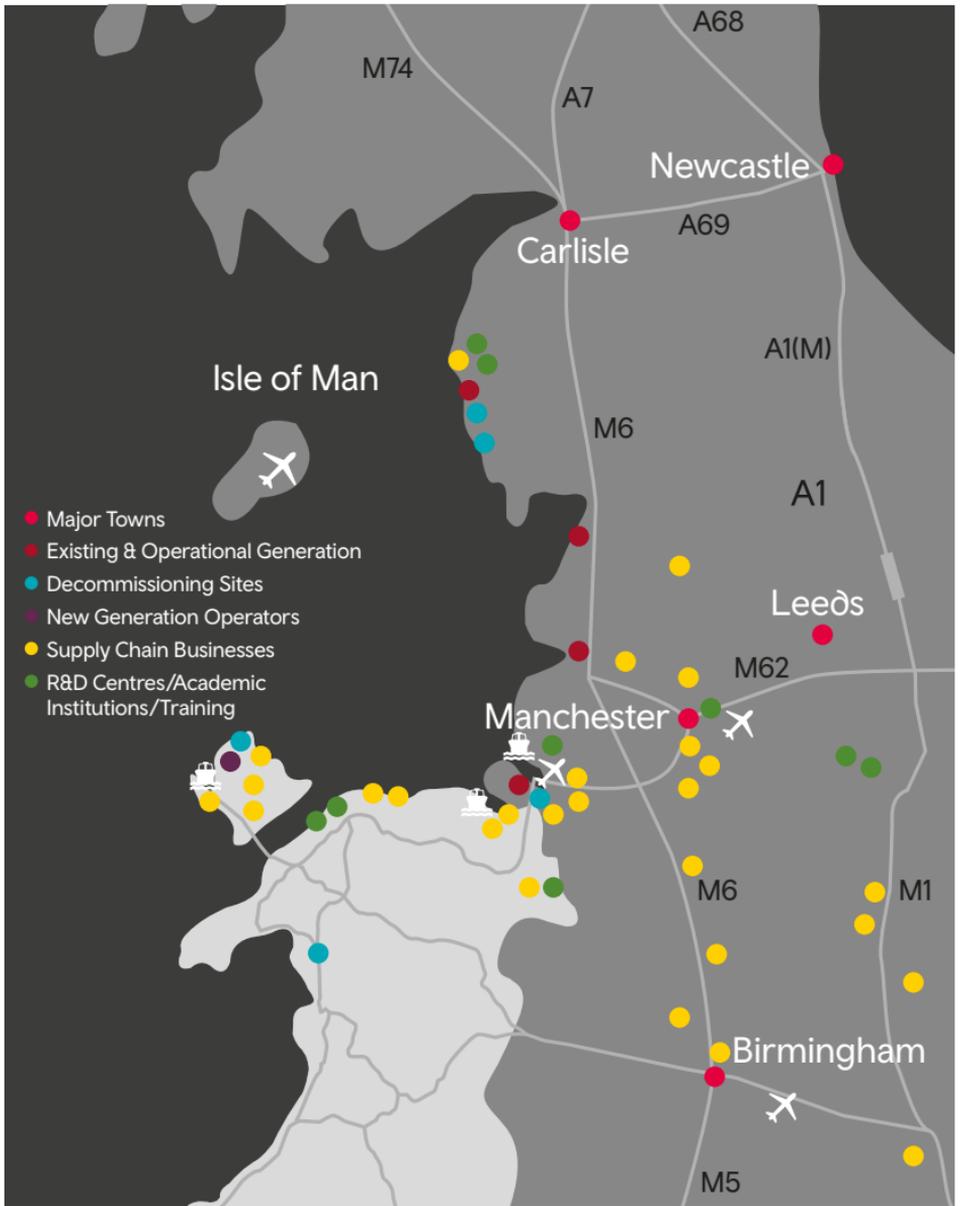
Horizon Nuclear Power's £10 billion Wylfa Newydd project in North West Wales, will have a net capacity of 2.7 GW, and Horizon estimates that the facility will employ 850 people when operational, and up to 8,000 people during the construction process, which will continue until the mid 2020s.

