



**MIDLANDS
ENGINE**

**GREEN
GROWTH**

TEN POINT PLAN FOR GREEN GROWTH IN THE MIDLANDS ENGINE

JULY 2021

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THE POWER OF PARTNERSHIP

Our Ten Point Plan for Green Growth in the Midlands Engine sets out, with a unified voice, the Midlands Engine Partnership's collective plan: actions to be taken in partnership which will accelerate both the Midlands and the UK's path to net zero.

We would like to thank all our partners from right across our region for contributing their valued time and immense expertise. Together, we have set out how we can drive collective action today to safeguard the environment for future generations; and how we will capitalise both on the wealth of economic opportunities presented by the shift to low carbon and enabling nature's recovery.

In particular, we would like to thank teams from: Browne Jacobson LLP for ensuring and enabling powerful regional engagement; the National Trust for providing crucial environmental insights and in-depth expertise; and the Energy Research Accelerator for their vast technical leadership.

We have collectively developed this plan with our partners, making shared investments and joint commitments. We will continue to work together, as our key milestones below set out, with urgency and purpose - a powerful partnership force with the ability to harness vast region-wide expertise and strengths, as we galvanise our efforts at pace to shape our green future.

COLLABORATE AND CREATE

July 2020 to June 2021

Our Draft Ten Point Plan is created with input from more than 300 leading pan regional voices over many months.

CONSULT AND FINALISE

June 2021

Open and inclusive consultation ensures our Ten Point Plan captures the widest possible intelligence and insights from across the entire region.

PUBLISH AND PROMOTE

July 2021 to January 2022

Our Ten Point Plan is launched at a series of events targeting media, parliamentarians and other regional stakeholders.

ACT & ACCELERATE

MAY 2021 onwards

We will be successful through our collective effort, with each partner working to their own strengths, supporting and complementing each other to add value.



“ Our partners agree: now is the time to stand together, to act in concert and accelerate our impact, together

The Midlands is the UK's original industrial powerhouse; the birthplace of the Industrial Revolution, leading the world in manufacturing ingenuity and invention. Now, the Midlands is seizing the opportunity to forge the future once more.

Tackling climate change and nature's decline are the most pressing issues of our age and we have just **one** opportunity - now - to make the changes that are urgently needed. The Government's Ten Point Plan for a Green Industrial Revolution sets out the approach to build back better and accelerate our nation's path to net zero. In response, we have brought together a powerful collaboration of leaders and innovators from every part of the Midlands, to deliver our Ten Point Plan for Green Growth in the Midlands Engine.

Ambitiously adding value, bringing pace and harnessing the immense power of partnership working, our Ten Point Plan sets out how the Midlands Engine Partnership will work together to drive change, create opportunities and deliver Green Growth. Never more than now has the spirit of collaboration, which we enjoy across our region, been more central to our future success. Working together, we can and we **will** ensure our economic recovery and community prosperity - underpinned by sustainable growth and by working to safeguard our environment for today's and future generations.

Both low carbon energy transformation and active steps to harness and grow natural capital are creating phenomenal opportunities for our region to build on our strengths. In our Plan, we have set out how we will translate opportunity into reality, securing success through the power of partnership - driving economic and environmental impact at scale in every part of our region.

Our partners across the Midlands are already leading in, and will remain at the heart of, the UK's Green Industrial Revolution. We will do so by remaining ambitious, with planned actions at scale, driven by the challenge we face and urgency of need. In co-authoring our Plan, with shared commitments for delivery together, our partners agree: now is the time to stand together, to act in concert and accelerate our impact, together.

Through the Midlands Engine Partnership, we will.

**Sir John Peace, Chairman,
Midlands Engine**



“ The Midlands can play a leading role in the green industrial revolution

At the heart of economic recovery and levelling up in the Midlands is net zero growth. This will require urgent, collective action across many areas and these are now, thanks to the collaborative work of more than 300 voices from across the Midlands, prioritised in this regional Ten Point Plan for Green Growth in the Midlands Engine. This Plan is the key to the Midlands Engine unlocking potential and driving the actions that will benefit communities, businesses and the natural environment in every part of our region.

As the world begins to recover from the devastating impact of the pandemic, there is huge potential for a broader transformation; one that will enable our country to build back better, supporting green jobs and accelerating our path to net zero. The Prime Minister's Ten Point Plan for a Green Industrial Revolution will mobilise £12 billion of government investment, and potentially three times as much from the private sector, to create and support up to 250,000 green jobs.

This Government will turn the UK into the world's number one centre for green technology and finance, laying the foundations for decades of economic growth by delivering net zero emissions in a way that creates jobs and allows us to carry on living our lives. We will position the UK to take advantage of export opportunities presented by low carbon technologies and services into new,

global emerging markets - providing jobs and reinvigorating our industrial heartlands.

With its expertise and the opportunities available, I believe that the Midlands can play a leading role in the Green Industrial Revolution. From global leadership in battery electric vehicles, decarbonising transport, low carbon hydrogen and energy efficient buildings, to pioneering economic regeneration focused on net zero and the vast potential that could be created by the region's two new Freeports: we can and we will drive sustainable change for our communities and economies.

Working together in powerful partnerships, across the Midlands, the UK and the world, now is the time to forge a greener, more prosperous future for us all.

**Robert Jenrick, MP,
Secretary of State for Housing,
Communities and Local Government**

MIDLANDS ENGINE STRENGTH IN PARTNERSHIP

Our Ten Point Plan for Green Growth in the Midlands Engine is an exemplar for collaborative working across our region. A recognition that by working together we can achieve exceptional impact for our region's people and places. Particular thanks to our key partners who have shaped the many insights received over many months to achieve a clear plan for future action.

“The Midlands Engine is a powerful enabling force for collaborative Green Growth action”

Our Midlands Engine Partnership spans a geography from the Lincolnshire coast to the Welsh border. Our region is a place that 11 million people call home. Working together, across organisational boundaries and through powerful partnership we know we can drive change where it matters for our communities and our economy; together we can underpin future prosperity. Across our Partnership, we recognise that green recovery is central to our region's future sustainability and success.

There has never been a stronger rationale for collaborative action to bring about change than the threefold challenge we face today: the stubborn, structural challenges in our regional economy; the severe impact of the Covid-19 pandemic fiercely exacerbating regional inequalities; and the undeniable level of threat posed by the climate emergency.

Our Partnership's Ten Point Plan for Green Growth brings together an impressive spectrum of expertise through the uniting power of the Midlands Engine. Working together as businesses, public sector partners, academics, thought leaders and conservation specialists to implement our Ten Point Plan, we are actively demonstrating our shared commitment, innovation and leadership as a region at the centre of shaping a green future ... for the Midlands, our nation and our world.

Rachael Greenwood, Executive Director, Midlands Engine



We are thrilled to be involved in the Midlands Engine Ten Point Plan for Green Growth. Having supported from the beginning, we have seen the hard work and dedication from all parties involved. We have learnt so much from every stage, speaking to a wide range of stakeholders from industry, academia and the public sector. We are looking forward to continuing our involvement to help to mobilise and deliver the actions presented in our Ten Point Plan in partnership with the Midlands Engine and other partners, as we embark together in leading the Green Industrial Revolution for our region, and the UK.

Peter Ware, Partner and Head of Government Sector, Browne Jacobson



Partnership between business, academia and local and regional government is essential. A shared vision is core to being able to shape and deliver innovation. The Midlands Engine Ten Point Plan for Green Growth is crucial in setting the regional priorities for the Midlands to drive towards net zero and support the Government's ambitions. It establishes a platform to facilitate the development of new industrial cleantech sectors, which will deliver regional jobs and growth. The Energy Research Accelerator was delighted to be able to support the engagement programme and the shaping of the Plan, and is fully committed to ensuring that it is delivered.

Professor Martin Freer, Director, Energy Research Accelerator (ERA)



Throughout the Green Growth Conversation, National Trust, alongside other conservation NGOs, has been working with the Midlands Engine Partnership. We believe local and regional partnerships will play a crucial role in delivering the societal shifts needed to meet net zero targets, ensure targeted action for nature's recovery and provide high quality accessible green space for all. The plans include levelling up on green and blue infrastructure investment, restoring and protecting natural assets and building early momentum to ensure nature-based solutions play a key role on the path to net zero. We look forward to continuing to work with Midlands partners to deliver on this ambitious Plan.

Paul Forecast, Regional Director, National Trust



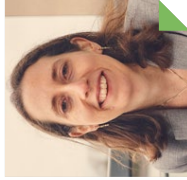
The evidence base underpinning our Green Growth Conversation is critical, and the Midlands Engine Observatory is delighted to support the work on the development of our Ten Point Plan. The mapping of current activity and identification of future priorities and potential impact towards net zero is essential to the future of the Midlands Engine economy. As the economy recovers from the impact of the pandemic and transitions to the new trade arrangements, diversification and growth of our business base and skills will be key.”

Professor Delma Dwyght, Director, Midlands Engine Observatory



EDF fully supports the Midlands Engine's Ten Point Plan for Green Growth, which is aligned to our ambition to help Britain achieve net zero. As Britain's largest generator of low carbon electricity, with growing expertise in the production and use of green hydrogen, we look forward to continuing collaboration with a number of local stakeholders to support the decarbonisation of the region.

Rebecca Rosling, Head of Smart Customers, EDF Energy



The Midlands Engine Ten Point Plan for Green Growth is a hugely important piece of work which I have been supporting, both from a professional perspective and as a Midlands parliamentarian, and Co-Chair of the Midlands Engine All-Party Parliamentary Group. This Plan, the first of its kind in any region in the UK, is both crucial and timely. Crucial, because the transition to net zero will have a massive impact on our region's economy, home to the UK's world beating manufacturing sector. And timely, because in the year that the UK plays host to COP26, the Midlands will lead the way in showing our determination to achieve clean, green, sustainable growth.

Lord Daniel Ravensdale, Co-Chair Midlands Engine APPG



Our Ten Point Plan for Green Growth in the Midlands Engine provides vision and pathways for regional economic recovery. It clearly demonstrates how communities can work together and be more resilient when facing challenges, by developing the regional green economy in partnership with other regions in the UK. We are delighted to work with many experts from different sectors and play a key role in developing this stimulating Ten Point Plan.”

Professor Upul Wijayantha, Loughborough University



We are excited by the potential for the Midlands Engine area to lead the Green Recovery for the UK. Our Midlands Energy Hub has identified the potential for the low carbon economy, facilitating access to this sector for SMEs, communities and individuals. In collaboration we can simultaneously boost the economy and work towards net-zero.

Wayne Bexton - Corporate Director for Growth and City Development (SRO for the Midlands Energy Hub)



THE MIDLANDS CONTEXT

In every part of the Midlands, pace is gathering around rich and diverse specialisms in low carbon energy based on historic sector strengths, wide-ranging natural assets, and ever-more-urgent needs and opportunities. This includes helping to grow the Low Carbon Environmental Goods and Services Sector, for which a **Midlands Low Carbon Sector Study** has been carried out. Our Ten Point Plan for Green Growth complements the groundbreaking work of our Local Enterprise Partnerships, Local Authorities, Combined Authority, businesses, universities and environmental organisations - a pan regional vision and mission, supporting everyone across our Partnership to connect, amplify initiatives and showcase areas of expertise. Together, we will achieve the maximum benefit and value for the Midlands.

