Ultra Low
Manchester
Liverpool
Cardiff
Newport
Wrexham
Swansea
Birmingham
M4
A55
M5
M50
Bristol
Tech Valleys
Ebbw Vale
Automotive clusters
Aberystwyth
Swansea
Newport
Cardiff
Bristol
The Welsh Government has pledged to make Wales a low-carbon economy.

— Transitioning to a low carbon society is vital to improving the social, economic, environmental and cultural well-being of Wales and the rest of the UK.

— Wales aims to be globally recognised as a leading location for the development and delivery of emerging technologies, particularly in the automotive sector, by 2027.

— That ambition has led to an investment in skills and research, matched with a desire to innovate.
The transition to a low carbon economy in Wales is being supported by the establishment of:

Advanced Manufacturing Research Centre (AMRC Cymru Wales), North Wales – the Institute, currently under construction, will have a strong focus on advanced manufacturing sectors including aerospace, automotive, nuclear and food. The institute will deliver game-changing support to key manufacturing companies as well as multi-sector supply chain companies and the broader small and medium sized enterprises economy.

Advanced Technology Cluster
Compound Semiconductors (CS), South Wales – compound semiconductor technology is at the heart of the next industrial revolution, and it is coming together in one place – Wales. Academia, Government and industry are collaborating to establish the world’s first compound semiconductor cluster – CS Connected. Integral to this are the:

— Institute of Compound Semiconductor Technology
— Compound Semiconductor Centre – the joint venture between IQE plc and Cardiff University.
— Future Compound Semiconductor Manufacturing Hub
— Compound Semi-Conductor Catapult
— Compound Semiconductor Wafer Manufacturing Foundry

Tech Valleys, South Wales
The Welsh Government has pledged to invest £100m in the Tech Valleys programme between 2017 and 2027 to support the creation of more than 1,500 jobs in cutting edge industries including automotive, with £25m allocated for the next three years on top of existing financial commitments made.

Tech Valleys will create an environment for the development and delivery of emerging disruptive technologies, including advanced materials and manufacturing, plus autonomous processes and products.
The vision to make Wales a low-carbon economy is supported by academic expertise throughout the country.

Wales has a strong history in low carbon technology. In 1839, Swansea born judge and inventor, Sir Robert William Grove, known as the father of the fuel cell, developed a platinum-zinc voltaic cell, the 'Grove' cell. He went on to create the voltaic battery in 1842, which was to become the forerunner of the modern fuel cell.

Current academic expertise in Wales:

**Cardiff Catalysis Institute (CCI), Cardiff University South Wales**

Catalysis can make a major contribution to the development of economic and environmentally sustainable manufacturing processes and the Cardiff Catalysis Institute (CCI) is recognised as a global leader. The centre has a successful track record, working with a range of businesses, including leading automotive companies.

The CCI’s research includes exhaust-gas reforming for waste heat recovery and aftertreatment.

**The Centre for Automotive & Power System Engineering (CAPSE), University of South Wales**

The Centre is a nationally recognised independent research, development, test and certification house with a reputation for cutting edge research and knowledge transfer activities within the advanced automotive and power systems engineering sectors.

**The Electrical Vehicle Centre of Excellence, Cardiff University, South Wales**

Focuses its research activities on all aspects of electrical vehicles including design and manufacture; innovative business models; consumer expectations; energy supply and charging infrastructure.
Electronic Systems Design Centre, Swansea University, South West Wales
Leading research in the areas of Power Semiconductor Devices and Technology, Sensors, Micro Electro Mechanical Systems (MEMs), Power Electronics and Power Systems.
Part of the Compound Semiconductor Applications Catapult.

The Hydrogen Centre, University of South Wales, South West Wales
New research, development and demonstration of hydrogen energy technology in Wales, and a centre for collaboration with industrial partners.

FLEXIS (Flexible Integrated Energy Systems)
A £24 million research operation designed to build on the world class energy systems research capability that already exists in Welsh universities.
This is led by Cardiff University, Swansea University and the University of South Wales.