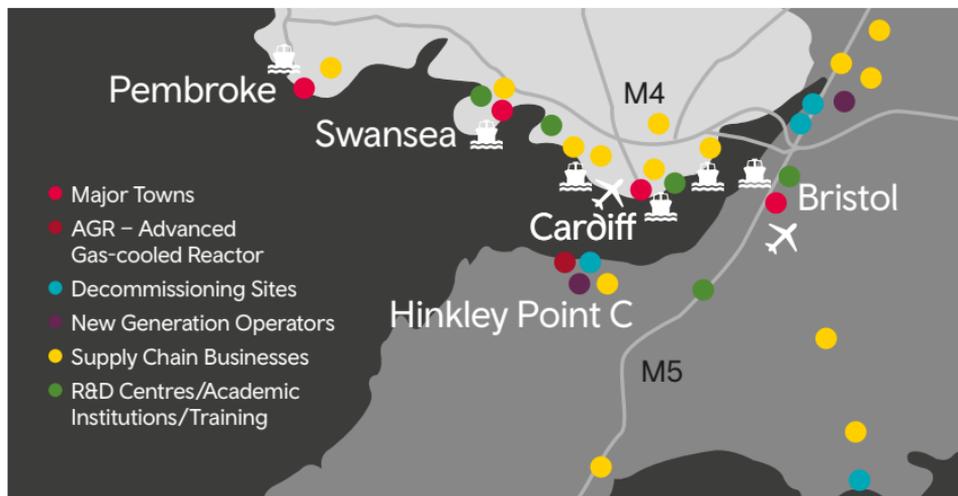
Progress is being made with all of its regulatory requirements – Horizon has recently submitted its application for a Nuclear Site license. The Development Consent Order application will be submitted later this year, and the Generic Design Assessment process, is also due to complete before the end of 2017.

The nature of the project, will enable emerging businesses to work alongside potential project partners, such as Bechtel, Costain, Cavendish Nuclear and Rolls Royce.

Investment opportunities are wide ranging, and encompass:

- A power station, including two nuclear reactors with a minimum generating capacity of 2700 MW.
- A Marine Off-Loading Facility (MOLF).
- Cooling water intake and outfall structure.
- Electricity transmission infrastructure.
- Other associated buildings, such as administration offices, park and ride facilities, temporary worker accommodation, and at least one logistics centre.
- Interim waste and spent-fuel storage facilities.
- Access roads.
- Measures and initiatives, to manage any impact during construction/ operation, of a new power station.





NEW BUILD HINKLEY POINT C

Of the 8 sites identified as being suitable for new build in the UK, EDF Energy's Hinkley Point C, is the first to achieve all the required regulatory consents, and to make a final investment decision.

Construction has now started on site, and the first nuclear concrete was poured in March 2017.

The Company estimates, that 3 million tonnes of concrete, and 230,000

tonnes of steel reinforcement, will be used in construction, with 64% of the contract values being spent in the UK, providing 25,000 job opportunities, and 1,000 apprenticeships.

EDF have to date, awarded over £465 million worth of local contracts within the region, including a £100 million rebar project, to Express Reinforcements, based in Newport, South Wales.



EDF Energy's 7 Key Contractors:

- BYLOR (Bouygues TP/Laing O'Rourke) – civil works
- Balfour Beatty – marine work
- GE Power – turbines
- Areva – instrumentation & control, nuclear steam supply system, fuel
- Balfour Beatty Bailey – electrical work

- Cavendish Boccard Nuclear
– mechanical pipework and installation
- Actan – HVAC

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S M A L L M O D U L A R R E A C T O R S (S M R)

Wales is fully committed, to helping the UK realise its vision for SMR technology, as part of a wider energy mix, and is well placed to support a first of a kind deployment, as the UK's location of choice.

Trawsfynydd is well placed to deliver on this vision – with a long history of nuclear energy related employment, a pool of skilled labour, and Trawsfynydd's strategic position on the UK's National Grid infrastructure.

The site is owned by the Nuclear Decommissioning Authority (NDA), who are working with us, to bring forward the site's redevelopment, and are supportive of the development of SMRs.

