

FUTURE MOBILITY INVESTMENT PROSPECTUS

The West Midlands
One region, many worlds



"Coventry has been the home of the black taxi for over 70 years and LEVC is proud to have introduced the first factory in the UK, in Ansty, dedicated solely to the production of electric vehicles. LEVC is transforming from an iconic British taxi brand to a leading electric vehicle manufacturer and is at the forefront of green mobility solutions."

Joerg Hofmann CEO of LEVC

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THE WEST MIDLANDS: KEY STRENGTHS

A world class, international powerhouse

- At £105bn, the West Midlands is a fast-growing and vibrant economy
- The UK's second-largest region with a similar economic output to Hungary
- Consistent GVA growth every single year during 2009-2019
- UK's top Foreign Direct Investment (FDI) location outside London and South East 2017-21
- Birmingham, as the UK's second largest city, has the highest rate of start-ups outside of London for last five years running
- The UK's largest region for manufacturing output
- There are 178,000 businesses ranging from global headquarters to microbusinesses
- A huge talent pool with a skilled and diverse workforce of 2.9m people, and not forgetting a pipeline of new graduates

One of Europe's most dynamic metropolitan zones

- Situated at the centre of the UK the region offers easy access to all key UK cities
- Anchored by three globally renowned and distinct cities
 Birmingham, Coventry and Wolverhampton bringing live, learn and earn opportunities
- The West Midlands is home to 4.7 million people which makes this region similar in scale to the whole of New Zealand
- More people from London decide to move here rather than anywhere else in the UK. It's also a popular choice for students with more than one in two of our graduates staying in the area after completing their studies
- There were 32,570 students in engineering and technology at the region's universities in 2019

90%

of the UK population and UK businesses are less than four hours' drive away.

A globally and nationally connected destination

- 90% of the UK population and UK businesses are within easy access and less than four hours' drive away
- Birmingham International Airport - 15 minutes from the centre of Birmingham and less than two hours from Heathrow and Manchester airports and connected to 400 global destinations by air
- With fast rail access across the UK - London, Oxford, Manchester, Leeds, Liverpool, all are less than two hours away
- With the new high speed rail investment, HS2, London and Manchester will be accessible in under one hour
- Centre of UK's motorway and rail network

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 Route map are creating fertile ground for innovative focused companies to assess and deploy new technologies in the region.

Powerful and strategic regional leadership (WMCA)

 A 3-city region able to operate at scale and pace led by our West Midlands Mayor, Andy Street 32,570

students in engineering and technology at the region's universities in 2019.



6

£54M

GKN and University of Birmingham collaboration on hydrogen powered aircraft. 40,000

Railway-related jobs in the West Midlands.

THE WEST MIDLANDS: FUTURE MOBILITY

The centre of the UK's largest automotive, rail and aerospace clusters, the West Midlands is at the vanguard of solving many global future mobility challenges and providing dynamic cross sector collaboration opportunities.

Area key:

Birmingham Nuneaton

Coventry

Stratford Upon Avon

Dudley

Wolverhampton

World Class Universities with Leading Research Centres

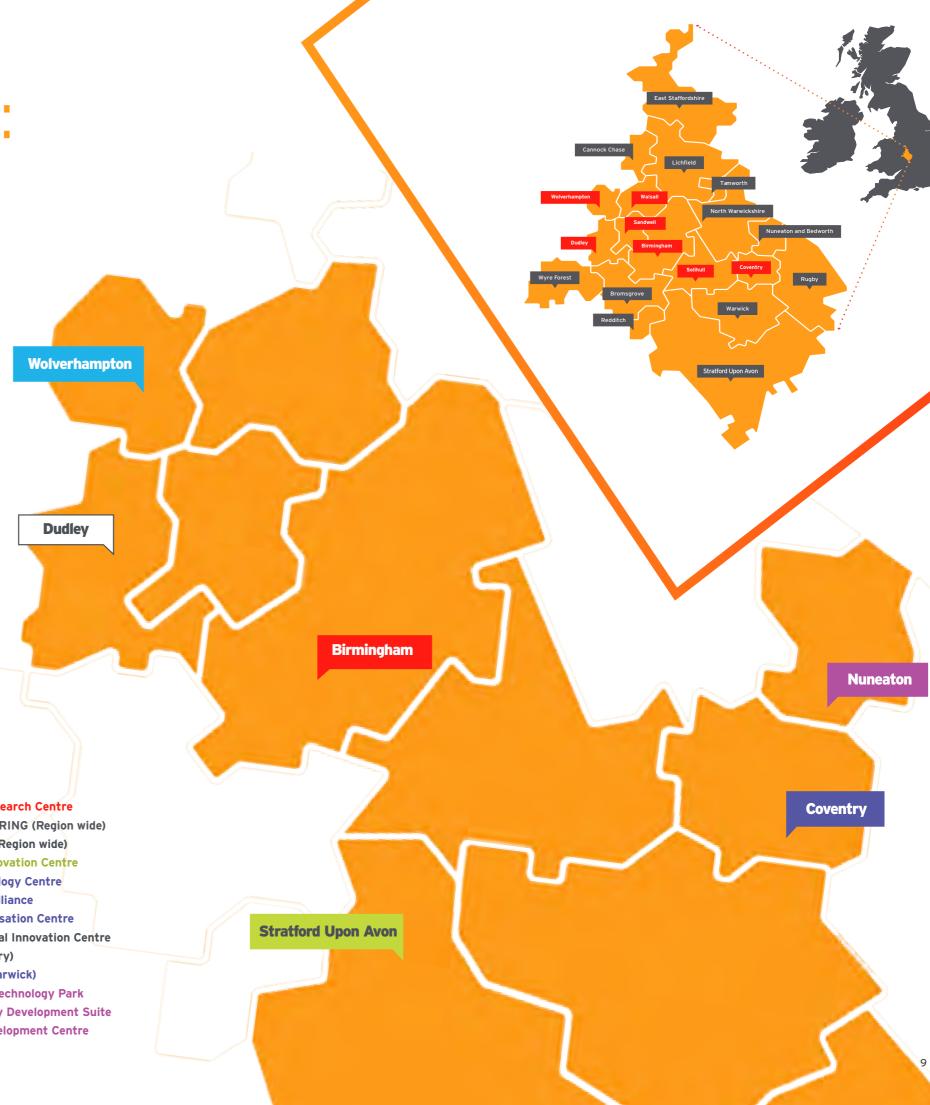
- Aston University
- Birmingham City University
- University of Birmingham
- Coventry University
- University of Warwick
- University of Wolverhampton

Technology & Research Centres

- Advanced Material & Manufacturing
- Advanced Materials Engineering
- Aston Institute of Materials Research
- Aston Institute of Photonic Technologies
- Aston Logistics & Systems Research Institute
- Birmingham Centre for Railway Research & Education
- Birmingham Energy Innovation Centre
- Centre for Fuel Cell & Hydrogen Research
- Centre of Excellence for Rail Decarbonisation
- Energy and Bioproducts Research Institute
- Vehicle Technology Centre
- Advanced Propulsion Centre
- Automotive Composites Research Centre
- Centre for Connected Autonomous
 Automotive Research
- Centre for Future Transport & Cities
- Centre for Low Carbon Propulsion Systems
- Faculty of Engineering, Environment & Computing
- Institute for Advanced Manufacturing & Engineering
- Lightweight Technologies Centre of Excellence
- National Automotive Innovation Centre
- National Transport Design Centre
- Centre for Engineering Innovation & Research

Specialist Innovation & Research Centres

- High Temperature Research Centre
- West Midlands 5G/ 5PRING (Region wide)
- Future Mobility Zone (Region wide)
- Long Marston Rail Innovation Centre
- Manufacturing Technology Centre
- Midlands Aerospace Alliance
- UK Battery Industrialisation Centre
- Very Light Rail National Innovation Centre (project site in Coventry)
- WMG (University of Warwick)
- HORIBA MIRA/ Mira Technology Park
- Mira Advanced Battery Development Suite
- Propulsion Test & Development Centre



