



**WEST
MIDLANDS**
GROWTH COMPANY
Invest in the West Midlands



LOW CARBON **INVESTMENT PROSPECTUS**

The home of sustainable green innovation



“As a Combined Authority we’ve set out bold ambitions to become net zero by 2041 and developed a clear plan for how we can achieve that. The first industrial revolution provided the world with unimaginable advances, and as the home of the green industrial revolution, we need to push those advances even further - but in a way that protects our planet and helps it recover.”

Andy Street
Mayor of the West Midlands

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THE WEST MIDLANDS: HOME OF THE GREEN INDUSTRIAL REVOLUTION

With low-carbon goods now representing the fastest growing sector in its £105bn economy, the West Midlands is poised to lead Britain's Green Industrial Revolution. Underscoring this, is the region's unique ability to take a whole-system approach to carbon reduction.



The West Midlands is already tackling some of the biggest barriers to achieving a greener, cleaner future, through innovation in low carbon and electrified transport, decarbonised commercial and domestic energy, and a net zero built environment. As a result, low carbon is now the fastest growing sector of the West Midlands £105bn economy, and tens of thousands of new green jobs are set to be created throughout the region's supply chains.

Innovation, collaborative R&D, and applied industrial technology, is at the heart of our low carbon offer. This holistic approach also brings together our world-ranked universities, national and local government, and a wide range of private sector partners from international corporates to specialist SMEs.

TACKLING THE WORLD'S BIGGEST BARRIERS TO NET ZERO

As a world-leader in automotive, rail and aerospace technology, the West Midlands is at the forefront of alternative propulsion solutions for the transport sector. The region developed the UK's first train to run on hydrogen, deployed one of the UK's first fully electric bus fleets, will launch the UK's largest hydrogen bus fleet, and has developed the UK's first *Future Mobility Zone* - over 200-mile mixed-road, multi-site testbed for 'real world' EV, CAV and 5G-enabled transport R&D.

The decarbonisation of energy, both through the grid and via battery cells, is another of our sector strengths. We are the home of National Grid and Cadent Gas - both of which are fully committed to reducing their reliance on fossil fuels - which puts the West Midlands at the epicentre of the UK's energy storage, distribution and transmission sector.

We are also the location of UK's first *Energy Capital* initiative - which has created four investor, developer and operator-ready Energy Innovation Zones (EIZs) across the region - and we host the Energy Systems Catapult, the government-backed agency at the forefront of low carbon energy innovation.

Further, our *UK Battery Industrialisation Centre* is revolutionising how we develop and use stored and portable battery power, while other R&D hubs are exploring how we can reuse and recycle industrial batteries. This activity informs the region's wider electrification specialisms and the extensive work we are doing in complementary disciplines such as propulsion and light weighting.

In addition, the region is addressing the challenge of creating a greener built environment. The new National Brownfield Institute (NBI), based at the University of Wolverhampton, is home to Europe's largest specialist

construction and built environment campus. This places the West Midlands as the UK's strategic centre for Modern Methods of Construction (MMC) and brownfield land remediation and regeneration.

We also have a growing cluster of private sector volumetric, modular and off-site construction specialists, and have a specialist R&D programme focused specifically on the decarbonisation of domestic heating.

By embracing a circular, partnership and joined-up approach to policy and investments, the West Midlands itself has set a target to develop a net zero local economy by 2041.

But through the work we're already undertaking to address some of the world's most emissions-intensive sectors, we are also leading the way on a national and international basis.

This means by investing in the West Midlands low carbon offer, you'll immediately become part of a truly global Green Industrial Revolution - not just a domestic one - and be actively involved in solving the climate crisis **now**, not tomorrow.

THE WEST MIDLAND'S LOW CARBON ECONOMY

- Fastest growing economic sector in the region
- 94,000 low carbon regional workforce
- 5,100 low carbon businesses
- £12bn low carbon revenue P.A.
- Annual low carbon growth:
 - + 7% Employment
 - + 7% Sales
 - + 9% New Company Entrants
- +21,000 New Low Carbon Jobs Set To Be Created By 2026

ONE REGION, MANY OPPORTUNITIES

- Future Mobility - CAVs, EVs, 5G-enabled transport systems
- Transport - propulsion, electrification light weighting (e.g. rail, aerospace)
- Energy - smart grids, net zero power, energy storage, transmission & distribution
- Built Environment - sustainable construction, decarbonisation of heat & retrofit technologies, brownfield land remediation
- Resource Management - circular economy, waste and recycling, water management systems, behaviour change

5,100

LOW CARBON
BUSINESSES IN THE
WEST MIDLANDS

THE WEST MIDLANDS: KEY STRENGTHS

COUNTRY'S LARGEST SPECIALIST WORKFORCE

The West Midlands' low carbon and environmental goods sector employs 94,000 people; a greater concentration of expertise than any other UK location. The region employs 28 times the national average in electricity transmission and 11 times more in mains gas network operation.