According to a report by the Institute of Mechanical Engineers (ImechE), in May 2017 – "The UK Government, in collaboration with the Welsh

Government, should support making the existing nuclear licensed site at Trawsfynydd in North Wales, available as a location for the building and demonstration of SMRs."

You'll find exceptional infrastructure on the 50-hectare (123 acre) site around the former nuclear power station, which is also home to one of Wales' largest lakes – 478 hectares (1,200 acres) a natural, low-cost source of cooling – the site is also connected to the National Grid, via its own sub-station.

The local workforce, includes technically skilled professionals, with Trawsfynydd able to access a highly skilled and experienced workforce, and is within easy reach of a substantial advanced manufacturing hub across North Wales.

M E N A I S C I E N C E P A R K

Menai Science Park Ltd (M-SParc), a wholly owned subsidiary of Bangor University, is developing a Science Park on Anglesey, to drive growth in knowledge based science.

Work on what will be Wales' first dedicated Science Park is underway, and will become operational by the end of 2017.

The UK National Nuclear Thermal Hydraulic Facility at Menai Science Park on Anglesey, is a proposal to bring a £50 million major research and testing facility to North Wales, that

has a legacy expectancy of up to 50 years. The Welsh Government, has the opportunity to collaborate with UK Government, to deliver the project as part of the UK's new nuclear research programme.

The UK Government has awarded contracts for the first phase, covering initial technical and research scoping, and technical requirements of the facility and, subject to a satisfactory outcome, the project will move to the design phase. It is intended that construction could start in mid 2019.





P O R T S

Wales has strategically located ports, which provide valuable supply chain and deployment support for energy projects.

Ports here, have reacted positively to maximise the market potential of energy projects. A prime example, is the Port of Mostyn in North Wales, who have made considerable capital investment to support the offshore wind energy sector, which has enabled them to become RWE's preferred partner, to service their three offshore wind farms in the area. They also work closely with Airbus, to transport their A380 wings. The port has also developed a comprehensive supply chain infrastructure to support the projects, which could provide significant input into the proposed energy developments, along the North Wales coast.

Holyhead Port, is strategically located to support energy projects in North Wales, including the nuclear sector, and has actively worked alongside companies to develop solutions. The port has recently completed a master planning exercise, which incorporated a nuclear development option.

Similarly, Milford Haven, the UK's largest energy port, which is based in South Wales, has an extensive oil and gas supply chain infrastructure, delivering products and services to both sectors.

Associated British Ports (ABP), operates 5 ports along the South Wales coastline, located at Barry, Cardiff, Newport, Port Talbot and Swansea.

ABP offers a wide range of services, and has experience of working alongside energy businesses.

S U P P L Y C H A I N

Alongside our ports, our manufacturing and service base, is striving to meet the industry's need for world class products and services.

The Fit 4 Nuclear (F4N) programme is an unique service, which assists supply chain companies, to get ready to bid for contracts, within the nuclear industry.

As part of the service, F4N lets companies measure their operations against the standards required to supply the nuclear industry – in new build, operations and decommissioning – and identify the next steps to close any gaps.

Companies such as Flamgard, Lloyd Morris Electrical, AIMet and Mon Maintenance Services in Wales, have all received their F4N certificate.

Wales offers a cradle-to-grave service solution, including a thriving service sector, ranging from Eversheds LLP and Hugh James solicitors, and environmental and engineering companies, such as ARUP and Mott MacDonald plus, all the main construction contractors, including Balfour Beatty and Kier Construction.



A C A D E M I C E X P E R T I S E

From North to South Wales, leading edge nuclear R&D programmes are underway, addressing key industry issues, including technology, training, supply chains, production and economics.

Bangor University in North Wales, is a prime example. With both nuclear decommissioning and new-build projects on its doorstep, the University is building a world leading capability in nuclear engineering, which will be the hub of a global network.

With a focus on existing and emerging technologies in the nuclear sector, including Pressurised Water Reactor (PWR) , Boiling Water Reactor (BWR) and Small Modular Reactor (SMR), Bangor University will become a leading centre of expertise.