FUTURE MOBILITY: SECTOR OPPORTUNITIES

Once the cradle of the industrial revolution and now the epicentre of UK transport and mobility, the West Midlands economy is undergoing profound technological transformation targeted at decarbonisation. This is opening a wave of new commercial opportunities across the region's future mobility sector, predominantly blended around four key specialisms: electrification; autonomous driving; connected autonomous vehicles and future rail.

Our collaborative, unique approach has seen the development of future mobility innovations and applications across many parts of the automotive production process. Involvement from our universities, government-backed programmes, the region's agile supply chain, and local government support are instrumental to the region's success.

The West Midlands is a leader in electrification and low carbon technologies. There is a considerable ecosystem of R&D and innovation assets supporting industry alliances and providing testbeds and state-of-art laboratories.

These include the National Automotive Innovation Centre (NAIC), The Advanced Propulsion Centre (APC), Manufacturing Technology Centre (MTC), WMG, HORIBA MIRA, the universities of Birmingham, Warwick, Coventry, Wolverhampton and Aston amongst others.

The UK's first 'Future Mobility Zone' was established in the West Midlands and positions the region as the UK's location for trialling autonomous technologies.

This brings together future innovative transport schemes, including alternative fuel, electric vehicles, electric bicycles, autonomous vehicle testing and other technologies which can be trialled locally.

100+ commercial test beds, accelerators, and collaboration facilities AUTONOMOUS

25%

of the UK aerospace industry is within the Midlands.

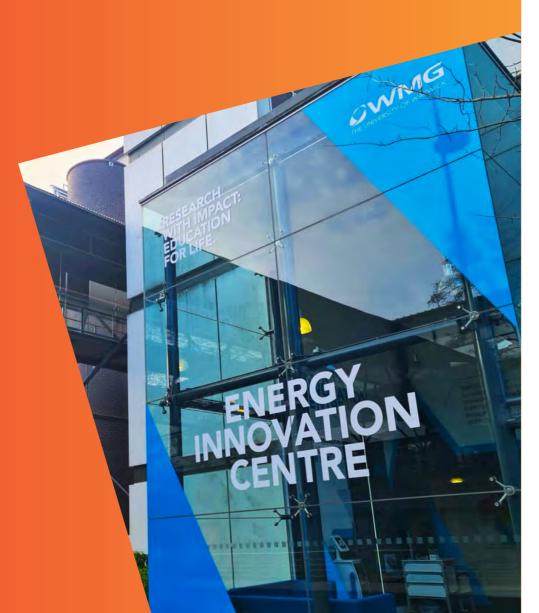
AUTOMOTIVE

The region's prominent role in the UK's shift to emission-free transport stems from its unrivalled position as the country's automotive capital. A third of all British-made cars and one in four UK engines are developed in the region, powered by a 46,500-strong workforce. Jaguar Land Rover, BMW, Aston Martin Lagonda, LEVC (Geely) and Changan all have major operations in the region, while notable plants such as Oxford Mini and Toyota Burnaston are on the doorstep.

The 2030 phasing out of petrol and diesel cars in the UK is accelerating significant new opportunities for the electrification of the supply chain and the development of new technologies.

The strength of the automotive industry and the innovation support available through the universities, the Catapults and HORIBA MIRA has also led to several international technology companies setting up locally. These include Clear Motion, Intrepid Control Systems and most recently, Israeli company REE Automotive (REE).

The presence of OEMs locally has led to the development of a diverse supply chain, with over 21% of all the UK's automotive parts and accessories manufacturers situated in the West Midlands – the most of any UK region.



Automotive Opportunities for Investment:

The West Midlands is the UK's leading region for the manufacture of transport equipment (automotive, rail and aerospace) and is rapidly evolving to incorporate low carbon technologies such as electrification and alternative methods of propulsion throughout the supply chain.