UK'S LEADING FUTURE MOBILITY ZONE

The established presence of Tier 1 to Tier 4 manufacturers, as well as university-led R&D centres specialising in powertrain and battery propulsion; power electronics, electronic machines; and CAV technologies, has created a ripple effect of leading supply chain opportunities in low carbon transport. This is bolstered by the regions' designation as the UK's first Future Mobility Zone.

UK'S ENERGY SUPPLY CHAIN

At the centre of the UK's power distribution networks and home to the headquarters of National Grid and Cadent Gas, a net-zero mission-critical supply chain of opportunities exists in smart grid solutions and UK grid modernisation.

BATTERY PRODUCTION CAPABILITY

Home to the UK Battery Industrialisation Centre (UKBIC) - part of the Faraday Battery Challenge - the West Midlands is Britain's leading location for businesses at varying stages in the value chain to test and scale next-generation battery production. The region has also entered a landmark Joint Venture Partnership with bold ambitions to build a Gigafactory in Coventry.

R&D FOCUSED ENERGY SYSTEMS

Multiple UK-first Energy Innovation Zones, led by regional body Energy Capital, provide a powerful single point of entry for companies with ambitions to turn new technologies into fully commercially-viable energy systems that function at 'city-scale'.

STRONG LOCAL LEADERSHIP

The West Midlands Combined Authority's (WMCA) ambitious Net Zero Five Year Plan is targeting net zero carbon emissions by 2041 - ahead of UK national targets. A number of priority policy interventions - from a Zero Carbon Homes Charter to a Circular Economy Routemap - are creating fertile ground for low-carbon focused companies to test and deploy new technologies in the region.



"The region's unique whole-system approach to carbon reduction has positioned it at the vanguard of the UK's Electric Vehicle revolution, Europe-leading in sustainable construction, and at the epicentre of smart grid solutions. These technologies are underpinned by our world-leading university-led R&D base."

Neil Rami
Chief Executive Officer
West Midlands Growth Company



HOME OF THE GREEN INDUSTRIAL REVOLUTION

National Automotive Innovation Centre -
Partnership between University
of Warwick, WMG, JLR, and Tata.

LOW CARBON SECTOR OPPORTUNITY: FUTURE MOBILITY

A third of all cars, and one in four engines, produced in the UK come from production lines in the West Midlands. The region exported £13.7bn worth of cars and parts in 2019, almost double the number of any other region - and 36% of the UK total.

ELECTRIFICATION, CONNECTED AND AUTONOMOUS VEHICLES

But as the car industry transitions from fossil fuel to hybrid, and from hybrid to fully electric, the West Midlands' automotive sector has been proactive in helping the industry find solutions to the electrification challenge.

This has been done in partnership with some of the world's biggest car manufacturers. For example, Jaguar Land Rover, Aston Martin Lagonda, BMW, Geely, Changan Automotive and SAIC all have a significant manufacturing presence in the region, as well as considerable R&D and innovation assets.

Our collaborative approach, which has involved our universities, government-backed programmes, the region's agile supply chain, and local government support,

has seen the successful development of new low carbon innovations and applications across many parts of the automotive production process.

This partnership approach also helped the region secure the UK's first *Future Mobility Zone* (FMZ), bringing together industry partners, academic institutions and public sector organisations to support and accelerate the adoption of new, low carbon and net zero transport modes and services. The FMZ has also helped the region establish the UK's largest 'real world' connected and automated mobility (CAM) testbed - over 200-mile zone of public roads (urban and rural) which is 5G enabled.

"We chose the region because of its automotive credentials and opportunities for further growth.

Responsible for 36% of all automotive and parts exports from the UK, the West Midlands has a highly productive and diverse supply chain of well-known and specialist vehicle manufacturing firms concentrated in the region."



To read more about IPG Automotive visit: investwm.co.uk/case-study/ipg-automotive/

The drive to electrification, and the West Midlands unrivalled EV, Connected Autonomous Vehicles (CAV) and Connected and Automated Mobility (CAM) facilities, has triggered considerable new investment by both existing companies and new entrants (including OEMs and supply chain companies). As an example, Jaguar Land Rover has stated that the Jaguar brand will be all electric by 2025, and that it plans to spend around £2.5bn a year on new technology as part of its electrification strategy.

But for electrification to really have the transformational impact required, and quickly, battery technology needs to also advance at pace. Further, with batteries representing circa 40% of an electric vehicle's value, 'de-risked' investments in battery manufacturing capability is required.

This plays to the West Midlands' significant strengths in battery technology. With a proposed investment of £2.5bn and creation of up to 6k new jobs, the new Gigafactory located at Coventry Airport will provide 4.5m sq. ft of commercial space. The Gigafactory would be located adjacent to Jaguar Land Rover's global headquarters, and also closely to the UK Battery Industrialisation Centre (UKBIC).