Bangor University and Imperial College London, with Hitachi-GE, already provide technical expertise and support, and have established a joint “BWR Research Hub and Network”. The BWR Research Hub and Network, brings together the UK research base, with Hitachi Nuclear researchers, to help develop future generations of Boiling Water Reactor technology.

At a broader level, Bangor University is also developing a number of highly ambitious projects in the wider energy sector, with a focus on sustainable and secure energy supplies for the future.

Professor David Shepherd, Deputy Vice-Chancellor of Bangor University said: “Together, these initiatives, will establish North Wales as a global centre of expertise, and help develop a new generation of scientists and engineers, to tackle the urgent need for energy security around the world.”

Swansea University, boasts a strong track record in materials research, which includes collaborations with the National Nuclear laboratory (NNL). Specific areas of activity include:

- Investigation of inter-granular corrosion (IGC) initiation on stainless steel used to clad spent fuels; plus,
- Characterisation of the localised corrosion behaviour of Magnox magnesium alloy.

Aligned with this activity, the University's focus on 'Atoms to Applications', has seen a £9 million investment by EPSRC and the Welsh Government, to establish an Advanced Imaging of Materials facility (AIM).

AIM is an integrated scientific imaging facility for Wales, that can provide imaging and analytical capabilities across several length scales, from Angstroms to centimetres. The Centre has strong linkages to large scale private and publically funded facilities, that can extend this capability (in both directions) to picometers and meters. Swansea also boasts considerable mechanical testing facilities.

The Welding Institute (TWI) is working with the nuclear industry, to deliver process knowledge and system solutions in specialist joining and welding, non destructive testing and materials testing techniques. Their Advanced Engineering Materials Research Institute (AEMRI), aims to develop a nuclear fabrication research centre at TWI Wales in Port Talbot, to support the nuclear supply chain in the delivery of skills and knowledge.



Meanwhile, Cardiff University runs three separate nuclear projects:

- The Understanding Risk Group at the School of Psychology, is researching public attitudes towards nuclear power and radiation.
- The Geoenvironmental Research Centre, at the School of Engineering, is researching high-level nuclear waste disposal, nuclear repositories and waste isolation.
- The School of Chemistry’s Heterogeneous Catalysis and Surface Science Group, is using analytical equipment to study the interaction of small molecules with surfaces — part of a collaboration with the National Nuclear Laboratory, studying long term storage of nuclear waste.

Alongside our higher academic programmes, Wales is working with Horizon Nuclear Power, to provide 3 year technical apprenticeship opportunities, via Coleg Menai in North West Wales.

Group Llandrillo Menai, who is National Skills Academy for Nuclear’s accredited local provider, delivers the Triple Bar qualification, which focuses on the basic principles of nuclear generation, health and safety and ‘human behaviours’. This is an essential, basic requirement, for working on existing nuclear sites, and allows the holder, to access and work unsupervised, on a nuclear facility.

Glyndŵr University in North Wales, is a recognised training provider, and is a HE Associate Member of the National Skills Academy for Nuclear.



S U P P O R T N E T W O R K

Join us in Wales, and your business could work with a number of support bodies.

Our newly formed, industry-led, Wales Nuclear Forum, has 50 plus companies, who are actively working towards supply chain collaboration, and solution provision, to the nuclear industry.

Construction Futures Wales is a joint initiative between the Construction Industry Training Board (CITB) and Welsh Government which offers support to Wales based construction businesses to grow and improve.

The Sell2Wales website, is an information source and procurement portal, set up by the Welsh Government to help:

- Businesses win contracts with the public sector across Wales.
- Public sector buyers to advertise and manage tender opportunities.
- Businesses promote their services.
- Businesses find contract opportunities.

Further details can be found at www.sell2wales.gov.wales

BRE Wales is a multidisciplinary team, providing sustainable building consultancy and research. Construction firms consult with BRE on diverse matters, including refurbishment, renewable energy, site waste management and thermal modelling.



WHAT NEXT?

The opportunities for your company to engage with the sector are many and varied – so let's talk.