WEST MIDLANDS COMBINED AUTHORITY

- Strengths in automotive and future green mobility technologies, low carbon technology, aerospace (precision component manufacturing) and innovative supply chains
- Predominantly urban - high demand for power, heat and transport for the population and the economy - decarbonisation is key to the WMCA green agenda
- WM2041 Five Year Plan published in 2021 outlining the actions needed to deliver a 33% reduction in carbon emissions by 2026 on the way to net zero by 2041. The plan has the full support of local authorities, a £5 million initial investment and has workstreams around clean energy, transport, net zero homes, natural capital, and green skills
- Key green projects such as district energy schemes and heat networks, HydroFlex and the West Midlands Regional Energy System Operator (RESO)

THE BLACK COUNTRY

- Strengths in science, research and innovation
- Projects include: Repowering the Black Country - an ambitious and bold plan to deliver the world's first zero carbon industrial cluster enabling clean GVA growth of £16 billion by 2030

GREATER BIRMINGHAM AND SOLIHULL

- Strengths in green innovation and energy and low carbon technologies R&D
- Projects include: the Clean Air Hydrogen Bus Pilot, Tyseley Energy Park Refuelling Station, and Project 3D - a digital initiative to help decarbonise Birmingham in a decade

COVENTRY AND WARWICKSHIRE

- Strengths in transport technology design, R&D and manufacturing, which employs 50,000+ in Coventry and Warwickshire across aero, auto, rail and marine
- Projects include: Coventry set to become UK's first £50 million All Electric Bus City, the Very Light Rail system development of rolling stock and rail infrastructure and supporting businesses with energy and environmental management through Business Sustain and the Green Business Network

THE MARCHES

- Strengths in traditional manufacturing are now driving innovative firms in high-tech agriculture, the automotive supply chain, and environmental and recycling technology transition
- Centre for UK agriculture innovation and low carbon digestion plants
- National leader in the deployment of anaerobic digestion plants
- Projects include: Investigating the use biomass pyrolysis to convert waste streams into carbon-negative products like biochar, biogas and bio-oils, and a focus on renewable and low carbon energy production, installation and servicing technologies at Herefordshire and Ludlow College Energy Training Centre

STOKE-ON-TRENT AND STAFFORDSHIRE

- Strengths in increasing renewable energy supply and decentralised energy provision
- Powerhouse Central Stoke-on-Trent and Staffordshire City Deal
- Home to Stoke on Trent College's District Heat Academy
- Projects include: the UK's first at-scale low carbon heat network within Stoke-on-Trent, and a £140 million Energy from Waste Plant at Four Ashes in South Staffordshire, and the Smart Energy Network Demonstrator (SEND) project at Keele University

DERBYSHIRE AND NOTTINGHAMSHIRE

- Strengths in manufacturing, with the second highest manufacturing GVA (£8.1 billion)
- World-leading manufacturers in green innovation including in wind, nuclear, building technologies and alternative fuels
- Largest cluster of transport manufacturing and R&D in the country
- Projects include: Net Zero Masterplan led by East Midlands Development Corporation and Nuclear AMRC Midlands - a new industrial R&D centre in Derby where partners are developing a £20 million bespoke research facility for the UK's nuclear supply chain

GREATER LINCOLNSHIRE

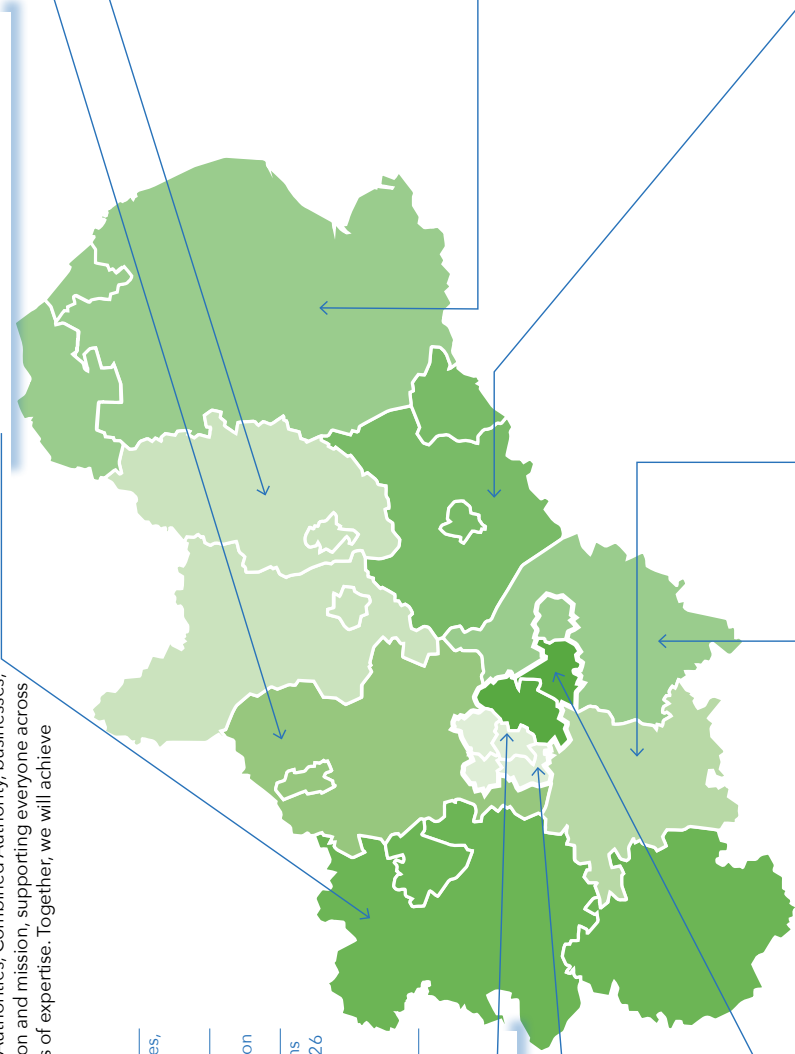
- Strengths in renewable energy production, offshore wind and next generation technologies
- Home to heavy industry and South Humber in the north of the county and a celebrated tourism industry and the Humber estuary deep sea port in the east
- South and central areas are world leaders in Agri-Food and Agri-Tech
- Projects include: Able Marine Energy Park, Humber Zero carbon capture and storage, and Sleaford Moor Enterprise Park - a 37-acre eco-conscious business development

LEICESTER AND LEICESTERSHIRE

- Strengths in science and technology, with two specialist enterprise zones
- Supporting the development of local supply chains
- Improving the effectiveness of local companies to supply low carbon products and services
- Projects include: the development, in partnership, of the East Midlands Airport Freeport - a site of regional and international importance bordering the counties of Leicestershire, Nottinghamshire and Derbyshire

WORCESTERSHIRE

- Strengths in geothermal heat with ambitions to increase local energy generation
- Currently a net importer of energy but with significant energy generation resources
- Healthy low carbon sector
- Projects include: the Worcestershire 5G Testbed, which has now been transitioned into a sustainable model, and the geothermal heat study which indicated real potential for developing sustainable heat networks in many parts of the county, including Offenham



MIDLANDS ENGINE - SPEARHEADING AND CONNECTING GREEN GROWTH ACTION TO MAXIMISE IMPACT

The Midlands Engine Partnership is unlike any other in the UK. We are a unifying, pan regional force spanning 65 Local Authorities, one Combined Authority, 20 universities, nine Local Enterprise Partnerships and over 800,000 businesses. We are also the first such Partnership in the UK to propose how stakeholders from right across our region will come together to deliver a greener future for our communities as we both safeguard our environment and grow our economy.

MIDLANDS ENGINE

The Midlands Engine is:

- ✓ **Pan regional:** We act and have impact at scale, where no other organisation can
- ✓ **Macro-economic:** We identify and capitalise on major regional economic opportunities
- ✓ **International:** We increase the global reach of our region

The role of the Midlands Engine in Green Growth is to:

- ✓ Highlight and advocate for our region's key role in driving the UK's green recovery
- ✓ Be a strong convening force across our region and an ambassador for our collective work
- ✓ Provide an evidence and intelligence base, underpinning activity, through the Midlands Engine Observatory
- ✓ Engage with policy makers on behalf of the region to influence and shape policies which bring benefits for every part of our region
- ✓ Work in partnership to identify together the most effective routes for action as we mobilise our implementation plan, leveraging the capabilities and knowledge of every part of our Partnership
- ✓ Publicise and celebrate the remarkable strengths of partners across our region, raising profile and building awareness of the immense capabilities of our region - across the UK and internationally

Economic recovery and levelling up in the Midlands will have Green Growth and our move to net zero growth at its heart. This will require collective action across multiple areas.

To inform such action, the Midlands Engine has led a regional Green Growth Conversation, connecting an impressive spectrum of more than 300 business leaders, parliamentarians, local government champions, thought leaders, researchers, and conservation and wildlife specialists to share insights and intelligence.

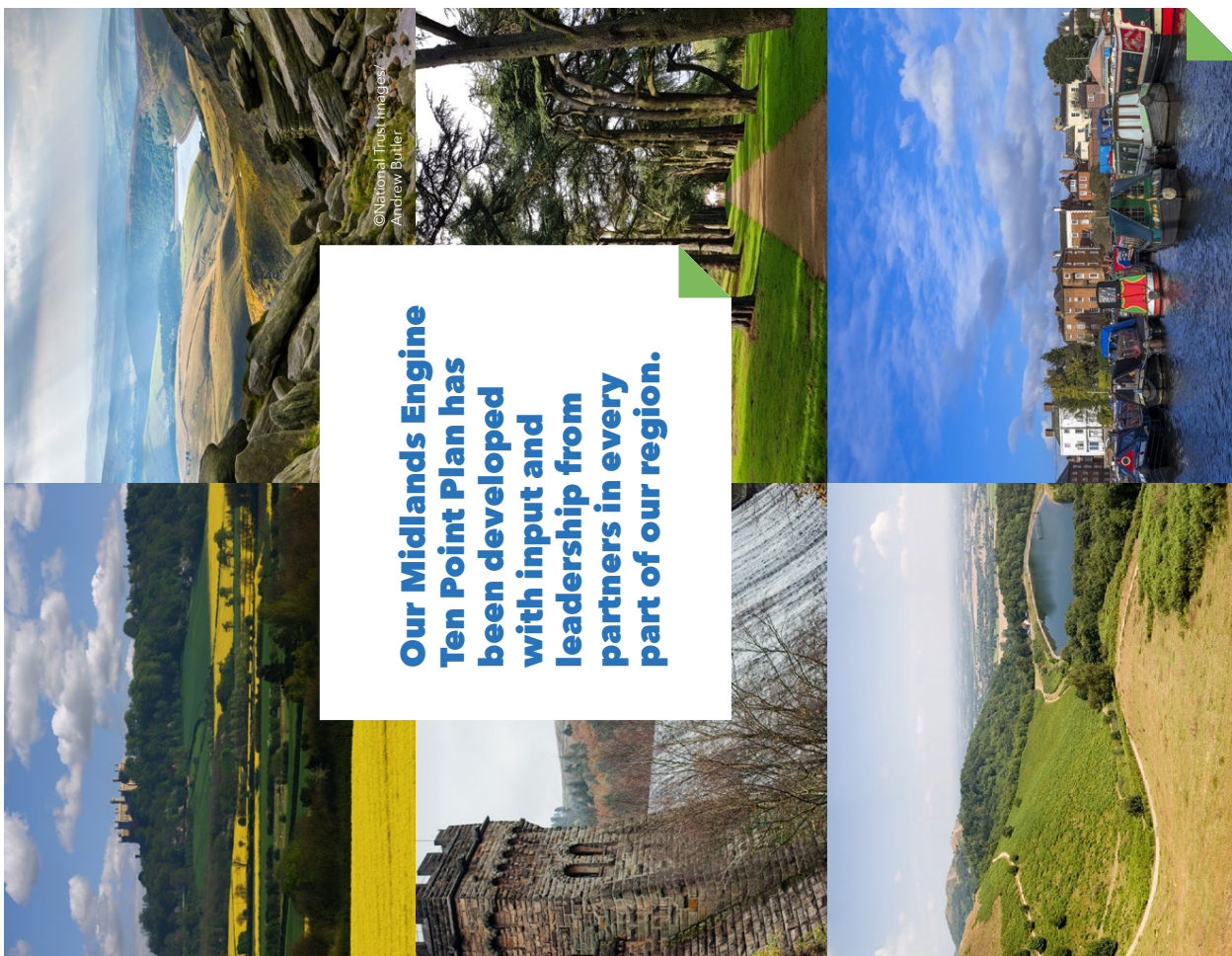
Our Ten Point Plan has been developed with input and leadership from partners from every part of our region.

Recognising that our region is rich in potential and diverse in scope and capacity, it sets out how, where and when we can act in true collaboration - to add value, connect and amplify our region's exceptional leadership and innovation in low carbon to benefit the Midlands and the UK.

The Plan prioritises ten key areas for action that will: benefit every part of our region; enable us to build back stronger, better and greener; and effectively accelerate our path to net zero.

The role of the Midlands Engine in all of this is to connect, champion and amplify. We will be successful through our collective effort, with each partner working to their own strengths, supporting and complementing each other to add value.