The research focuses on developing flexible energy systems, a major current strategic need within the energy world. At the heart of the project is the development and strengthening of research and innovation of energy systems technologies across Wales, highlighting Wales as a leader in this area.

National Spectrum Innovation, Engineering and Experimentation Centre, Aberystwyth University & QinetiQ
Research opportunities include:
Intelligent transport systems (road, rail, air), Radio Systems, Robotics, Autonomous Vehicles, Space instrumentation and Sensors, Sensor Development and Networks, Infrastructure – improving communications and connectivity to local communities, smart/future cities in rural areas, Cyber Security, Agri-tech, Precision Farming, Visualisation/Image Processing, Materials, 5G.
THE INDUSTRY IN WALES

Some examples of low carbon economy companies who are already within Wales:

Toyota, Deeside, North Wales
More than one million next-generation hybrid engines have now been produced in Wales. The new engine is the latest generation of Toyota's world-leading hybrid powertrain technology and will play an important role in Toyota Motor Europe’s ambitions for increasing hybrid vehicle sales Jim Crosbie, Engine Plant Director, said: “Toyota has a long and successful record of building engines in north Wales”.

Riversimple, Mid Wales
Established their R&D site in Wales to develop the 'Rasa' – a radical hydrogen fuel cell vehicle which forms part of their ambition to eliminate the environmental impact of personal transport. The Rasa is now being manufactured in Wales.

Hugo Spowers, Founder states, “Coming to Wales has been much better than we ever expected. We didn’t realise just what advantages it would have. We get a lot of support from the Welsh Automotive Forum. It’s fantastic for us, being able to leapfrog and establish cross-sectoral collaborations. We’ve also got a fantastic relationship with the Welsh Government and they really have been extremely supportive. This is a much better environment than if we’d stayed across the border; for what we’re doing, it’s easier to do it here in Wales”.

Hydro, Bedwas
Aluminium components for the new zero emissions capable London cab, are now made in Wales by Hydro following a £9.6m investment.

“There is a good example of how industrial companies such as Sapa are growing in advanced markets fueled by demands for lighter vehicles and more sustainable materials,” says John Thuestad, Business Area President, Hydro.
YASA, Mid Wales
YASA is a leading manufacturer of advanced electric motors and motor controllers for hybrid and electric vehicles. For a given power and torque requirement they can deliver smaller, lighter electric motors and controllers than competing technologies. Their innovation in automotive design is matched by world-class series manufacturing for Tier 1 and OEM customers at competitive cost.

They were recently successful in the latest Advanced Propulsion Centre (APC) funding round to produce a best-in-class Electronic Drive Unit (EDU) for next generation Battery Electric Vehicles (BEVs).

Senior Flexonics, South Wales
Part of Senior Plc, Senior Flexonics Crumlin is a Sales and R&D headquarters which has been based in Wales for over 25 years. They are experts in designing, developing and manufacturing thermal management solutions for combustion, hybrid and electric drivetrains and high efficiency heat exchangers for fuel cell energy applications.

Haydale, West Wales
Haydale is a global technologies and advanced materials group that facilitates the integration of nanomaterials into the next generation of commercial technologies and industrial materials. With expertise in graphene, silicon carbide and other nanomaterials, Haydale is able to deliver improvements in electrical, thermal and mechanical properties, as well as toughness. Collaborating with BAC Mono, Haydale claimed a world first, using graphene in the wheel arches and diffuser body panels of the single seater Mono supercar. The result; increased mechanical performance and weight reduction.

Dawson Shanahan, Mid Wales
Dawson Shanahan design, prototype and precision engineer customer specified components and assemblies, to the highest quality. Since their
foundation in the 1930’s Dawson Shanahan has been heavily involved in the automotive sector, in both high volume manufacturing and in the development of specialised components for motorsport, from F1 downwards. As the industry transitions to alternative powertrains, the company continues to play an important role, partnering global electrical connector companies with the development of high power connectors for electric vehicles using cold forming and machining techniques.