Find out what Wales can do for your business:

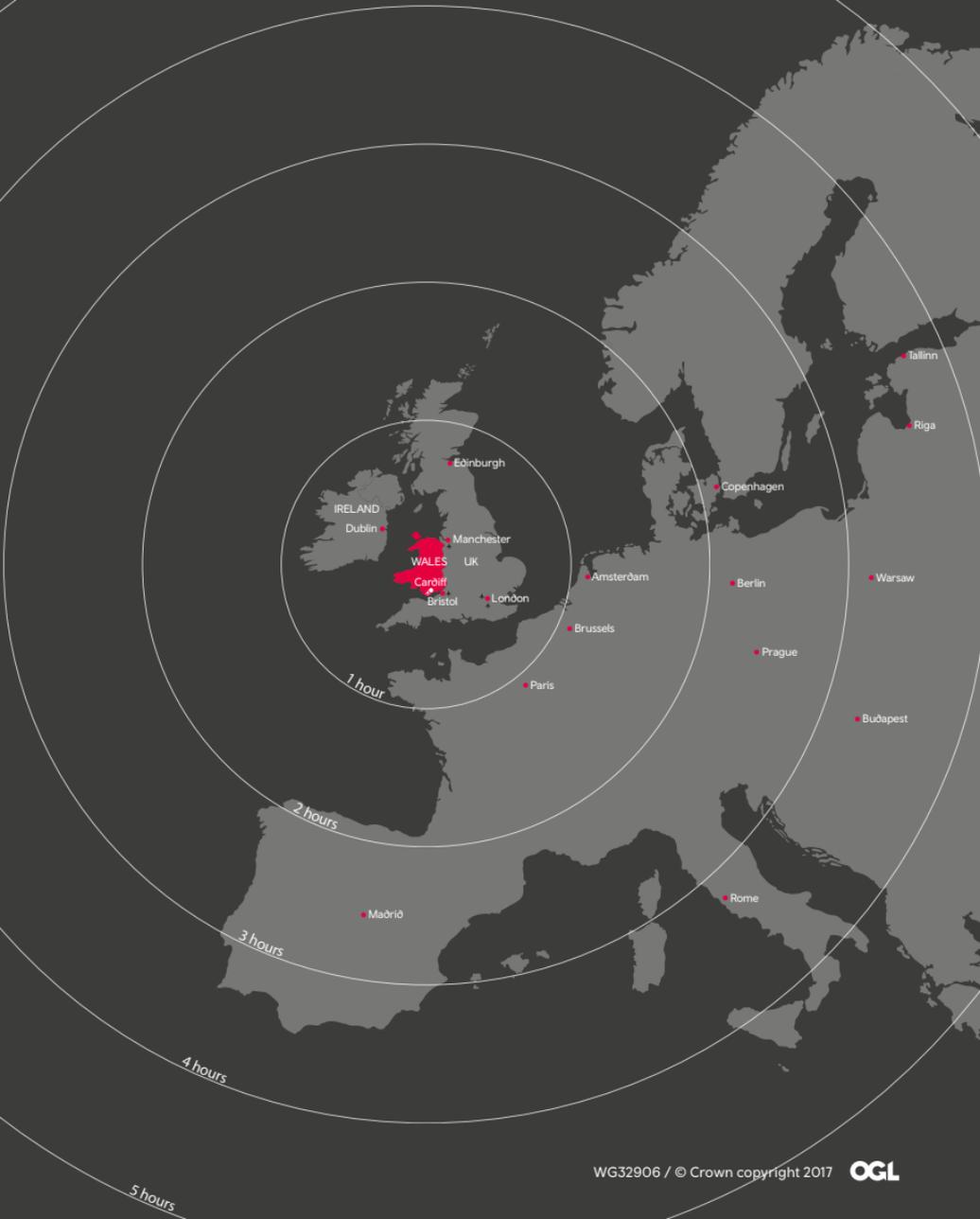
UK—
+44 (0) 3000 6 03000
tradeandinvest.wales

The Welsh Government has identified 4 distinct yet interwoven opportunities supporting the future development of the sector.

These include:

- New build.
- Small Modular Reactors (SMRs).
- Ongoing decommissioning across the UK fleet.
- Planned infrastructure investment projects covering energy, environment and transport.

Wales is entering an exciting era in the development of nuclear power – and businesses from the UK and overseas, are invited to play a part.





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