Together, we are greater than the sum of our parts - dynamic advocates for our region, benefitting every partner, every business and every community through our shared regional vision.



Our Midlands Engine Ten Point Plan has been developed with input and leadership from partners in every part of our region.

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POWER OF PARTNERSHIP TO DELIVER

The activity identified in our Ten Point Plan will have a fundamental impact on the people, places and businesses of the Midlands.

By 2041 we will achieve:

PEOPLE



MORE THAN

196,000 JOBS

PLACES



MORE THAN

£24.2 BILLION GVA

PROSPERITY



QUANTIFYING OUR IMPACT

Our partners at WSP consulting have reviewed each of the actions in our Ten Point Plan and identified what these mean in terms of potential economic, environment and community impact, including:

- ▶ **Jobs and GVA** - new jobs will bring increased opportunities for our communities and GVA growth will help close the regional £76 billion productivity gap
- ▶ **Carbon reduction** - collective actions will drive forward sustainable, green solutions, accelerating decarbonisation towards net zero targets
- ▶ **Sustainable Development Goals** - delivery will aid and underpin levelling up through activity aligned to UNESCO goals

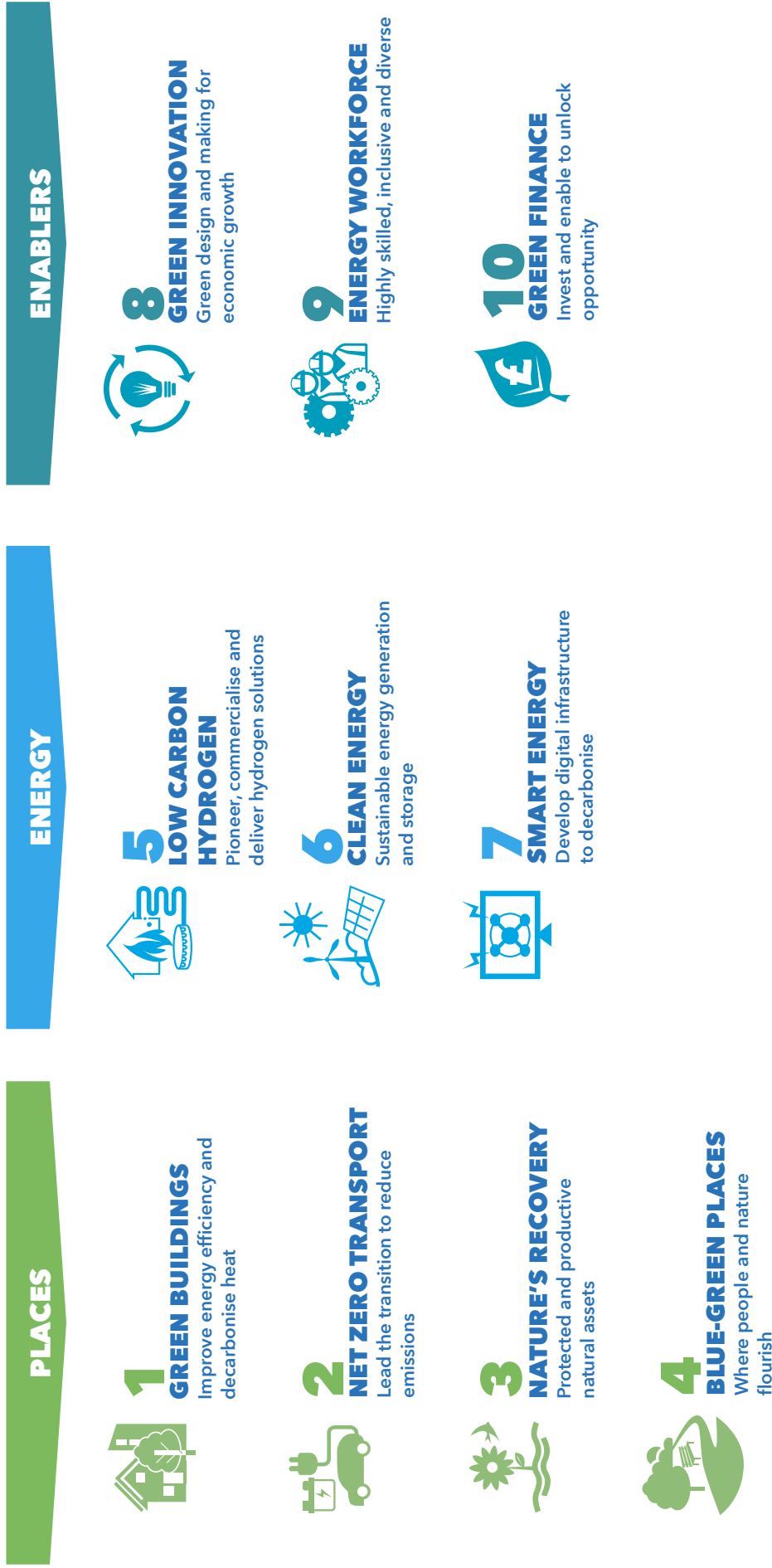
More information on the data we've used and methods we've applied to assess the potential impact of our plan is available from the Midlands Engine Observatory.

Source all: WSP (2021), 'Impact Statement Calculations: Ten Point Plan for Green Growth in the Midlands Engine', (report prepared for Midlands Engine)

Focus areas	Economic impact	Carbon impact	Sustainable Development Goals
1. GREEN BUILDINGS 	Increasing GVA via 30,000 new green jobs	3% CO₂ reduction via retrofitting housing stock	SDG 1, 2, 7 and 13
2. NET ZERO TRANSPORT 	New Gigafactories employing 8,000 people	12% CO₂ reduction via electric vehicle usage	SDG 3, 8 and 13
3. NATURE'S RECOVERY 	3,000 new forestry workers	1.1% reduction emissions via 15% tree coverage across the region	SDG 3, 8, 13, 14 and 15
4. BLUE-GREEN PLACES 	£6 benefits for every £1 investment in active travel	Increase urban green spaces	SDG 3, 8, 10, 11 and 14
5. LOW CARBON HYDROGEN 	£3.3 billion GVA and 14,000 jobs supporting hydrogen technologies sector	Maritime sector reducing CO₂ by 1.3% nationally	SDG 7, 8 and 9
6. CLEAN ENERGY 	3,000 new green jobs in offshore wind and solar	7.3% CO₂ reduction through offshore wind	SDG 1, 7, 8 and 13
7. SMART ENERGY 	£1 billion savings to Midlands Engine residents	Effective energy usage reducing CO ₂	SDG 1, 7 and 8
8. GREEN INNOVATION 	£2.3 billion additional investment in Midlands Engine R&D	Enabling new technologies	SDG 8, 9 and 13
9. ENERGY WORKFORCE 	100,000 new Midlands Engine jobs in the sector by 2030	10% CO₂ reduction via new low carbon heating alternative	SDG 7 and 8
10. GREEN FINANCE 	New models of green finance unlocking funding	8.2% CO₂ emissions reduced via new home efficiency	SDG 8, 9 and 13



TEN POINT PLAN FOR GREEN GROWTH IN THE MIDLANDS ENGINE

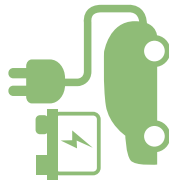




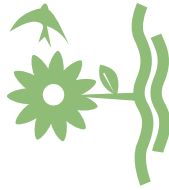
PLACES



1 GREEN BUILDINGS
Improve energy efficiency and decarbonise heat



2 NET ZERO TRANSPORT
Lead the transition to reduce emissions



3 NATURE'S RECOVERY
Protected and productive natural assets



4 BLUE-GREEN PLACES
Where people and nature flourish



GREEN BUILDINGS Improve energy efficiency and decarbonise heat

The Midlands will lead the UK in the shift to energy efficient buildings and away from fossil fuel sources for heating, significantly reducing greenhouse gas emissions. With a threefold focus on designing and building new greener buildings, retrofitting existing buildings to improve energy efficiency and developing next generation low carbon heating technologies, we will also create new jobs, skills and supply chains in our region.

AIMS

- ✔ Reduce greenhouse gas emissions
- ✔ Reduce energy demand
- ✔ Improve energy security
- ✔ Support innovation
- ✔ Create exports in low carbon heating
- ✔ Create high-value jobs, particularly in SMEs

OPPORTUNITY

The Government's policy paper 'the Grand Challenges' sets as one of its missions to at least halve the energy use of new buildings by 2030.¹ The Midlands is already a clear leader in innovative low carbon solutions for heating and greener buildings, and home to a large number of heat and energy sector businesses, such as Baxi, Worcester Bosch, Vaillant, Engie, Cadent, E.ON and many innovative SMEs.

Housing and heating make up 15Mt CO₂eq² of greenhouse gas emissions in the Midlands, with more than 50% of energy costs for households coming from heating and hot water.³ The Midlands is home to 4.46 million households,⁴ most of which need retrofitting to improve thermal insulation.

Around 32,000 new homes are also being built every year⁵ in our region, yet current building regulations do not support low carbon homes development and workers often lack the skills to identify and implement new low carbon solutions.

Substantial growth opportunities exist, including:

- ▶ **The development of next generation low carbon heating appliances to support the housing retrofit sector.**

The Midlands has significant capability in green heating technology, including Vaillant's renewable heating solutions using heat pump systems and cylinders, as well as solar thermal hot water solutions, and Worcester Bosch which has developed a hydrogen boiler and aims to be a centre of excellence for this technology. Work is already underway at Worcester Bosch to develop next generation low carbon heating appliances and enable the housing retrofit sector.

We have the potential to create thousands of new manufacturing jobs and skills, including in the service sector, through the training of low carbon heating engineers.

- ▶ **Taking a leading role in constructing energy efficient new buildings and homes.**

We have huge potential to build on groundbreaking projects, such as the Nottingham CityHomes Pilot to retrofit housing association homes and the Net Zero Neighbourhood concept to help tackle fuel poverty in the West Midlands. The Midlands also has an opportunity to take a leading role in constructing energy efficient

new buildings and homes, as well as building a workforce that is skilled and knowledgeable in low carbon energy technologies such as district heating, hydrogen, air and ground source heat pumps and geothermal. Plus, we will demonstrate leadership in heating, developing regional energy planning capability to support local authorities in making the right choices, as demonstrated through the West Midlands Combined Authority SMART Hub and Net Zero Neighbourhood Demonstrator programme.

Our region has some of the most nationally significant district heating programmes.

- Nottingham is one of the largest district heating networks in the UK and one of the most established. It has proven the long-term viability of heat networks and continues to be a pioneering project which stands as an example to other cities which are adopting this technology decades later.
- The Birmingham district heating system provides heating, together with cooling, to many of the municipal buildings in the city.
- The Coventry network is connected to waste plant energy and Stoke is developing a network

which could combine the waste heat from industry, waste processing and geothermal. Midlands universities have world leading expertise in thermal energy. Academics at De Montfort University, Leicester have been leading just one of four sites across Europe to demonstrate and monitor how to use heat energy stored in the ground using next generation geothermal heat pumps.