The UKBIC is the country's only facility dedicated to testing and prototyping batteries for large-scale production.

Other major R&D activity dedicated to the development of battery technology includes The University of Birmingham's *Energy Institute's* research project with Bentley Motors to deliver a sustainable source of rare earth magnets for electric and hybrid vehicles.

Another is a project led by the *Warwick Manufacturing Group* (based at the University of Warwick) which has been working with Goodwolfe Energy to accurately measure the power, performance and reliability of battery-powered systems in real-world driving situations.

These are just part of a considerable automotive R&D ecosystem which supports industry collaborations and provides testing facilities to gauge which technologies are not only low carbon, but are also scalable and commercially viable. Others examples include the *National Automotive Innovation Centre* and *The Advanced Propulsion Centre*.

"Birmingham's engineering and manufacturing capabilities are world-class, and locating in the Advanced Manufacturing Hub will ensure we can easily access local supply chain networks, a wide pool of skilled engineers, and easily connect with target markets in the UK and internationally."

Chris Weston
Managing Director
of Guhring Ltd

GUHRING

To read more about Guhring visit: investwm.co.uk/case-study/guhring/



LOW CARBON SECTOR OPPORTUNITY: FUTURE MOBILITY



£54M

UK COLLABORATION PROGRAMME, LED BY GKN AEROSPACE AND PARTNERED WITH THE UNIVERSITY OF BIRMINGHAM.

RAIL

The West Midlands is a central hub of the UK's rail industry, with HS2 representing Europe's largest infrastructure project. The region is also at the centre of an expanding network of Light Rail through the West Midlands Metro, with up to 50 new trams planned as part of an £83.5m investment. The West Midlands Combined Authority area has nearly 40,000 railway-related jobs - the highest number of any combined authority in the UK.

As with our automotive industry, the rail sector is committed to decarbonisation and increasingly electrification. To help achieve this, many rail businesses are engaging with the region's specialist R&D facilities which are dedicated to net zero train technologies.

These include:

- The University of Birmingham's Centre of Excellence in Rail Decarbonisation
- The Birmingham Centre for Railway Research and Education (BCRRE)
- The Very Light Rail National Innovation Centre (VLRNIC) in Dudley

With only 38% of the UK's rail network electrified, such expertise offers a major opportunity to businesses wanting to explore low carbon rail. The region's R&D facilities have also enabled the testing and operating of hydrogen trains, battery-powered trams and low carbon light-rail prototypes.

AEROSPACE

The drive to meeting new CO₂ targets is leading the aerospace industry to increase its focus on light weighting and the development of hybrid and electric propulsion systems. As an established world-leader in electrification and low carbon transport, the West Midlands is an ideal location for companies developing these technologies.

The Midlands region is home to 25% of the UK aerospace industry and has considerable expertise in aerospace systems.

The local supply chain represents a diverse base of activity, ranging from metals (Mettis Aerospace and Timet) and castings (Westley Group) to precision engineered components (AE Aerospace and Mills). These support large international manufacturers such as Airbus, BAE Systems, Boeing and Rolls-Royce.

The Midlands Aerospace Alliance, based in Coventry, represents the largest aerospace cluster in Europe with more than 300 members.

Again, close collaboration between our universities and industry is already driving low carbon innovation across a number of aerospace applications.

For example, the University of Birmingham's Rolls-Royce University Technology Centre is helping to develop a fan engine which is 25% more efficient than a first-generation Trent turbofan. The University of Birmingham is also a key partner in a £54m UK collaboration programme (H2GEAR), led by GKN Aerospace, to develop the company's first hydrogen propulsion system for sub-regional aircraft.

In addition, the *Advanced Materials and Composites Group* at the University of Wolverhampton is focused on optimisation of materials for aerospace applications.

25%

**OF THE UK
AEROSPACE
INDUSTRY IS
WITHIN THE
MIDLANDS**

The West Midlands is at the centre of much of the UK's energy transmission and distribution infrastructure. This is both geographically and with regards to the businesses headquartered in the area.

Through its manufacturing expertise, the region is also a leader in renewable energy generation, with extensive wind, solar PV and biomass supply chains throughout the region. Recent research revealed that the West Midlands already employs 37,000 people within renewable energy generation.

LOW CARBON SECTOR OPPORTUNITY: ENERGY GENERATION, DISTRIBUTION AND STORAGE

LOW CARBON SECTOR OPPORTUNITY: ENERGY GENERATION, DISTRIBUTION AND STORAGE

Mass-market electric vehicle adoption and wider sector coupling is contingent on successful, efficient, and cost-effective grid integration. Anchored by the region's expertise in future mobility solutions, the West Midlands has responded to both global market demand and local industry need by developing and deploying UK-first advancements in distributed power generation and storage systems. As such, the region has become the country's leading location for electricity systems talent, employing 28 times the UK average in this field.