Electrification, Connected and Autonomous Vehicles

As the car industry transitions from fossil fuel to hybrid, and from hybrid to fully electric, the West Midlands automotive sector is proactively helping the industry find solutions to the electrification challenge.

The drive to electrification, and the West Midlands unrivalled Electric Vehicles (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). 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.

Working closely with several of the world's biggest car manufacturers has led to a significant manufacturing presence in the region, together with considerable R&D and innovation assets.

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

Electrification - Batteries and Energy Storage

Batteries represent circa 40% of an electric vehicle's value, and for electrification to really have transformational impact quickly, battery technology needs to also advance at pace. This plays to the West Midlands' significant strengths in battery technology. 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.

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).

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.

Further projects led by WMG (University of Warwick) have been working with Goodwolfe Energy to accurately measure the power, performance and reliability of battery-powered systems in real-world driving situations.

These opportunities are 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. Other examples include the National Automotive Innovation Centre (NAIC) and The Advanced Propulsion Centre (APC).

FUTURE RAIL

The region has developed a considerable collaborative ecosystem to support innovation and the commercialisation of new technologies across the rail industry with 40,000 railway related jobs, one of the highest of any region in the UK.

TERMINAL PROPERTY.

The considerable rail sector in the West Midlands is home to HS2 and includes Europe's largest railway group.

The rail industry is also supported by the UK's largest rail sector business organisation, the RBD Community (formerly The Rail Alliance), the fastest growing rail business community in the UK.

Additionally the UK Rail Research & Innovation Network's Centre of Excellence in Digital Systems at the University of Birmingham is focussed on areas such as: future railway operations and control, data integration and cybersecurity, smart monitoring and autonomous systems

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

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

The West Midlands has nearly 40,000 railway-related jobs – the highest number of any combined authority in the UK.

350

businesses currently in the local HS2 supply chain.

Rail Opportunities for Investment:

HS2 is a transformational project with a new state-of-the-art high-speed rail network that will reach speeds of 230mph. It represents a considerable opportunity for companies to become part of the significant supply chain but also more widely within the rest of the rail industry and including digital rail and decarbonisation featuring Light and Very Light Rail.

HS2

The West Midlands is a central hub of the UK's rail industry, with High Speed Two (HS2) representing Europe's largest infrastructure project.

The region is home to: HS2's construction and procurement HQ, Network Integrated Control Centre and maintenance depot. HS2 is a nationally significant market opportunity.

The West Midlands HS2 Growth Strategy contains approximately £1.2 billion of transport connectivity investment to be delivered by 2028, that will improve the wider transport network, expand the economic area and increase productivity.

This brings an enormous number of opportunities for the supply chain. There are approximately 350 businesses currently in the local HS2 supply chain: ranging from large companies to small and medium sized businesses. The rolling stock procurement will provide openings in areas including: design, engineering, technology and customer experience.

Light Rail and VLR

As part of our decarbonisation opportunities, 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.

Current major investments include:

- Very Light Rail National Innovation Centre, Dudley
 £28m project and 2.2km test track
- A region-wide pilot to install a Very Light Rail transport network in Coventry City Centre backed by R&D from the University of Warwick. This will link Coventry's Railway Station with the University Hospital, reducing not only costs but also pollution from brake, rubber and tyre dust
- The UK's first hydrogen train, HydroFLEX, led by the University of Birmingham

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AEROSPACE

The UK's aerospace industry is the second largest in Europe and the third largest globally. The West Midlands is home to 25% of the UK aerospace industry and has considerable expertise in aerospace systems.

The Midlands Aerospace Alliance, based in Coventry, represents the largest aerospace cluster in Europe with more than 300 members. Again, close collaboration between the region's universities and industry is already driving low carbon innovation across several 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 drive to meeting new CO₃ targets is leading the aerospace industry to increase its focus on lightweighting and the development of hybrid and electric propulsion systems, and the local supply chain represents a diverse base of activity, ranging from metals (Arconic and Timet) and castings/forgings (Westley Group and Mettis Aerospace) to precision engineered components (AE Aerospace and Mills). These support large international manufacturers such as Airbus, BAE Systems, Boeing and Rolls-Royce.