¹ Department for Business, Energy & Industrial Strategy, (2020). The Grand Challenge missions. [online]. Available at: <https://www.gov.uk/government/publications/grand-challenge-missions-the-grand-challenges-missions> (Accessed: May 2021)

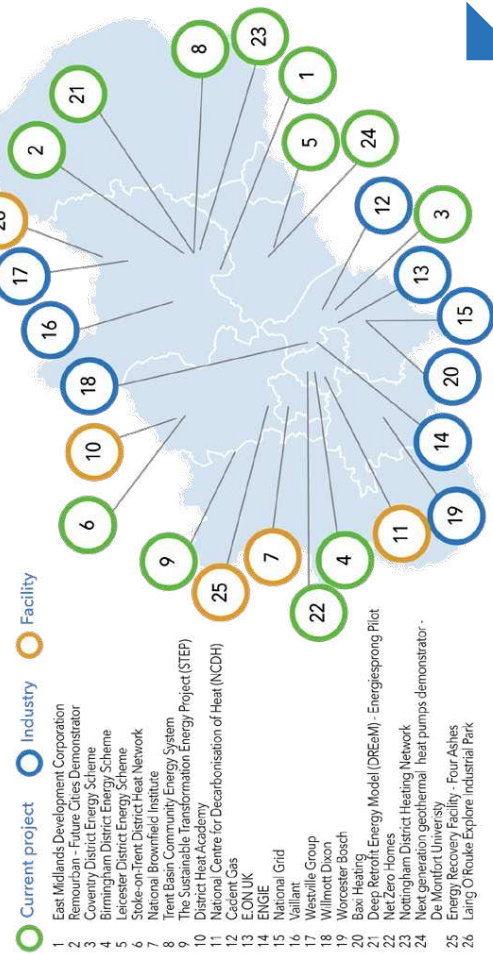
² Department for Business, Energy & Industrial Strategy. UK local authority and regional carbon dioxide emissions national statistics: 2018. [online]. Available at: <https://www.gov.uk/government/collections/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics> (Accessed: March 2021)

³ Energy Saving Trust. Heating and hot water. [online]. Available at: <https://energysavingtrust.org.uk/advice/heating-and-hot-water/#:~:text=Electric%20heating%20is%20one%20of%20the%20most%20expensive,am%20electric%20heating%20system%20will%20be%20a%20positive> (Accessed: March 2021)

⁴ Statista. Number of households in the United Kingdom in 2020, by region. [online]. Available at: <https://www.statista.com/statistics/295297/households-in-uk-by-region/> (Accessed: March 2021)

⁵ Ministry of Housing, Communities & Local Government. Live tables on housing supply: indicators of new supply. [online]. Available at: <https://www.gov.uk/government/statistical-data-sets/live-tables-on-house-building> (Accessed: March 2021)

REGIONAL ASSETS GO TO DIGITAL GREEN GROWTH MAP



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DOMESTIC EMISSIONS
SINCE 2005
36%

MIDLANDS LOW CARBON BUILDING TECHNOLOGY SECTOR WORTH £4BN

OVER £1,500
LOW CARBON BUILDING TECHNOLOGIES
COMPANIES

CASE STUDIES

TRENT BASIN COMMUNITY ENERGY SYSTEM



Part of a major regeneration project in Nottingham known as Project SCENE (Sustainable Community Energy Networks), this groundbreaking 'living lab' community energy scheme, enables residents to generate, store and use solar electricity and will provide around 500 contemporary, high quality, low carbon homes at the edge of the city centre. Led by the University of Nottingham, this project demonstrates a unique collaboration between the renewable energy industry and academia.

▶ DISCOVER THE PROJECT

WORCESTER BOSCH



Based in the Midlands, Worcester Bosch is the UK market leader in domestic boilers. The company's current product range includes renewable technologies such as heat pumps and solar water heating systems. Over the last few years, they have developed a prototype boiler that can run on 100% hydrogen gas. The prototype has been designed to also run effectively on natural gas. This means that in the future, if hydrogen gas becomes reality, those who have a 'hydrogen-ready' boiler can simply convert to hydrogen without the need for an entirely new heating system.

▶ DISCOVER THE PROJECT

ACTIONS

1 Develop a pan regional zero carbon homes route map
 Focused on shared goals to unlock barriers to supply chain growth, skills, innovation and programmes for existing homes including a balance of new sites (e.g. as part of the East Midlands Development Corporation plans) and more challenging opportunities across the region to alleviate fuel poverty. To include work with the WMCA SMART Hub and regional partners to support their goals to encourage low carbon construction methods.

2 Work with partners to undertake a regional study on low carbon buildings and heat
 Subsequently, engage with policy makers to make evidence-led recommendations for interventions, including:

- o Opportunities to augment building regulations.
- o Driving forward innovative pilots in the region, focused on future technologies.

3 Work in partnership to secure the establishment of a National Centre for Decarbonisation of Heat in the Midlands
 This will involve:

- o Establishing the Midlands as a national leader in low carbon heat by bringing together partners and industry to develop large-scale net zero demonstrators. These will include new build sites as part of the East Midlands Development Corporation plans.
- o Advocating on behalf of the region for the construction of a National Centre for Decarbonisation of Heat at Tyseley Energy Park.

IMPACT POTENTIAL

£3.4 BILLION

Economic

The Midlands is uniquely placed to contribute to and benefit from the government targets to deploy heat pumps. Deploying around 200,000 a year by 2040 in the region will require nearly 30,000 trained people and give manufacturers in the area a huge opportunity.

1.8MtCO₂
 (3% OF 2018 EMISSIONS)

Carbon

By retrofitting home energy efficiency we can reduce home energy bills in the region by £290m, reduce greenhouse gas emissions by 1.75MtCO₂ (3% of 2018 emissions) per annum by 2040 and improve thermal comfort.

30,000 JOBS

Sustainable development goals

These measures will reduce poverty (SDG1), improve health (SDG2) and provide clean energy, reducing GHG emissions (SDG7 and SDG13), whilst providing jobs.



▶ DISCOVER THE GOALS

MIDLANDS ENGINE

INDUSTRY PARTNERS



“Using hydrogen for heating buildings unlocks huge economic benefits for the Midlands region, for example in hydrogen-ready boiler manufacturing, fuel cell development and scaled green hydrogen production.”
 Dr Angela Needles,
 Director of Strategy,
 Cadent Gas



2 NET ZERO TRANSPORT

Lead the transition to reduce emissions

Home of the UK automotive industry, the Midlands is in the vanguard of low carbon transport innovation, including battery electric vehicles and fuel cell technology. By strengthening this sector further, our region will play a major part in delivering UK Government ambitions to accelerate the shift to zero emission public, private and industrial vehicles. We will also protect jobs in the Midlands, boost export potential and drive down our CO₂ and NO_x emissions.

AIMS

- ✔ Reduce greenhouse gas emissions
- ✔ Protect existing and create new regional jobs
- ✔ Accelerate shift to net zero vehicles
- ✔ Integrate energy and transport plans across the region

OPPORTUNITY

The Midlands is an internationally significant hub for the automotive industry, employing more than 293,000 people.¹ We are home to seven volume car manufacturers, seven commercial vehicle manufacturers and 16 of the world's top 20 automotive suppliers. A number of the country's leading brands are based in the region, including:

- **Toyota's** first European car plant was set up at Burnaston, Derbyshire in 1992. Since opening, the plant has manufactured over four million cars and was the first Toyota plant outside Japan to start making hybrid cars in 2010 when it began manufacturing the Toyota Auris.
- **Jaguar Land Rover** has a long-established heritage in the Midlands, with operations in Solihull, Wolverhampton, Coventry and Warwickshire. The company has announced that all vehicles will be available as all electric variants by 2030.²
- **Aston Martin Lagonda** has its Global Headquarters in Warwickshire where the company plans, designs and builds its cars for global distribution. It is due to build its new full electric cars in the UK from 2025.

Spearheading Innovation

Midlands businesses and our region's universities are spearheading innovation through projects such as the £130 million UK Battery Industrialisation Centre (UKBIC) which focuses on large-scale manufacture of batteries enabling the scale-up of UK battery manufacturing. For the Midlands to retain leadership in transport technologies, continued investment in R&D and innovation is needed, recognising the regional strengths of the Warwick Manufacturing Group - the lead centre for Vehicle Electrification and Connected and Autonomous Vehicles within the High Value Manufacturing Catapult network, and Mira Technology Park whose Southern Manufacturing Sector provides approximately 2.5 million sqft of automotive-related advanced manufacturing facilities. The Advanced Propulsion Centre too was set up to research, develop and commercialise the technologies for the vehicles of the future, and to do this, it manages a £1 billion investment fund which will safeguard and create over 30,000 jobs over the next ten years.³

There is also the opportunity to look to the future and create the next generation of mobility technology, including Connected and Automated

Mobility (CAM) solutions as is currently being developed in the West Midlands by Midlands Future Mobility.

World class automotive supply chain

Our mobility supply chains and skills base are ideally located for trialling and implementing new low carbon transport infrastructure projects. Battery Electric Vehicles (BEVs) are being developed at pace by private sector expertise in the Midlands, such as Jaguar Land Rover and Aston Martin Lagonda. Meanwhile, electric vans are being developed and built in the Midlands by London Electric Vehicle Company. Major Midlands-based retailers, such as Central England Cooperative, are actively developing EV charging points across their property estate and local government is looking at how to support all forms of transport in the transition from fossil fuels.

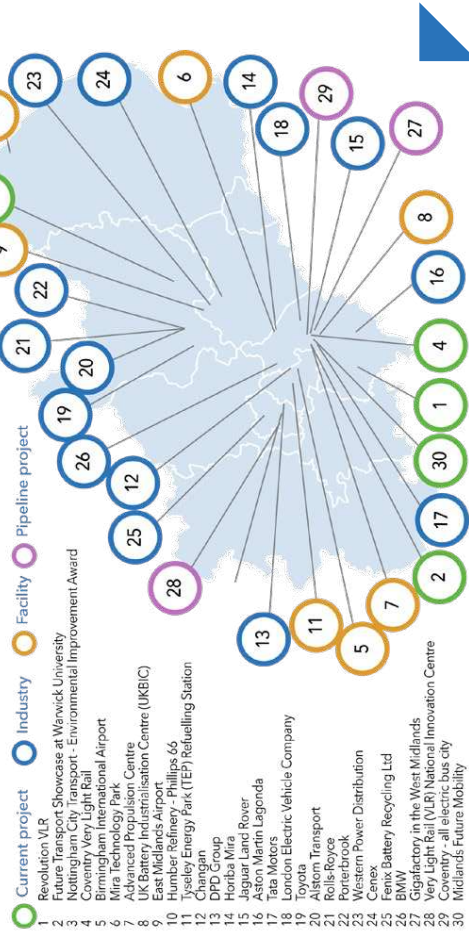
There is an opportunity to ensure that the whole supply chain underpinning the scale-up of electric vehicle manufacturing is based within our region. The proposed battery Gigafactory in the West Midlands will be a key ingredient, but there

will be opportunities that lie beyond traditional vehicle production, including battery recycling and reprocessing, such as that being developed by start-up Fenix Battery Recycling in Willenhall.

The Midlands sees the highest amount of road freight in the UK, accounting for 45% of all rail freight and 30% of lorry freight. Sustainably refuelling the enormous volume of heavy goods vehicles travelling through our region presents unique infrastructure challenges and opportunities. Some fleets are already switching to biomethane, others are advocating overhead power line solutions (catenary systems) to recharge HGV batteries on the move, and many believe that hydrogen refuelling may be the future.

¹ Nomis - Official Labour Market Statistics, 'Business Register and Employment Survey', [online]. Available at: <https://www.nomisweb.co.uk/datasets/newbires6pub> (Accessed: March 2021)
² Jaguar Land Rover, 'Jaguar Land Rover reimagines the future of modern luxury by design', [online]. Available at: <https://media.jaguarlandrover.com/news/2021/02/jaguar-land-rover-reimagines-the-future-of-modern-luxury-design> (Accessed: May 2021)
³ Advanced Propulsion Centre UK, 'Our Story', [online]. Available at: <https://www.apcuk.co.uk/our-story/> (Accessed: May 2021)

REGIONAL ASSETS GO TO DIGITAL GREEN GROWTH MAP



293,000
AUTOMOTIVE
JOB

ALTERNATIVE FUEL
 VEHICLE SECTOR HAS
DOUBLED
 UK GROWTH RATE
 SINCE 2017/18
200%

1/4 ENGLAND
ENERGY
 LOW EMISSION VEHICLE
 & INFRASTRUCTURE
JOBS BY 2030

CASE STUDIES

UK BATTERY INDUSTRIALISATION CENTRE

The £130 million UK Battery Industrialisation Centre (UKBIC) is a pioneering concept in the race to develop battery technology for the transition to a greener future. The unique facility provides the missing link between battery technology, which has proved promising at laboratory or prototype scale, and successful mass production. Based in Coventry, the UKBIC is bringing together manufacturers, entrepreneurs and researchers to lead the race to develop battery technology for the transition to a greener future.

DISCOVER THE PROJECT



Image Courtesy of UKBIC

TYSELEY ENERGY PARK REFUELLING STATION

The UK's first multi-fuel, open access, low and zero carbon fuel refuelling station is the result of a five-year collaboration between the private and public sector. The unmanned facility is available 24/7 for refuelling, with integrated pay at pump options, and currently offers hydrogen, biodiesel and electric vehicle charging with Bio-CNG to follow in 2022. From the summer of 2021, TEPC refuelling station will service 20 hydrogen double-decker buses purchased by Birmingham City Council.