£7.1BN

Will be invested by National Grid, headquartered in Warwick, over the next five years to decarbonise an electricity network that serves 7.9m customers in the Midlands, the South-West of England and Wales.

Allied to the region's critical mass of energy-specialist talent is its position as the strategic centre of the UK's power distribution network. National Grid, Cadent Gas and Western Power Distribution are all headquartered in the West Midlands, powering a net zero-mission-critical, growing supply chain of opportunities in smart grid solutions and UK grid modernisation.

The growing roster of international heavyweights plugging intelligent services and products into the region's power distribution network include Kelvatek (Camlin), Burns & McDonnell, Enzen, SPS International and Quartzelec.

Intensifying the growing pipeline of energy innovators locating in the region is the £130m UK Battery Industrialisation Centre (UKBIC); the UK's most exciting centre of breakthrough science for next-generation battery production. Located in Coventry, companies and researchers at varying stages of the value chain have open access to the UK's only facility to scale technologies that will form the core products of the UK's emergent Gigafactories.

The facility provides advanced manufacturing capability that can enable the development of the next generation of battery systems across electrode, cell, module and pack levels to allow companies to move to full-scale, high-volume battery manufacturing.

In addition to battery technology, the region is accelerating the adoption of hydrogen fuel cells as a viable zero-emission fuel through world-first transport activations. The Birmingham Centre for Railway Research and Education (BCRRE) at the University of Birmingham has launched the UK's first Hydrogen train, HydroFLEX, meanwhile the world's first zero-emission hydrogen fuel cell double decker buses are being piloted by National Express West Midlands in partnership with Wrightbus.

£130M

**UK BATTERY
INDUSTRIALISATION
CENTRE (UKBIC)**

LOW CARBON SECTOR OPPORTUNITY: SMART ENERGY SYSTEMS AND THE BUILT ENVIRONMENT

REGIONAL INTEGRATED ENERGY SYSTEMS

Energy Capital is the smart energy innovation partnership for the West Midlands. It has created four Energy Innovation Zones (EIZs) across the West Midlands region and each offers investors significant opportunities to test and deploy low carbon technologies in areas such as energy management, heat networks, storage, local grids and rapid charging. Programmes and projects being driven by the EIZs include:

REPOWERING THE BLACK COUNTRY

A project designed to accelerate the migration of the region's industrial areas towards zero carbon through the creation of local energy hubs.

TYSELEY ENERGY PARK (TEP)

Part of Birmingham Energy Innovation Zone, TEP is set to become the energy and waste nexus for the city of Birmingham, helping to shape the way the city develops infrastructure for renewable heat and power, energy storage and clean transport fuels.

UK CENTRAL HUB

Epitomising the significant energy challenges presented by a modern multi-modal transport hub, the UK Central EIZ includes Birmingham Airport, the National Exhibition Centre, Jaguar Land Rover,

Birmingham International Station and Birmingham Business Park. It will also include the High Speed 2 rail station and the mixed-use Arden Cross.

REGIONAL ENERGY SYSTEM OPERATOR

The Regional Energy System Operator (RESO) project aims to explore the advantages of a new kind of energy system operating at city scale. The system will include local low carbon energy generation, storage and management, and will integrate future mobility assets such as electric vehicles into its overall structure.

ZERO CARBON RUGELEY

The project aims to produce an innovative design for a town-wide Smart Local Energy System (SLES) including the former Rugeley Power Station site. The project offers an opportunity to work closely with the lead private sector partners to ascertain the true opportunity that will lie in the design, planning, construction and operation of this site. This aims to be a full system approach, including energy production, storage, AI evaluation and monitoring, housing, industrial site, and transportation.

“Birmingham and the West Midlands has a concentrated presence and focus on energy innovation. With organisations such as Energy Systems Catapult, Sustainability West Midlands and various leading Universities there is expertise in the energy sector and a ready source of talent.

“Our ambitions include becoming a key player and employer in the region serving all of the UK and potentially Europe.”

Spiros Livadaras
Managing Director
of carbonTRACK



To read more about Carbon Track visit:
investwm.co.uk/case-study/carbontrack/

THE UK'S 'GREEN ENERGY' CAPITAL

Headquartered in Warwick, FTSE 100 company National Grid owns the high-voltage electric power transmission network in England and Wales. Over the next five years, National Grid is investing £7.1bn to decarbonise the electricity network, presenting a nationally significant supply chain opportunity across manufacturing, engineering and digital (see table).

Other distribution companies and utility suppliers with a significant presence in the West Midlands include Cadent, Calor and E.ON. Further, the West Midlands has considerable expertise in electrical energy storage - particularly through the Warwick Manufacturing Group (which was instrumental in bringing the UK Battery Innovation Centre to the region).