**Deregallera Holdings Limited (DHL), South Wales**

DHL is a Materials Research and Engineering R&D company established in 2010. The company is creating the next generation (non-lithium-ion) energy storage and advanced electric motor systems. DHL are a team of 20 of highly experienced and motivated PhD materials scientists and mechanical and electrical engineers.

They recently secured £700,000 of UK Government funding through the Faraday Battery Challenge to develop a new hybrid energy storage system to extend the life of an electric vehicle battery by 50%.

**Tri-Wall Europe Limited, Monmouth**

Tri-Wall are global leaders in technical packaging in the automotive industry, experts in UN Dangerous Goods and 4G battery packaging.

The UK arm, Tri-Wall Europe Ltd, based in Monmouthshire has secured more than £700,000 of UK Government funding through the Faraday Battery Challenge towards their £1.18million stake in the LIBRIS (Lithium Ion Battery Research In Safety) project. This project consists of 8 industry experts, research and training together with packaging and handling and its total value is £7m. It will influence the world-wide standard for the future on how lithium-ion batteries are transported.

**Oxis Energy**

OXIS Energy is to establish the first ever manufacturing plant for the production of electrolyte and cathode active material specifically for the mass production of lithium sulfur cells for worldwide export. The plant, which will be built in Port Talbot, South Wales, will produce components for batteries to power buses, trucks, drones and submarines. The company received £3.2m investment from the Development Bank of Wales.
WHY WALES?

As well as a strong automotive sector and commitment to develop low carbon infrastructure in Wales, there are many reasons to consider Wales.

Establishing a business
Wales is part of the UK, the world’s fifth largest economy and is home to the largest financial centre in Europe. It takes just 13 days to establish a business in Wales.

Location
Cardiff to London is 2hrs by train. Flights from Cardiff to major European and Middle Eastern hubs enable access to destinations around the globe.

University
Wales’ leading universities feature among the UK’s top institutions and are internationally recognised for their research and development facilities.

Business
You probably experience Wales every day. The chip in your smartphone, the wings of your plane, that film/TV series you enjoyed, your car’s engine. All Wales made.

Tax
Corporation Tax fell to 19% in 2017, the joint lowest in the G20. This will fall to 17% in 2020.

Law
As a devolved Government, we have the flexibility to ensure you succeed in Wales. Wales shares the same legal jurisdiction as England which provides stability, security and expertise.

People
A population of 3.1m with a skilled workforce of 1.4m.

Language
A modern bilingual nation. Welsh, spoken by one in five. English spoken by everyone.

An epic shore
Wales Coast Path – an 870-mile journey along our entire coastline from north to south Wales.
Wales is investing in R&D and innovation.

Benefits include:

— Access to world-renowned academic support our SMARTExpertise programme.

— One of Europe’s most comprehensive support systems for industrial research, experimental development and feasibility studies via our £115m SMART Cymru research fund.

— On-going investment into Europe’s first eco-system dedicated to compound semiconductor applications, growing and integrating this high spec material into innovative new products.

— ‘Rising Stars’ fund supports the highest calibre researchers to work in excellent research groups in Welsh universities.

The Welsh Government helps businesses to grow in Wales.

Many global companies in Wales re-invest. Wales has its own elected Welsh Government as well as representation to the British Government in London. Foreign investors are taken good care of by a small but dedicated team at the Welsh Government from beginning to end of the investment project.

Wales is a great place for work and play.

Rough Guide says Wales 'is the most beguiling part of the British Isles'. The Lonely Planet describes Wales as the 'best region on earth to visit'. Culture, festivals and sport are all to be enjoyed in Wales.
“I am so proud that the Rasa has been designed and developed here in Wales. It really is an innovative machine – the first of its kind in the world – and one boasting innovative low-carbon technology. This is exactly the sort of Research and Development technology that we want to attract to Wales and I wish Riversimple continuing success as they work towards developing and expanding their business.”

Ken Skates AM
Cabinet Secretary for Economy and Transport