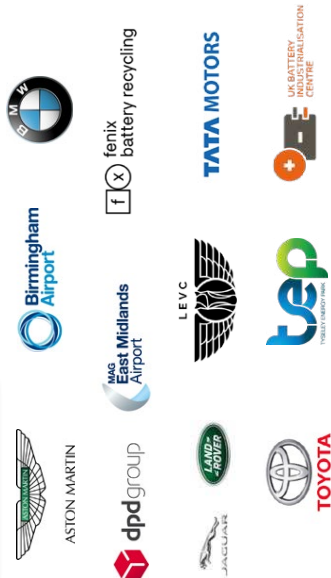
DISCOVER THE PROJECT



Image courtesy of Tyseley Energy Park

MIDLANDS ENGINE

INDUSTRY PARTNERS



“Toyota has pioneered low and zero emission technology from hybrid to hydrogen and is pleased to support the Midlands, where we have our manufacturing plant, on the journey to net zero and beyond”

Jon Hunt, Manager, Alternative Fuels, Toyota

ACTIONS

1 Map and futureproof our region's charging and refuelling infrastructure and connect key stakeholders to foster a coordinated charging and refuelling infrastructure strategy

Enabling authorities and businesses to plan strategically and improve the visibility of such projects across the region, promoting Government and consumer awareness, in turn increasing investment prospects and encouraging early consumer adoption of BEVs and alternative fuel vehicles. In addition, working with WMCA to support its infrastructure for Zero Emissions Vehicles Strategy.

2 Develop a regional BEV and charging and refuelling skills strategy

Enhancing our region's skilled automotive workforce and regional positioning in the vanguard of the electric and alternative fuel vehicle revolution. This will bolster our region's position as lead candidate for new national and grant-funded projects and inward investment.

3 Develop and promote the Midlands Engines as a centre of excellence for BEVs and charging and refuelling technologies

Building on the concentration of automotive businesses, supply chain and know-how in the area. Seize opportunities for the region to take a leading role in the development of next-generation batteries and battery recycling, as well as other refuelling infrastructure.

4 Work through partnership to enable energy and transport infrastructure plan integration across our region

Work with partners to ensure the integration of energy and transport infrastructure plans for our region. This will involve building on the work carried out by Cenex (funded by Midlands Energy Hub and commissioned by Coventry City Council) which provides intelligence and highlights options for a strategic network of multimodal transport hubs across the Midlands.

IMPACT POTENTIAL

£916 MILLION GVA

Economic

By 2030 all new cars made in the UK will be electric, requiring more than 60GWh of batteries, requiring around four "Gigafactories", with the Midlands the ideal location, employing 8,000 people.

7.0MtCO₂
(12% OF 2018 EMISSIONS)

Carbon

The switch to electric vehicles could reduce greenhouse gas emissions by as much as 7MtCO₂ (12% of 2018 emissions) per annum by 2040, as well as improving air quality and reducing noise.

8,000 JOBS

Sustainable development goals

By delivering on active travel people we can improve health (SDG3) and reduce GHG emissions (SDG13), whilst protecting and creating jobs (SDG8).



DISCOVER THE GOALS



3 NATURE'S RECOVERY

Protected and productive natural assets

Clean air and water, fertile soil, beautiful landscapes, rich biodiversity: our economy and our people depend upon our region's natural assets. We will invest in them urgently and consistently to maximise the carbon storage potential of our land, ensure a sustainable and attractive environment for our people and visitors, and a productive asset for agriculture. The recovery of the natural environment is a crucial element of the Midlands' economic and social health.

AIMS

- Invest in woodland, peatland and other carbon sinks
- Deliver long-term environmental resilience
- Enhance biodiversity
- Improve health and wellbeing
- Encourage green tourism and boost visitor economy
- Create more jobs in the green economy
- Increase cycling and walking

it is wildlife rich, provides safe drinking water, minimises flood risk and sequesters carbon. With early investment in peatland and wetland restoration, we can rapidly increase the carbon capture and carbon storage functions of this land. A focus on restoring peat moorlands in the Midlands will mean working with nature to develop low cost, high impact nature-based solutions, contributing to both climate mitigation and biodiversity targets.

¹ Department for Business, Energy & Industrial Strategy, 'UK local authority and regional carbon dioxide emissions national statistics' [online]. Available at: <https://www.gov.uk/government/collections/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics> (Accessed: February 2021)

² Kantar, 'The Great Britain Day Visitor 2019 Annual Report' [online]. Available at: https://www.visitbritain.org/sites/default/files/ab-corporate/gb-dvs_2019_annual_report.pdf (Accessed: May 2021)

³ Nomis - Official Labour Market Statistics, 'Business Register and Employment Survey' [online]. Available at: <https://www.nomisweb.co.uk/datasets/newres6pub> (Accessed: February 2021)

⁴ Office for National Statistics, 'Regional gross value added (balanced) by industry: local authorities by NUTS region' [online]. Available at: <https://www.ons.gov.uk/economy/grossvalueadded/gva/datasets/regionalgrossvalueaddedbalancedbylocalauthoritiesbynuts1region>, (Accessed: February 2021).

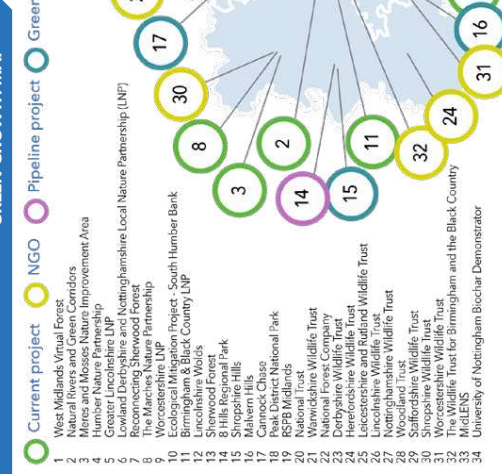
corridors. This ambition aligns with Government recommendations to increase woodland cover from 13%-19% across the UK to help reach net zero targets.

As we look ahead to Birmingham 2022, steps are being taken to ensure this is the most sustainable Commonwealth Games to date with initiatives such as Severn Trent Water's Commonwealth Forest - the creation of 2022 acres of forest as well as 72 tennis-court-sized mini forests across West Midlands urban areas.

Woodland creation and tree planting will form a key part of the climate mitigation pathway by locking up and storing carbon, helping to clean up air pollution, stabilising soils and reducing run off into rivers, and providing valuable wildlife habitat for a wide range of species. At the same time, through robust policy and sympathetic development, we must protect our irreplaceable habitats such as ancient woodlands and veteran trees.

In addition, we must recognise the importance of peatland. When peatland is functioning well

REGIONAL ASSETS GO TO DIGITAL GREEN GROWTH MAP



- 1 West Midlands Virtual Forest
- 2 National Rivers and Green Corridors
- 3 Meres and Mosses Nature Improvement Area
- 4 Humber Nature Partnership
- 5 Greater Lincolnshire LNP
- 6 The Peak District National Park
- 7 Romsley and Sharncliffe Local Nature Partnership (LNP)
- 8 The Malvern Hills and Cannock Chase
- 9 Worcestershire LNP
- 10 Ecological Mitigation Project - South Humber Bank
- 11 National Wildlife Centre
- 12 Lincolnshire Wolds
- 13 Sherwood Forest
- 14 8 Hills Regional Park
- 15 Shropshire Hills
- 16 Cannock Chase
- 17 Peak District National Park
- 18 RSPB Midlands
- 19 National Trust
- 20 National Forest Company
- 21 National Forest Wildlife Trust
- 22 Derbyshire Wildlife Trust
- 23 Leicestershire Wildlife Trust
- 24 Leicestershire and Rutland Wildlife Trust
- 25 National Wildlife Centre
- 26 Nottinghamshire Wildlife Trust
- 27 Woodland Trust
- 28 Staffordshire Wildlife Trust
- 29 Shropshire Wildlife Trust
- 30 Staffordshire Wildlife Trust
- 31 The Wildlife Trust for Birmingham and the Black Country
- 32 M10LENS
- 33 University of Nottingham Biochar Demonstrator
- 34



OPPORTUNITY

Change in land use has been one of the key drivers in the global decline of biodiversity. Intensively farmed land, deforestation, drainage of peatland and the pollution of waterways have all had an impact on the quality of the environment.

In the Midlands, forests, grasslands and other landscapes remove 2,670kt of carbon a year.¹ But lack of appropriate market incentives and pan regional collaboration and in some cases lack of land availability, coupled with under-investment in natural assets, have prohibited positive change to invest in nature-based solutions to help the region to decarbonise. There is now an opportunity to address this as we transition to post-EU-exit land use policies. Projects such as the Ecological Mitigation Project - Europe's largest ecological mitigation project - located on the South Humber Bank are exemplar initiatives that support Nature's Recovery while promoting economic growth. By mapping current and building new nature recovery networks and investing in building our natural carbon sinks, we can maximise the role that nature-based solutions will play in the Midlands journey to net zero and nature's recovery.

Outstanding natural assets

The Midlands boasts some of the country's most wonderful landscapes: Sherwood Forest, the Peak District, the Shropshire Hills, the Lincolnshire Wolds, the Malvern Hills and Cannock Chase. Every year, our region's outstanding landscapes receive tens of millions of day visits. In 2019, there were over 230 million day visitors in the Midlands Engine area, spending £7.2 billion.² These woodlands and landscapes must be invested in, not just for environmental reasons, but because they are vital for our people's quality of life and for our visitor economy which accounts for one in ten jobs³ in our region and £10 billion GVA.⁴

With the creation of the National Forest 25 years ago, the Midlands has already pioneered a model for investing in woodland to benefit biodiversity, leisure tourism and decarbonisation. Our region also has many pockets of fragmented woodlands which provide an exceptional opportunity to create both rural and urban woodland corridors, allowing us to lock in carbon at the same time as providing wildlife habitat, a more resilient landscape and health benefits for communities. There is potential to develop this at scale by expanding the National Forest with east-west

CASE STUDIES

NATURAL RIVERS AND GREEN CORRIDORS PROJECT



Natural Rivers and Green Corridors is a three-year project to improve woodlands, grasslands, wetlands and watercourses along the River Rea and its tributaries in South-West Birmingham and the River Tame in West Birmingham. As well as improving habitats for wildlife, the project will benefit communities by making local green spaces more attractive and encouraging healthy lifestyles. The project is a partnership between Birmingham City Council, the Environment Agency and the Wildlife Trust for Birmingham and the Black Country.

▶ **DISCOVER THE PROJECT**

RECONNECTING SHERWOOD FOREST



Image courtesy of Sherwood Forest Trust

Landowners and a wide range of partners are working together to restore and reconnect Sherwood Forest to the wider landscape and City. An internationally renowned wood, important for wildlife and tourism, Sherwood Forest has been one of the first projects to receive funding through the Government's Green Recovery Challenge Fund. A focus on restoration, ancient trees, forest expansion and forestry skills and jobs will see Sherwood and the surrounding area maximise its environmental and economic potential.

▶ **DISCOVER THE PROJECT**

1 Establish and convene a Midlands Engine Natural Capital taskforce

Develop partnership approaches between business, environmental specialists and Government to make recommendations on how to embed natural capital into the Midlands regional economy, and to enable steps to link and increase knowledge exchange and development of spatially-based data.

2 Develop the Midlands Forest vision with National Forest, Woodland Trust and other partners, expanding forestry and woodland cover across the Midlands

Create conditions to ensure increased support for adoption of and investment in the Midlands Forest vision, and support initiatives such as the West Midlands Virtual Forest and Severn Trent Water's Commonwealth Forest.

3 Work to shape policies and regional approaches which can significantly increase space for nature and carbon sinks

Through the work of the Midlands Engine Natural Capital taskforce, actively identify ways through which to contribute to Government's commitment of protecting 30% of land for nature by 2030, and ensure a lead role in peatland restoration.