The gas network is also investing heavily in a low carbon future. Coventry based Cadent, the UK's largest gas distribution company, is at the centre of much of this investment, and is working closely with other major gas businesses to help the sector move towards being a net zero industry.

Cadent Gas and National Grid Gas Transmission are working together to explore how much hydrogen will be needed to supply industry demand in the West Midlands and the East of England. The first-of-its-kind study will identify opportunities to build new infrastructure to produce hydrogen locally and transport it across the UK.

Enriched by a vast array of technical consultancies, Enzen, Arup and Arcadis are also advising on national hydrogen projects to activate new opportunities. Arup is partnering Cadent Gas to become the first gas distribution network operator to convert a city to hydrogen fuel, by exploring how digital and data can streamline hydrogen conversion planning to decarbonise energy systems.

WEST MIDLANDS-BASED ENERGY SUPPLY CHAIN

Company	Activity
Kelvatek (Camlin)	Intelligent monitoring products for grid.
Burns & McDonnell	US EPC (Engineering, Procurement and Construction) consulting engineering specializing in power networks.
Enzen UK	UK HQ of Indian owned consultancy specialising in the digitalisation, decentralisation and decarbonisation of water and energy power systems.
SPS International	US owned company specialising in asset management information for optimising critical and capital parts life to optimise reliability in energy grids.
Omexom Transmission	Part of Vinci - high voltage power infrastructure.
GE Power Conversion	Manufacture of machinery including rotating stabilisers for National Grid.
Quartzelec	HQ and manufacturing of AC/DC rotating machines and other services for power grids.

LOW CARBON SECTOR OPPORTUNITY: SMART ENERGY SYSTEMS AND THE BUILT ENVIRONMENT

ADVANCED MANUFACTURING AND MODERN METHODS OF CONSTRUCTION

The region is host to numerous companies specialising in Advanced Manufacturing in Construction (AMC) and Modern Methods of Construction (MMC), which are transforming the buildings we live and work in. This includes offsite, volumetric and modular building processes which can massively reduce the carbon footprint of large-scale housebuilding. For example, Accord's offsite manufacturing business, LoCaL Homes, moved into a new 56,000 sq/ft factory in Walsall in 2018 is now producing 1,000 new homes per year.

REPURPOSING BROWNFIELD

The West Midlands is set to be home to the National Brownfield Institute (NBI). Part of the University of Wolverhampton, the NBI will be Europe's largest specialist construction and built environment campus. The NBI will also help drive R&D across Modern Methods of Construction (MMC), and brownfield land remediation and regeneration, creating a supply chain of opportunities in low-carbon construction.

Brownfield regeneration is also at the heart of Birmingham's Stone Yard project, led by residential developer Court Collaboration, the scheme will deliver 995 homes on 1.37 hectares of brownfield land in the centre of Birmingham.

LOW CARBON HOUSEBUILDING

The West Midlands has set out ambitious housing plans which will see over 16,000 new homes built every year - the second highest housing target in the UK.

In addition, it has made a commitment that by 2031 net zero buildings will be delivered in line with the region's 2041 Climate Change Action Plan, and that the region will focus on homes being built based on the most advanced, low carbon principles available.

There is also a huge retrofit opportunity; ensuring existing housing stock is as sustainable and energy efficient as possible.



THE WEST MIDLANDS: A LOW CARBON INTENSIVE R&D REGION

With extensive academic, research and consultancy expertise in the West Midlands, there is the unique ability to collaborate in research in almost every aspect of the low carbon economy. The extensive reach and experience of the region's eight universities, and their focus on real-world zero carbon implementation, makes the West Midlands an ideal location to explore solutions in lowering carbon impacts.

ADVANCED PROPULSION CENTRE

Established in Warwick in 2013, the £1bn Advanced Propulsion Centre (APC) specialises in low carbon propulsion technologies - such as battery production, hydrogen fuels, motors and drives - for cars, buses and HGVs. The Centre also advises industry-academic project consortia across all tiers of the supply chain, with JLR, the London Electric Vehicle Company (LEVC), Ford Technologies and Hofer Powertrain among the current roster of clients.

UK BATTERY INDUSTRIALISATION CENTRE

The £130m UKBIC in Coventry is the UK's leading facility for battery development from prototype scale to mass production. UKBIC is a key part of the Faraday Battery Challenge, a UK Government programme to fast track the development of cost-effective, high-performance, durable, safe, low-weight and recyclable batteries.

HORIBA MIRA

The Nuneaton (Warwickshire) based HORIBA MIRA and Mira Technology Park leads engineering, research and test services for the automotive, defence, aerospace and rail industries. Electrification and energy; powertrain and emissions; vehicle resilience (cybersecurity); and CAV are among its leading expertise. The Park hosts a number of UK-first, real-world testing facilities specialising in battery abuse; climactic vibration; electric cycling; and self-driving technologies.