Aerospace Opportunities for Investment:

Lightweighting

The drive to meeting new CO, targets is leading the aerospace industry to increase its focus on lightweighting and the development of hybrid and electric propulsion systems.

The region's national strengths in automotive, including F1, means there is a considerable base of R&D and commercial expertise in low carbon propulsion and lightweighting and has a considerable cross over into the aerospace industry. This positions the West Midlands as an ideal location for companies developing these technologies.

Alternative Propulsion Systems

The University of Birmingham is also a key partner in a £54m UK collaboration programme (H2GEAR). Led by GKN Aerospace, they are developing 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.

THE WEST **MIDLANDS SUPPLY CHAIN**

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 boosted leading supply chain opportunities in low carbon transport.

This is reinforced by the region's designation as the UK's first Future Mobility Zone.

LEVC - the manufacturer behind the iconic London black cab has launched a new commercial electric van line from its headquarters in Coventry. Significant international automotive suppliers with a presence in the West Midlands include Lear, Magna, Brose, Webasto, IAC, DraexImaier, Dana, Dura and ZF.

Supply Chain Opportunities for Investment:

The region's role in developing the future of mobility is further supported by its established base of OEMs specialising in critical components for electrification, such as high-performance power electronics (for inverters, converters and charging equipment) and electric machines (electromagnetic components).

Notable investments include Jaguar Land Rover's Powertrain Centre in Coventry, Changan's Powertrain Division R&D Centre in Solihull, and Zhuzhou CRRC Times Electric's R&D innovation centre for electric vehicles, in Birmingham.

1ST

The region is the **UK's first Future** Mobility Zone.

TECHNOLOGY **OPPORTUNITIES**

The West Midlands is home to 211,000 + automotive, rail, aerospace, engineering, and manufacturing professionals; 32,500 engineering and technology university students and 30+ Future Mobility Technology and Specialist Research Centres





electronic machines supply chain the machine. Magnets represent approximately 40-50% of the cost machine - these costs are leading solutions and being pioneered by

Alternative Propulsion and Hydrogen Power

As the leading region for the automotive sector in the UK, and with electrification accelerating, the Advanced Propulsion Centre (APC) recognise power electronics as a £10bn opportunity in the UK's supply chain. EV's require highperformance power electronics (for inverters, converters and charging equipment) based on compound semiconductors.

This is an area where there has been considerable new investment and as electrification increases there will be higher demand in the region and excellent opportunities for investment.

The 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 industryacademic 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.

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.

Lightweighting and **Advanced Materials**

The driver of meeting new CO₂ targets is leading the aerospace industry to increase its focus on lightweighting and the development of hybrid and electric propulsion systems. Lightweighting removes weight from a product, consequently it will take less energy to move it.

It is a key priority in manufacturing and is an urgent objective, most particularly for the transport sector. Manufacturers and suppliers in the automotive, aerospace, maritime, and rail industries are designing and producing lighter, more efficient vehicles to meet the evolving demands of hybrid and fully electric vehicles (EVs).

The region has extensive research and technology collaborations around for example titanium alloys and is home to the National Centre for Additive Manufacturing based at the Manufacturing Technology Centre based Coventry

A WORLD LEADING FUTURE MOBILITY R&D REGION

Businesses located in the West Midlands benefit from access to world-class research centres, facilities, and equipment, as well as industry testbeds to support research work, product development and commercialisation.



Established in Warwick in 2013, the £1bn 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.

WMG (University of Warwick)

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

Birmingham Centre for Railway Research and Education (BCRRE)

The University of Birmingham is leading critical applied research in key areas of digitalisation and decarbonisation in rail.