4 Advocate for the Midlands to be at the forefront of delivering key nature conservation policies

Work with partners such as the Midlands Engine Observatory and the West Midlands Natural Capital Board to ensure contemporary understanding of this dynamic policy area including Local Nature Recovery Strategies, the emerging Environmental Land Management Agreements to promote sustainable farming, and Biodiversity Net Gain opportunities soon to become mandatory following the Environment Bill's enactment. Support development of ambitious targets with local, regional and national policies as enablers for delivery and change.

IMPACT POTENTIAL

£394 MILLION GVA

608 KtCO₂
(1.1% OF 2018 EMISSIONS)

3,000 JOBS

Economic

To expand woodland cover across the Midlands, we will need nearly 3,000 forestry workers which will create local jobs and generate £394 million worth of economic value.

Investment in pan regional natural capital will maximise ecosystem services including clean water, clean air, productive soils - all reducing costs to society and businesses.

Carbon

By reaching the 15% tree coverage targeted for the UK, by 2040, 500ktCO₂ would be captured each year, the equivalent of 1.1% of total emissions in the Midlands.

Sustainable development goals

One way to work towards SDG#13 is to plant more trees. When the Midlands meets the UK targets for tree coverage of 15%, we will have over 400 million more trees, more than 36 per person.



▶ **DISCOVER THE GOALS**

MIDLANDS ENGINE

PARTNERS



“We are facing a twinned crisis of nature and climate emergencies, the need to act is now urgent. The Midlands can rise to this challenge, working together protecting and enhancing our landscapes for all.”

Toby Bancroft,
Regional Director, Central England, Woodland Trust



4 BLUE-GREEN PLACES

Where people and nature flourish

Providing green and blue spaces in our cities, towns and villages is as important for the wellbeing of our region's people as it is for climate change resilience. By collaborating with business, industry, public bodies, and landowners to develop our green and blue infrastructure, we will enhance quality of life in the Midlands, boost the visitor economy, improve flood and carbon management, and protect nature.

AIMS

- ✔ Reduce greenhouse gas emissions
- ✔ Improve health and wellbeing
- ✔ Improve water management systems
- ✔ Encourage green tourism and boost visitor economy
- ✔ Reduce heat island effect
- ✔ Improve wildlife natural habitats
- ✔ Enhance biodiversity

Government departments are key inhibitors to realising opportunities. In rural areas, however, agricultural policy is changing and this offers a golden opportunity to look at sustainable water management through strategic land use changes.

Catchment scale broad partnership projects, such as the River Severn Regional Growth Zone, and the River Trent Partnership will play a key role by enabling partners to work together and maximise the economic, social and environmental benefits of landscape scale cooperation. Similarly, looking after our coast and coastal communities to maximise Green Growth benefits will be important in the Midlands.

¹ Natural England, (2009) 'An estimate of the economic and health value and cost effectiveness of the expanded WHI scheme 2009', (online). Available at: <https://publications.naturalengland.org.uk/publication/35009?category=9001> (Accessed: March 2021)
² Vivid Economics, (2021). 'Natural Capital Account in the Midlands Region: the Benefits of Urban Greenspace', (presentation prepared for Midlands Engine)
³ Ibid ⁴ Ibid ⁵ Ibid ⁶ Ibid
⁷ West Midlands Public Health Observatory, (2010) 'Health Effects of Climate Change in the West Midlands: Summary Report', (online). Available at: https://wmpaho.org.uk/resources/Climate_Change_and_Health_Summary_Report.pdf (Accessed: March 2021)

to air quality; and improving biodiversity by maximising space for nature and connecting places. Increasing our urban woods and planting more street trees to combat pollution, capture carbon and provide summer shade will also be a part of climate adaptation for our towns and cities, mitigating the urban heat island effect.

In terms of blue infrastructure, the Midlands is well served by two key river basins (the Severn and the Humber), significant canal and river heritage and the Sherwood Sandstone Aquifer. Our waterways are multi-functional assets. Not only do they form part of our cultural and natural heritage, through new innovations they can potentially form 'Information Superhighways' and act as sources of thermal energy generation and cooling. They are also important resources for carbon storage, water supply, nature and the wellbeing of local communities.

Managing water will be crucial for both flood risk and water scarcity issues in the Midlands. Land availability, funding and lack of an integrated vision between landowners and

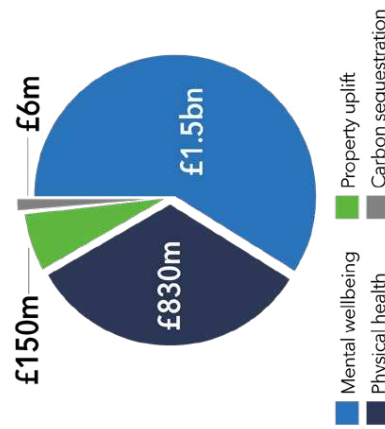
OPPORTUNITY

Natural England has estimated that £2.1 billion per year could be saved in health costs if everyone in England had good access to green space due to increased physical activity in those spaces.¹ Time spent in natural green spaces has also been shown to improve mental health and wellbeing, and reduce stress, anxiety and depression. Urban green space in the Midlands generates benefits to physical health and mental wellbeing valued at an estimated £2.4 billion per annum.²

The Midlands is home to some of the greenest cities in the UK, with over 5,000 green spaces in urban locations, representing 30,000 hectares of land, which attract an estimated 109 million visits annually.³ By investing in improving accessibility in 2,000 of these spaces, it is estimated that annual visits will increase by around 89 million.⁴ This would lead to substantial increases in physical health and mental wellbeing valued at an additional £2 billion per year.⁵

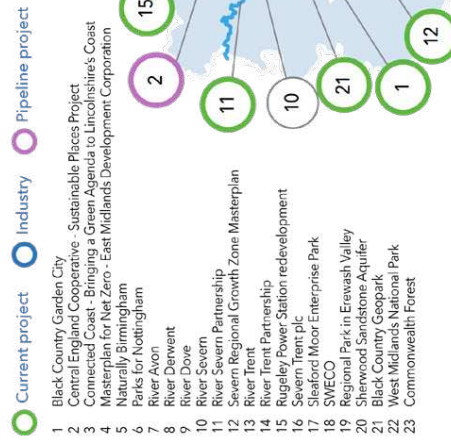
Providing green space is also important for climate adaptation. It is likely that in the Midlands, urban areas will experience higher temperatures

Figure 1: Natural Capital Account in the Midlands: The Benefits of Urban Greenspace⁶



than rural areas due to the 'urban heat island effect'.⁷ Creating a network of parks and green spaces across cities and towns, like the creation of the West Midlands National Park, will give more people access to nature near to where they live while increasing resilience to future climate pressures; supporting sustainable transport through cycle and walking routes, contributing

REGIONAL ASSETS GO TO DIGITAL GREEN GROWTH MAP



SOCIOECONOMIC MENTAL HEALTH GAP WITH ACCESS TO GREEN SPACE

VALUED AT **£2.5BN A YEAR**

INVEST IN **2,000 GREEN URBAN SPACES**

ESTIMATED **89M ANNUAL VISITORS**

40%

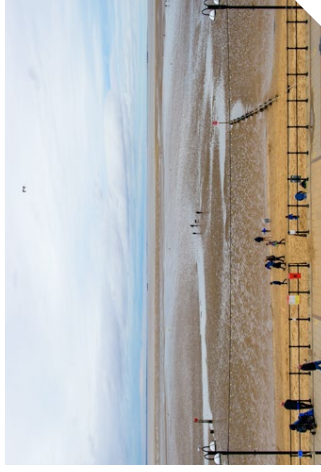
CASE STUDIES

MASTERPLAN FOR NET ZERO - EAST MIDLANDS DEVELOPMENT CORPORATION



The East Midlands Development Corporation is pioneering a new approach to economic regeneration by focusing on the delivery of large-scale sustainable developments with the potential to achieve direct impact on net zero. It is focused on new communities 'living, making and moving' with net zero built into developments from the start. The initial focus is on creating new green spaces, parks, sustainable transport and net zero housing, and on ensuring nature corridors and habitat connection within the area.

CONNECTED COAST - BRINGING A GREEN AGENDA TO LINCOLNSHIRE'S COAST



Led by East Lindsey District Council, a green agenda is being mapped on the Lincolnshire coast and written into the Town Investment Plans for both Skegness and Mablethorpe. The agenda will focus on investing in green infrastructure to support the local communities. The vision is for Mablethorpe and Skegness to make distinctive contributions to a Connected Coast through a programme which diversifies their economies, builds their skills base and establishes them as national test beds for future living and natural resource management.

▶ DISCOVER THE PROJECT

MIDLANDS ENGINE

PARTNERS



The co-operative
Central England Co-operative



“By cleaning our rivers, restoring our landscapes and creating new wildlife-rich spaces across cities, towns and countryside, the Midlands Engine Partnership can establish our region as a beacon – a place where people and nature thrive.”

Paul Wilkinson, Chief Executive, Nottinghamshire Wildlife Trust

ACTIONS

1 Convene and advocate for cross-sector and multi-agency collaboration at scale for nature based solutions and catchment scale cooperation

Bringing together partners from across NGOs, public bodies, industry and the Midlands Engine Observatory to identify opportunities to share data and to work at scale in partnership to develop the region's blue and green infrastructure.

2 Work with Government and partners to deliver proposals for the East Midlands Development Corporation 'Masterplan for Net Zero'

Focusing on communities 'living, making and moving' by investing in green infrastructure to drive net zero ambitions and to support the levelling up agenda – to include putting green spaces at the heart of new developments to bring positive benefits to people, places and the environment.

3 Advocate on behalf of the region for connected towns and cities through the creation of natural and active travel corridors

Supporting and championing partner initiatives, and provide evidence to promote wider, healthier towns and cities with nature corridors and infrastructure that facilitate sustainable and active travel.

IMPACT POTENTIAL

INCREASE URBAN GREEN SPACES

Economic

We will encourage connected cities across the Midlands through the creation of natural and active travel corridors. On average, investment in active travel measures generates £6 of benefit to society for every £1 spent.

100KtCO₂
(0.2% OF 2018 EMISSIONS)

Carbon

Every year, urban green spaces in the Midlands sequester 100,000 tonnes or £6 million worth of CO₂ (0.2% of 2018 emissions).

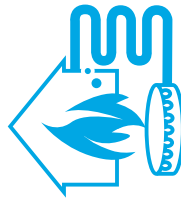
Sustainable development goals

Our investment in the creation of new green and blue spaces will help to reduce inequality (SDG#10), improve health and wellbeing (SDG#3) and create sustainable communities (SDG#11).

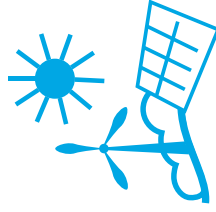


▶ DISCOVER THE GOALS

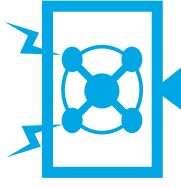
ENERGY



5 LOW CARBON HYDROGEN
Pioneer, commercialise and deliver hydrogen solutions



6 CLEAN ENERGY
Sustainable energy generation and storage



7 SMART ENERGY
Develop digital infrastructure to decarbonise



LOW CARBON HYDROGEN

Pioneer, commercialise and deliver hydrogen solutions

Thanks to exceptional business, industry and academic innovation, the Midlands is already pioneering next generation, cost-effective hydrogen technologies, with powerful potential to scale up. A pan regional hydrogen task force will ensure that the Midlands Engine capitalises on the opportunities presented by hydrogen, playing a national leadership role in decarbonising transport, logistics and heating, creating jobs and accelerating net zero UK.