WARWICK MANUFACTURING GROUP

Part of the University of Warwick - is a HVM Catapult member pioneering research in hand with industry across the energy; materials and manufacturing; digital technologies; and intelligent vehicles markets.

ENERGY SYSTEMS CATAPULT

The catapult provides technical, commercial and policy expertise to drive innovation across the whole energy system. Providing a range of capabilities, tools and labs - from world class Net Zero modelling and cutting-edge systems engineering - through to digital and data science and real-world innovation trials that drive start-ups to success, the team support companies to navigate net zero in a commercial environment.

THE NATIONAL BROWNFIELD INSTITUTE

Part of the University of Wolverhampton, the £17.5m National Brownfield Institute (NBI) will offer revolutionary new solutions to regeneration, remediation and repurposing of brownfield land to unlock former industrial sites for greener, safer and more affordable housebuilding.

BIRMINGHAM ENERGY INSTITUTE

The University of Birmingham is directly working with industry to develop and apply low carbon technologies and techniques to create sustainable energy solutions and support the regional, national and global transition to a zero carbon energy system.

MANUFACTURING TECHNOLOGY CENTRE

Coventry's MTC is part of the High Value Manufacturing Catapult (HVM Catapult) established by Innovate UK - the UK's innovation agency - and supports research commercialisation with real-world testing facilities in additive manufacturing; digital manufacturing; and robotics and autonomous systems.



THE WEST MIDLANDS: A LOW CARBON INNOVATION ECOSYSTEM

The West Midlands is a region of intensive Low Carbon R&D with numerous research centres focused on working with industry to co-develop solutions to carbon issues or develop new lower carbon products.

UNIVERSITY OF BIRMINGHAM

The University of Birmingham (UoB), houses the Birmingham Energy Institute, a national leader in low carbon research. It also hosts nationally-recognised Centres of Excellence in energy storage, nuclear, strategic elements and critical materials, fuel cell and hydrogen research.

Other UoB initiatives include National Centre for the Decarbonisation of Heat and the ATETA (Accelerating Thermal Energy Adoption) programme. The university also recently entered into a joint international research partnership with the Automotive Research Association of India.

UNIVERSITY OF WARWICK

The University of Warwick is home to the world-leading Warwick Manufacturing Group (WMG) which works across numerous industries including automotive, aerospace and defence. It has specialisations in many key low carbon technologies including batteries, intelligent vehicles, advanced materials, and vehicle propulsion.

The university's Automotive Composites Research Centre is further involved in multi-partner projects with companies including Jaguar Land Rover, Ford and Aston Martin, while its Energy Innovation Centre is a national centre for battery R&D, from materials and electrochemistry through to application, integration, and recycling.

ASTON UNIVERSITY

Aston's Energy and Bioproducts Research Institute (EBRI) is a unique hub of bioenergy research and technology development. Home to both academic and industry-facing teams, it aims to accelerate the commercial development of emerging renewable energy, bioenergy, bioproducts and supporting technologies.

EBRI's research and technology capabilities include a range of advanced thermal technologies and biological conversion processes including gasification, pyrolysis, catalysis, and thermochemical refining of biomass, wastes and plastics to high-quality products and fuels. It also provides expertise in energy systems, supply chains, techno-economic analysis, transport logistics, analytics, engines and energy systems.

COVENTRY UNIVERSITY

With a focus on sustainable, flexible transport in our cities, and the issues of living in cities, Coventry University's Institute for Future Transport and Cities (IFTC) coordinates expertise across manufacturing, engineering, design and business studies.

Housed within the IFTC is the National Transport Design Centre (NTDC). Taking a multidisciplinary approach, the NTDC focuses on both human and technological aspects of developing low carbon transport systems.

Coventry's IFTC is also home to the Centre for Advanced Low Carbon Propulsion Systems, the most advanced test centre of its kind in the UK. Working across the automotive, aerospace, and marine and rail industries, it helps to create cleaner mobility and develop a low carbon supply chain.

UNIVERSITY OF WOLVERHAMPTON

In addition to the National Brownfield Institute (see above), which helps to develop modern methods of construction and regenerate brownfield sites, the University of Wolverhampton is also the location of the Centre of Engineering Innovation and Research (CEIR).

The CEIR is focused on combining advanced scientific techniques, specialist knowledge and critical enquiry to solve engineering problems relevant to industry, society and the environment. Low carbon specialisms include next-generation energy-absorbing devices and advanced energy storage.

BIRMINGHAM CITY UNIVERSITY

Birmingham City University hosts the Global Environmental Challenges Research Group, which focuses on sustainable energy and water related issues, and the Transforming Building Life Cycle Research Group - which advances knowledge related to the building life-cycle through the application of digital technology.