Centre for Connected Autonomous Automotive Research (CCAAR)

The CCAAR is a joint initiative of Coventry University and HORIBA MIRA, a world-leader in vehicle engineering, research and product testing. It develops and tests the latest intelligent connected vehicle technology and is located at the HORIBA MIRA headquarters in Nuneaton.

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 several UK-first, real-world testing facilities specialising in battery abuse; climactic vibration; electric cycling; and self-driving technologies.

National Automotive Innovation Centre (NAIC)

The NAIC is a partnership between WMG at the University of Warwick, Jaguar Land Rover, and Tata Motors UK. It is the largest research centre of its kind in Europe, with 33,000m² dedicated to automotive innovation.

The centre's work is focused on the long-term challenges outlined by the UK Automotive Council, including electric vehicles, carbon reduction and smart and connected cars.

National Transport Design Centre (NTDC)

The NTDC investigates influences on future vehicle design to create safe and sustainable transport solutions for the cities of the future. The centre houses equipment such as precision CNC milling machines for scale model creation; a range of 3D printing technologies; large bed graphics printers and structured whitelight 3D scanning for reverse engineering.

Universities

For centuries, the West Midlands has helped drive Britain forward and shape the world. It has always been an engine of growth and a catalyst for change, a magnet for inquisitive minds and commercial innovators.

Home to several of the world's highest-ranked universities and three world-class business schools. The largest six being Aston University, Birmingham City University, Coventry University, University of Birmingham, University of Warwick and the University of Wolverhampton.

An internationally recognised academic community with world-class research institutions, and boundless talent all in one region. The West Midlands' universities accelerate discovery, innovation and technological development. As we move forward with an ever-increasing pace, our universities provide the acceleration behind the future of mobility technology.

World-first electric urban air taxi port

Hyundai Motor Group, Coventry City Council, and the UK government have partnered with Urban Air Port to launch the world's first fully-operational hub for electric vertical take-off and landing (eVTOL) aircraft., simply named Air One. It will be the world's first "pop up" urban airport and charging hub for future eVTOL aircraft, which include cargo drones and air taxis.

58,000

Graduates produced in the region every year.

170,000

One of the largest student populations in the UK.

The Coventry Very Light Railway (CVLR)

This project will make light rail as affordable and environmentally friendly as possible and is designed to sit just 30cm inside the road surface. With no overhead power supply this VLR will be easy to install and remove, significantly reducing the impact on utilities and saving millions of pounds.

From innovative mass transit projects to exciting new micromobility projects, the region is working on bringing the best technological solutions in transportation to the area.

£1.3BN

travel plan will see Coventry become the UK's first very light rail line.

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WEST **MIDLANDS** GROWTH COMPANY



West Midlands Growth Company, (WMGC) acts as the official Investment **Promotion Agency for** the WMCA Region.

We are a not-for-profit organisation funded by the WMCA, 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.

In the last five years, the West Midlands has attracted over 600 foreign direct investment (FDI) projects, creating almost 35,000 new jobs and safeguarding a further 5,000. An important part of attracting inward investment to the West Midlands is our support on offer to help businesses relocate and grow.

By working with regional partners we deliver comprehensive support packages to inward investors. Using a variety of campaigns and events WMGC work with investors to ease relocation or expansion plans and focus on future growth.

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."

Adam Titchen

Senior Business Development Manager - Advanced Manufacturing West Midlands Growth Company

INVESTOR SUPPORT



Your business will have access to a total package of support, with a dedicated sector specialist for every step of the way, helping with targeted introductions and links into the local ecosystem.



To see how we have supported organisations with growth into the West Midlands region, please visit: investwestmidlands.com

West Midlands Business Investment Support

- One-to-one business sales and support
- Immigration support and DIT working VISA connection
- Support for key employees and their families moving to the area including familiarisation visits
- Commercial property search and assistance including 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
- COVID-19 and EU exit guidance including import/ export and financial support

- 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 guarterly 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

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WHAT HAPPENS NEXT?

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