AIMS

- ✔ Reduce greenhouse gas emissions
- ✔ Capitalise on regional, world-leading hydrogen expertise
- ✔ Reduce energy costs and imports
- ✔ Improve energy security
- ✔ Create high-value jobs
- ✔ Increase public and private investment opportunities
- ✔ Strengthen regional leadership in transport, logistics and heating sectors

OPPORTUNITY

The international Hydrogen Council suggests that by 2050 there will be a \$2.5 trillion market for hydrogen and fuel cell equipment, providing sustainable employment for more than 30 million people.¹ The UK has established its own Hydrogen Advisory Council to inform the development of hydrogen as a strategic decarbonised energy carrier, amplified by ambitious targets in the Government's Ten Point Plan for a Green Industrial Revolution.²

▶ Hydrogen facilities and infrastructure

Significant investment is targeting development of low carbon hydrogen facilities and infrastructure right across the Midlands to enable our region's national leadership and support our Ten Point Plan for Green Growth. For example, Tyseley Energy Park in Birmingham has now installed a 3MW electrolyser fed by a biomass plant, providing the largest scale green hydrogen for hydrogen-powered buses. The facility is presently exploring scaling up hydrogen production to cater for several hundred trucks, with a 35 MW plant with 350 MWh of storage. Plus, the University of Birmingham in collaboration with Porterbrook has developed the

Midlands Engine businesses with international reach lead the UK hydrogen economy, including: Worcester-Bosch and Baxi (hydrogen boilers and heating solutions), Cadent (gas distribution network), Intelligent Energy (fuel cells), Porterbrook (hydrogen trains), Toyota (hydrogen vehicles), Caterpillar, Faun Zoeller and JCB (heavy vehicles) and close by, ITM (hydrogen generation). Siemens is working closely with regional partners in next generation hydrogen production and the 20-tonne JCB 220X excavator, powered by a hydrogen fuel cell, has been a world first for the Midlands region.

▶ Groundbreaking hydrogen research

Our region's world-leading universities join force through the Energy Research Accelerator collaboration to provide exceptional thought leadership and spearhead next generation hydrogen technologies. Together, they host the national training programmes associated with doctoral-level training for hydrogen and fuel cells, and have pioneered: hydrogen for heating; hydrogen microcabs, trains, houses and boats; and hydrogen generation and storage systems.

Right now in the Midlands, nationally funded projects for large-scale hydrogen production are in train, such as the BEIS-funded £7.5 million HyPER project led by Cranfield University and plans for a methane cracking pilot at Loughborough. At Keele University, the HyDeploy project has pioneered hydrogen injection into the gas grid, while the University of Nottingham is developing the East Midlands Hydrogen Innovation Zone focusing on three heavy transport hydrogen demonstrators in road, rail and aviation. In addition, through the Midlands Engine Partnership incorporating Midlands Connect, we are seizing the opportunity to lead in the development of alternative fuels, including hydrogen, for freight and logistics.

¹ Hydrogen Council, 'Hydrogen - Scaling Up', [online]. Available at: https://hydrogencouncil.com/wp-content/uploads/2019/02/HC_Influencers_FINAL.pdf (Accessed: March 2021)
² Prime Minister's Office, 10 Downing Street and The Rt Hon Boris Johnson MP, 'PM outlines his Ten Point Plan for a Green Industrial Revolution for 250,000 jobs', [online]. Available at: <https://www.gov.uk/government/news/pm-outlines-his-ten-point-plan-for-a-green-industrial-revolution-for-250000-jobs> (Accessed: March 2021)

REGIONAL ASSETS GO TO DIGITAL GREEN GROWTH MAP

- Current project
- Pipeline project
- Industry Facility
- Academia

1. ERA Clean Air Hydrogen Bus Pilot
2. Keaby Hydrogen power station
3. Green Hydrogen for Humber-side
4. Humber Zero
5. Zero Carbon Humber Partnership
6. H2 Gear
7. Methane cracking pilot - Loughborough University
8. Bilborough Hydrogen energy project
9. Hydropropt at Keele
10. East Midlands Hydrogen Innovation Zone
11. HydroFLEX
12. Hydrogen Systems Test Bed
13. Tyseley Energy Park - 3MW ITM electrolyser
14. Bluepower - Faun Zoeller
15. Bluepower - Faun Zoeller
16. Baxi Heating
17. Cadent Gas
18. Toyota - Hydrogen Vehicles
19. Intelligent Energy
20. Caterpillar
21. JCB - hydrogen powered heavy vehicles
22. Worcester Bosch
23. Adelan



19% OF ENGLAND'S HYDROGEN VEHICLE AND INFRASTRUCTURE BY 2030

ES T I M A T E D HYDROGEN JOBS TO QUADRUPLE BY 2050

10+ HYDROGEN FUEL CELL DEVELOPMENT PROJECTS ONGOING

CASE STUDIES

H2GEAR - INTELLIGENT ENERGY



Intelligent Energy, a Loughborough-based fuel cell engineering company, has been selected to develop its leading lightweight fuel cell modules for aerospace as part of the H2GEAR programme. As well as developing the next generation of fuel cell technology, this programme supports the growth of manufacturing in the East Midlands. Intelligent Energy is planning to increase its manufacturing capability with a new state-of-the-art Gigafactory facility in the region, positioning the East Midlands as a centre of hydrogen fuel cell manufacturing in the UK.

▶ DISCOVER THE PROJECT

HYDEPLOY AT KEELE



Image courtesy of Keele University

HyDeploy at Keele is the first stage of a three-stage pioneering hydrogen energy programme and is the first project in the UK to inject hydrogen into a natural gas network. This groundbreaking live demonstration of hydrogen in homes aims to prove that blending up to 20% volume of hydrogen with natural gas is a safe and greener alternative to the gas we use now and provides reduced energy costs for consumers without them having to change their appliances.

▶ DISCOVER THE PROJECT

1 Establish a Midlands Engine Hydrogen Network and develop a Midlands Engine Hydrogen Technologies Strategy

Enabling our region to:

- Establish a strong regional voice and articulate / evidence current and future economic growth potential across our region.
- Define and demonstrate a timeline for the regional hydrogen technologies manufacturing USP.
- Identify and design interventions to overcome barriers to sector growth.
- Create a regional industry platform around the core supply chain clusters to encourage strategic investments.

2 Advocate for a major hydrogen freight and logistics demonstrator linked to our region's two Freeports

Positioning the Midlands Engine as a significant contributor in the transition to hydrogen – leading in hydrogen technologies. Build on our region's leading role as a national logistics hub and create demand for the development of refuelling infrastructure, grow market confidence in hydrogen-fuelled heavy goods vehicles, and catalyse the market for the hydrogen truck manufacturing sector.

By including the public sector and other major organisations with requirements at scale for alternative fuels (public transport, refuse collection vehicles and service vehicles) and linking to major logistics infrastructure and manufacturers, we will grow with pace and scale, with appropriately leveraged Government funding and wider investment.

IMPACT POTENTIAL

£3.3 BILLION

Economic

According to the UK Hydrogen Task Force, scaling up hydrogen solutions could unlock £3.3 billion in GVA and support 14,000 jobs by 2035.

0.75 MtCO₂
(1.3% OF 2018 EMISSIONS UK-WIDE)

Carbon

The Humber is a key area for low carbon freight facilities in the Clean Maritime Plan. The maritime sector is set to decrease GHG emissions by 50% in 2050 (compared to 2008). This would reduce UK's emissions by 0.75 MtCO₂ per annum (1.3% of 2018 emissions).

14,000 JOBS

Sustainable development goals

By identifying the opportunities for hydrogen we can provide clean energy (SDG7), innovation and growth (SDGs 8 and 9).



▶ DISCOVER THE GOALS

MIDLANDS ENGINE

INDUSTRY PARTNERS



“The Midlands is the heart of the UK automotive and logistics industry. It is the ideal place to develop and demonstrate hydrogen and heavy duty vehicles and green hydrogen refuelling infrastructure.”

Robert Evans, CEO, Cenex



CLEAN ENERGY

Sustainable energy generation and storage

The way we generate and store energy is at the heart of our region's path to net zero. The Midlands has phenomenal capability in renewable energy, bio-energy and energy storage, and ambitious plans to grow this sector. We will support our region and people to move away from fossil fuels, securing the renewable, sustainable and reliable sources of power we need for future economic prosperity and unlocking major new opportunities for business and industry.

AIMS

- ✔ Reduce greenhouse gas emissions
- ✔ Coordinate development of energy systems
- ✔ Reduce energy costs and imports
- ✔ Improve energy security
- ✔ Create high-value jobs
- ✔ Increase regional innovation

OPPORTUNITY

Currently only 37% of the electricity generated in the UK comes from renewable sources.¹ Electricity demand is projected to double by 2050 and this, combined with national low carbon targets, means a four-fold increase in clean electricity generation is needed.²

In the Midlands, this provides economic growth opportunities through the development of a range of initiatives including:

▶ Renewable energy generation and storage

The Midlands consumes 16% of Great Britain's electricity³ and we have 19% of England's total installed renewables capacity, with wind, solar and bio-energy being the most significant sources and more concentrated in the East Midlands.⁴ We will amplify our world leading innovation in the development of energy storage, such as in liquid air and phase change materials systems, which have the potential to make the region and the UK distinctive in this sector.

At the heart of the UK: Our geographical position makes the Midlands the ideal location to develop low carbon energy projects to meet local and wider energy demand for homes, transport and

future of our energy systems. For example, the development of ABLE Marine Energy Park (AMEP) in Lincolnshire and the completion of Hornsea Two, the biggest and best value offshore wind farm in the world, provides a unique facility that can be integrated into wider strategic planning.

The Midlands is also home to a number of energy sites that have either already or are about to be decommissioned as the use of coal is phased out. This will result in a loss of generating capacity but will also create a number of major sites already linked to the energy network that could be repurposed for 21st century low carbon energy projects such as the Ratcliffe-on-Soar power station. Future opportunities include developing large-scale onshore wind, anaerobic digestion, geothermal and mine water heat recovery.

▶ Nuclear energy

The UK Government's Ten Point Plan for a Green Industrial Revolution prioritises small-scale nuclear energy generation and there is an opportunity for the Midlands to play a more significant role in this. In particular, opportunities exist linked to the

development and deployment of Small Modular Reactors (SMR) and nuclear fusion, through the Spherical Tokamak for Energy Production (STEP) programme which is currently considering two Nottinghamshire sites, among others across the country, to construct a prototype fusion powerplant. Our region already hosts important components of the UK's nuclear skills base, in particular with Rolls-Royce, the project lead for the SMR programme, and a branch of the Nuclear Advanced Manufacturing Research Centre, NAMRC, both located in Derby.

¹ Friends of the Earth, 'Renewable energy in the UK', [online]. Available at: <https://friendsoftheearth.uk/climate/renewable-energy-uk-low-wind-wave-and-sun-will-power-uk> (Accessed: May 2021).
² Department for Business, Energy & Industrial Strategy, (2020), 'The Energy White Paper: Powering our Net Zero Future' (p46), [online]. Available at: <https://www.gov.uk/government/publications/energy-white-paper-powering-our-net-zero-future> (Accessed: March 2021).
³ Department for Business, Energy & Industrial Strategy, (2020), 'Subnational Electricity and Gas Consumption Statistics', [online]. Available at: <https://www.gov.uk/government/collections/sub-national-electricity-consumption-data> (Accessed: March 2021).
⁴ Department for Business, Energy & Industrial Strategy, 'Regional Renewable Statistics', [online]. Available at: <https://www.gov.uk/government/statistics/regional-renewable-statistics> (Accessed: March 2021).
⁵ Ibid.