It is also home to the Sensors and Control Research Group, which works on energy harvesting, power management, and low power electronic and communication, and the Computational Modelling Research Group, which investigates nano-fluid heat transfer, vehicle aerodynamics, complex systems and hydrological modelling.

GOVERNMENT-BACKED LOW CARBON R&D

The UK government has recognised West Midlands' significant R&D value, and the importance of its cluster of collaborative research activity, across the low carbon and net zero agendas. As a result, the region is also home to the Energy Systems Catapult, the government-backed agency at the forefront of low carbon energy innovation and accelerated research.

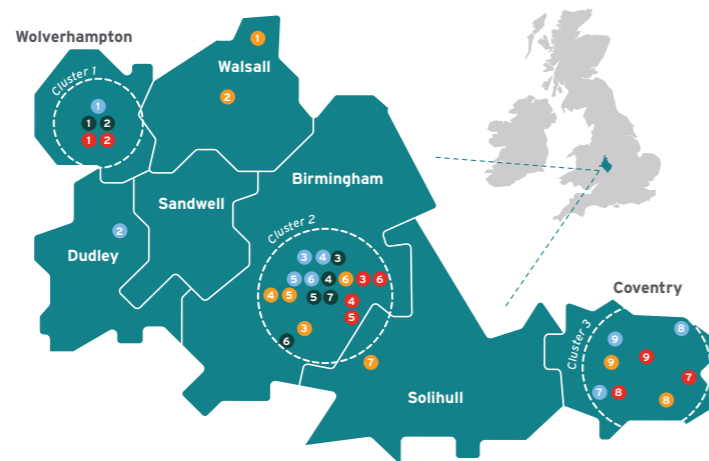
THE WEST MIDLANDS: CIRCULAR ECONOMY AND RESOURCE MANAGEMENT

Key to developing a truly sustainable and net zero economy is the re-use and recycling of resources.

The West Midlands Combined Authority is pioneering a range of circular economic approaches and has developed a dedicated circular economy route-map for the region which is anchored by three city-region clusters.

In addition, Wolverhampton was the first English city to sign the Circular Cities Declaration. This commits the city to move from a linear to a circular economy, decouple economic growth from resource use, and achieve a climate-neutral, fair and prosperous society.

This map illustrate many of the projects already underway and the cross overs between the work on delivering an economy that better resource management and consumption and the shift to low carbon.



Circular Economy Adopters and Practitioners

1. Dunton Environment Waste Treatment Facility, Walsall
2. Urban Hax, Walsall
3. Jericho Foundation, Birmingham
4. Incredible Surplus, Birmingham
5. Eat Make Play, Birmingham
6. International Synergies, Birmingham and West Midlands
7. Koolmill, Solihull
8. UK Battery Industrialisation Centre, (UKBIC), Coventry
9. EXERGY, Coventry

Circular Economy Research Centres

1. Brownfield Research and Innovation Centre (BRIC) University of Wolverhampton
2. Black Country and MARCHES Institute of Technology, Dudley
3. Energy and Bioproducts Research Institute (EBRI), Aston University
4. Centre for Circular Economy and Advanced Sustainability, (CEAS), Aston University
5. Birmingham Energy Institute, University of Birmingham
6. National Centre for Decarbonised Heat, University of Birmingham
7. Circular Economy Research Network, (CERN), University of Warwick
8. Manufacturing Technology Centre, Coventry
9. Institute for Advanced Manufacturing and Engineering, Coventry

Circular Economy Pilot Projects and Demonstrators

1. National Brownfield Institute, University of Wolverhampton
2. National Centre for Sustainable Construction and Circular Economy, (NCCSCCE), University of Wolverhampton
3. Recycling Supply Chain for Luxury Cars Project, University of Birmingham
4. Tyseley Energy Park, Birmingham
5. Birmingham Energy Innovation Hub, Tyseley Energy Park, Birmingham
6. Food Trails, Birmingham
7. West Midlands Gigafactory, Coventry
8. RESO Project, Coventry
9. SimBio Project, Coventry University

Circular Economy Support Programmes and Networks

1. Built Environment Climate Change Innovations (BECCI), University of Wolverhampton
2. Environmental Technologies and Resources Efficiency Support Services, (EnTRESS), University of Wolverhampton
3. UK Manufacturing Symbiosis Network Plus, (UKMSN+), Aston University
4. ATETA, University of Birmingham
5. Alternative Raw Materials with Low Impacts, (ARLI), University of Birmingham
6. STEAMhouse, Birmingham
7. Circular Economy Club, (CEC), Birmingham and West Midlands

Recovas is a partnership between the University of Warwick, EMR, Bentley, BMW, JLR, the HSE, the UK Battery Industrialisation Centre, Autocraft Solutions Group and Connected Energy and URecycle. Its aim is to maximise the remanufacture and reuse of EV batteries. The project is to run for three years, by which time the partnership expects the circular supply chain to be operating commercially.

Developed by Severn Trent, the UK's first full-scale wastewater innovation test pad in Redditch provides a full-scale, plug-and-play testbed for new technologies, demonstrations and trials in a safe, controlled environment and supports their long-term urban wastewater strategy and low energy wastewater treatment testing.



DRIVING THE LOW CARBON AGENDA

The West Midlands has committed to being a carbon neutral location through the WM2041 Five Year Plan and is running region wide initiatives until 2026 to achieve this.

A roundtable in December 2020 chaired by Mayor of the West Midlands Andy Street brought together Severn Trent, E.on, BT, Birmingham Airport and National Express.

The event heard how many of the companies are already taking action to help achieve net zero carbon including:

- BT has already switched to 100% renewable electricity and is looking to reduce supply chain emissions by 87% by 2030
- Severn Trent's ambition to be net zero by 2030 and its aim to plant 1.3m trees by 2030
- A pledge by National Express to only buy zero emission buses going forward - the company bought its last diesel bus in 2019

- E.on ditching all fossil fuel generated electricity in 2015 with customers now receiving renewables as standard
- Cadent switching all its pipes to plastic to transport hydrogen while looking at hydrogen-ready boilers

Companies heard how the first Five Year Plan will build on the existing commitment to make the West Midlands carbon neutral and the region's strategy for a green recovery. Economic and business opportunities were also discussed including the 250,000 new jobs by 2030 outlined in the Government's 10 Point Plan as well as £60bn in business opportunities for the UK by 2035.

Other opportunities for the region are expected to be generated by a rapid growth in electric vehicles, with the West Midlands already seen as a UK leader in the development of electric and autonomous vehicle research and development.

THE WEST MIDLANDS GROWTH COMPANY



The West Midlands Growth Company acts as the official Investment Promotion Agency for the West Midlands Combined Authority Region.

We are a not-for-profit organisation funded by the West Midlands Combined Authority, the seven metropolitan councils that make up the WMCA area and the region's six leading universities: Aston University, University of Birmingham, Birmingham City University, Coventry University, Warwick University and Wolverhampton University.

Total FDI projects have increased from 143 to 181 year-on-year, with jobs created increasing from 5,571 to 8,252 (48%). In terms of Net Zero related projects, this amounts to 34 projects with 3,145 new jobs. An important part of attracting inward investment to the West Midlands is our support on offer to help businesses relocate and grow.

In addition to reaching out through campaigns and events to drive inward investment from businesses large and small, both international and domestic, By working with regional partners we deliver comprehensive support packages to inward investors. This is to help to take the pain out of relocating or expanding so investors can focus on growing their business.

Our expert teams act as a strategic partner and consultant to investing companies to ensure they have the information they need and a comprehensive package of support, across all phases of their business plan.

OUR WORK

We have vast experience of helping hundreds of companies to relocate to and expand within the West Midlands. We work with our partners on projects that deliver tangible growth and employment opportunities for the region.

"As the West Midlands' investment agency, we are committed to helping organisations of all sizes discover how the region and its people can benefit their business. I would encourage any company, no matter what stage they are at in their growth journey, to contact us and find out more about how the region could best serve their needs."

Jon Baty
Head of Inward Investment
at the West Midlands
Growth Company

INVESTOR SUPPORT



Your business will have access to total package of support, with a dedicated account manager who specialises within your sector to support your West Midlands set up every step of the way.

- One-to-one business sales and support
- Immigration support and DBT working VISA connections
- Support for key employees and their families moving to the area inc. familiarisation visits
- Commercial property search and assistance inc. viewings
- Free PR support to amplify your brand with our global press contacts, maximising press attraction
- Supply chain introductions and external support programmes
- Business network introductions and speaking opportunities
- Detailed local economy data reports
- Links to local and national government via the West Midlands Growth Company
- Recruitment assistance and salary insights
- Free skills hub recruitment support
- Location dependent business rates relief
- R&D opportunities via funded university projects or regional challenges
- Ongoing quarterly account management
- Invites to regional relevant sector activities and networking events
- Our commercial network can introduce you to more than 100 leading companies who can help you to establish smoothly and maximise the benefits of your investment



TO SEE HOW WE HAVE SUPPORTED ORGANISATIONS WITH GROWTH INTO THE WEST MIDLANDS REGION, PLEASE VISIT: [INVESTWESTMIDLANDS.COM](https://investwestmidlands.com)

West Midlands Business
Investment Support
Invest in the West Midlands



**WEST
MIDLANDS
GROWTH COMPANY**
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WHAT HAPPENS NEXT?

If you are looking to find out more about the West Midlands Low Carbon Investment opportunities, please get in touch with a member of our Inward Investment team.



investwestmidlands.com