REGIONAL ASSETS

GO TO DIGITAL GREEN GROWTH MAP

- 1 Keady 2 & 3 - low carbon power stations
- 2 Centre for Renewable Energy Systems Technology (CREST) - Loughborough University
- 3 Repowering the Black Country
- 4 West Burton B Battery Storage - EDF Energy
- 5 Small Modular Reactors - Rolls-Royce
- 6 Superigen Storage & Network
- 7 Lincs Offshore Wind Farm - Orsted
- 8 Hornsea 2 - Orsted
- 9 Humber Refinery - Phillips 66
- 10 Birmingham Centre for Energy Storage (BCEs)
- 11 National Grid
- 12 Liquid Gas UK
- 13 Rolls-Royce
- 14 Nuclear AMRC Midlands
- 15 Penny Hydraulics
- 16 KEW Technology
- 17 Central England Co-operative
- 18 Engle
- 19 Siemens Energy Industrial Turbomachinery
- 20 STEP Fusion
- 21 McCamley Power Ltd.
- 22 ABLE Marine Energy Park (AMEP)
- 23 Humber Zero

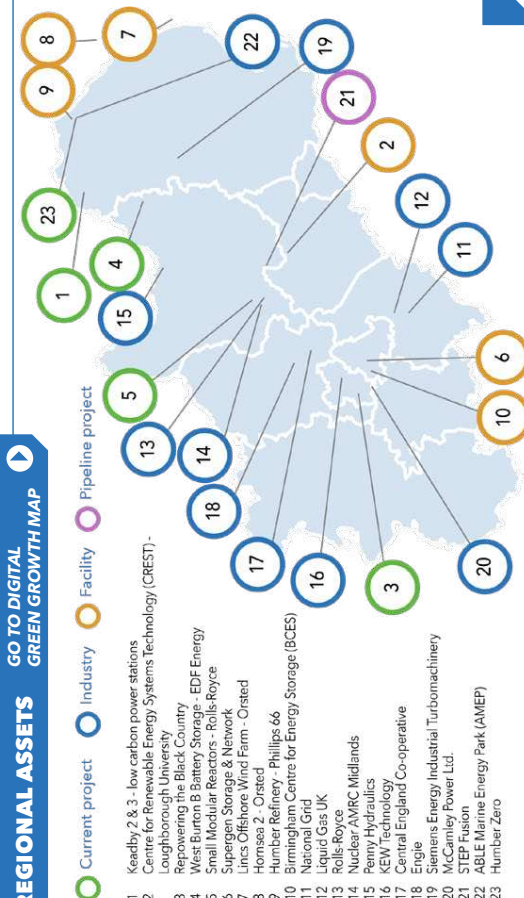
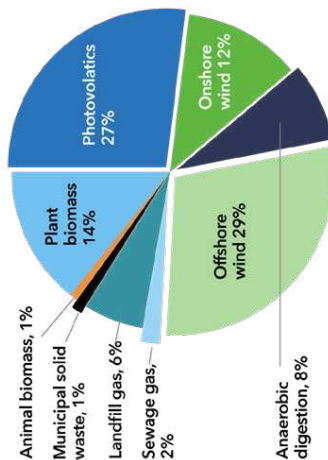


Figure 1: Midlands Engine Renewable Energy Generation⁵



industry. This will be either as direct electricity or via innovation in energy storage for conversion to fuels such as hydrogen, to provide sustainable, secure, zero carbon supply. Energy storage is an area in which the Midlands has significant leadership, being home to the Birmingham Centre for Energy Storage and leading the UK's Supergen Energy Storage Network+. Hosting a mix of regional and national generation facilities will provide our region and the country with greater flexibility and resilience.

Future energy: Significant expertise in the Midlands Engine is already helping to shape the

WIND ENERGY

SECTOR WORTH

£4.4BN

18% ENGLAND'S RENEWABLES CAPACITY

25% OF UK SOLAR ENERGY SALES

ACTIONS

1 Ensure the continued growth and jobs creation in the renewable manufacturing sector

Working with local and national Government to accelerate and scale emerging and fledgling industrial sectors in low carbon, such as heating and transport. We will also promote the success of offshore wind in the Humber estuary and seek to expand investment in onshore wind, anaerobic digestion and solar energy.

2 Enable widespread roll out of renewable energy generation with the BEIS-funded Midlands Energy Hub

Develop plans for growing and leveraging joint ventures for public/private partnerships in energy projects - where these can grow supply chains and enable private sector investment, delivering economic growth and regional skills. Work will build on the Midlands Energy Hub's "Establishing public-private Joint Ventures and partnerships for investment in and delivery of energy schemes" goals. This will enhance focus, and grow capacity and efficiency in our implementation of renewables and low carbon technology programmes and investments.

3 Enable the scaling up of regional nuclear research and generation activity

Advocating for investment and supporting the use of Midlands-based sites for energy generation and research activities. We will commission a review of current infrastructure to understand and identify existing facilities, expertise and capacity as well as opportunities for further growth.

IMPACT POTENTIAL

£369 MILLION

4.2 MtCO₂
(7.3% OF 2018 EMISSIONS) BY 2030

3,000 JOBS

Economic

By 2030 employment in the offshore sector in the Midlands could increase ten-fold across management, technical and skilled manual roles. Energy storage and smart energy management will be crucial in integrating it to our system. The logical location for this will be on our coastline where we already have the biggest offshore wind farm.

Carbon

Solar power on homes in the Midlands alone has the ability to reduce GHG emissions by 187ktCO₂. The UK's offshore wind fleet is due to more than treble in size by 2030. Based on existing deployment, this could mean that over 3 million homes in the Midlands are powered by offshore wind by 2030, reducing emissions by 4.2MtCO₂.

Sustainable development goals

Providing clean energy (SDG7) will spur economic growth (SDG8) and reduce poverty (SDG1) and address climate change (SDG13).



DISCOVER THE GOALS

CASE STUDIES

ABLE MARINE ENERGY PARK

Situated in the widest part of the Humber Estuary, the ABLE Marine Energy Park will be a bespoke port facility for the renewable energy sector, particularly offshore wind, representing a £450 million investment by ABLE. It is designed specifically for the marine renewables sector providing a multi-user facility for the manufacture, storage, assembly and deployment of next generation offshore wind turbines and their associated supply chain(s), all in the heart of the largest offshore wind market in the world.

DISCOVER THE PROJECT



Image courtesy of Able UK

NUCLEAR ADVANCED MANUFACTURING RESEARCH CENTRE MIDLANDS

Nuclear AMRC Midlands is a new industrial R&D centre at Infinity Park, Derby, providing facilities for manufacturers to develop technology demonstrators and test ideas. The centre is currently working with local partners to develop a £20 million bespoke research facility focusing on later-stage development in technology areas which will deliver the maximum impact for the UK's nuclear supply chain, creating 70 jobs and helping to reboot the local economy after the Covid-19 crisis.

DISCOVER THE PROJECT



MIDLANDS ENGINE

INDUSTRY PARTNERS

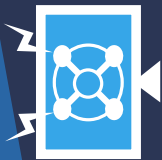


“The Humber will be critical in delivering the Green Agenda and AMEP will play a key role. As the big space in the right place it will provide bespoke facilities for the manufacture and installation of offshore wind components.”

Neil Etherington,
Group Development Director,
Able UK

7 SMART ENERGY

Develop digital infrastructure to decarbonise



Over the next decade, digitising the energy system will transform the way we generate, use and profit from energy. The Midlands has rapidly developed capability in digital infrastructure, particularly in transport, manufacturing and healthcare. By applying the same leadership and ingenuity to energy data and digitalisation, including smart grids and AI, we will improve efficiency, increase consumer value, unlock business potential, future-proof power supply and effectively decarbonise.

AIMS

- ✔ **Deliver smart energy systems**
- ✔ **Provide technology flexibility**
- ✔ **Optimise energy supply**
- ✔ **Meet future energy demand**
- ✔ **Create opportunities for businesses offering energy services**
- ✔ **Increase green consumer choice**
- ✔ **Enhance resilience of green infrastructure**

firms and public sector influencers to: accelerate infrastructure role out; remove barriers to digitalisation; and ensure connectivity continues to underpin regional competitiveness and community prosperity for every part of our region. Plus, we will continue to build on our sector-leading projects, which include:

- The Black Country, home to over 3,000 energy-intensive manufacturing businesses, is aiming to deliver the **world's first zero carbon industrial cluster** through a range of measures including cost-efficient energy infrastructure and greater resource efficiency.
- In Rugeley, the West Midlands Combined Authority is involved in a zero carbon scheme to deliver a **Smart Local Energy System** following the decommissioning of the local coal power station.
- Keele University has developed the **Smart Energy Network Demonstrator**, using its campus to establish an intelligent energy system that can optimise low-cost and low carbon energy use.
- **Green Smart Community Integrated Energy Systems (GreenSCIES)**, is a project in Sandwell looking at a new smart energy grid which channels waste heat generated by industry to heat homes and businesses.

OPPORTUNITY

Digital technology, from smart meters to supercomputers, weather modelling and AI, could deliver nearly one third of the carbon emission reductions required by 2030.¹

Smart grids offer considerable opportunity for energy decarbonisation; linking renewable power to vehicle to grid (V2G) and using AI to optimise supply across the different energy types results in a more sustainable energy system. By adopting a smart grid approach in our region, we could significantly cut emissions, address fuel poverty and reduce consumer bills.

► Building on sector-leading projects

The Midlands Engine Partnership is a centre of excellence in digital innovation, home to the first UK multi city 5G testbed and the world's first 5G connected forest - world famous Sherwood Forest. We are also the first region in England to have a digital and connectivity map, allowing us to shape policy, target investment and plan strategically.

Digital will play a pivotal role in the green industrial revolution and through our pan regional Digital Strategy Board we will continue to bring together digital experts, technology

- Working with Energy Capital, the West Midlands Combined Authority is creating a **Net Zero Pathfinder** which will deliver a step change in net zero ambitions, boost the Green Industrial Revolution in the area, and create a showcase for smart local energy systems.
- Led by the Energy Capital partnership, the **Regional Energy System Operator (RESO)** project in Coventry looks to create a new kind of low carbon energy system operating at city scale that will integrate future mobility assets such as electric vehicles.

► Private sector opportunities

Effective use of digital technology globally could reduce carbon emissions by 15%.² The Midlands is home to organisations such as National Grid and Energy Systems Catapult and a number of nationally distinctive programmes are paving the way for the development of the sector in areas including: Local Area Energy Planning, which proposes new smart measures for local networks to support rising electricity demand from renewable solutions; and enhanced data collation, cybersecurity and substation analysis.

► Energy data

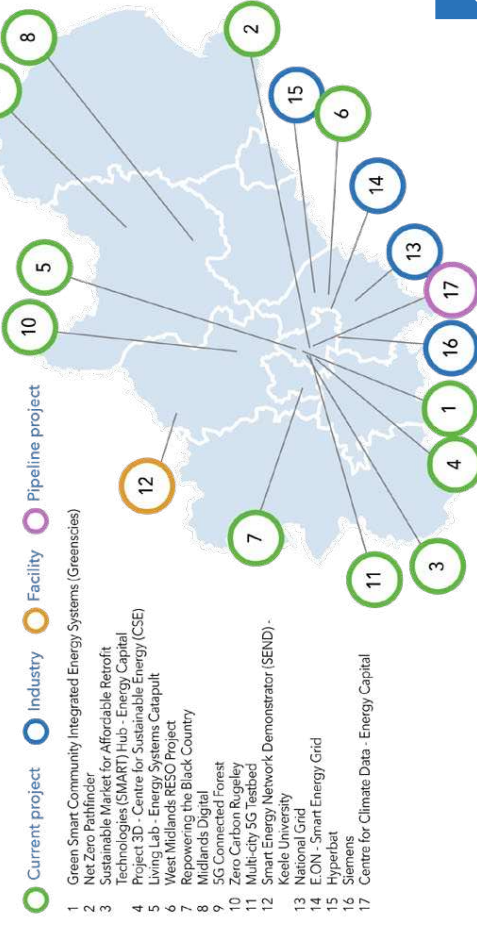
Standardisation of energy data and access to energy data are also crucial to the low carbon transition and futureproofing our energy systems. The public sector could play a vital role in becoming a conduit for knowledge and data sharing through partnerships, such as the Midlands Engine. According to the National Infrastructure Commission, integrated digital energy systems could save consumers up to £8 billion a year.³ Better understanding energy usage in our region will lead to more accurate forecasted energy requirements for better planning, and consumer awareness campaigns to change behaviours.

¹The Royal Society. (2020) 'Digital technology and the planet', [online]. Available at: <https://royalsocietypublishing.org/journal/rsos/170101> (Accessed: May 2021)

²World Economic Forum. (2020), 'Exponential Roadmap', [online]. Available at: <https://www.weforum.org/agenda/2019/01/why-digitalization-is-the-key-to-exponential-climate-action> (Accessed: May 2021)

³National Infrastructure Commission, 'Smart Power: A National Infrastructure Commission Report', [online]. Available at: <https://www.gov.uk/government/publications/smart-power-a-national-infrastructure-commission-report> (Accessed: May 2021)

REGIONAL ASSETS GO TO DIGITAL GREEN GROWTH MAP



- 1 Green Smart Community Integrated Energy Systems (GreenSCIES)
- 2 Net Zero Pathfinder
- 3 Sustainable Market for Affordable Retrofit Technologies (SMART) Hub - Energy Capital
- 4 Project 3D - Centre for Sustainable Energy (CSE)
- 5 Living Lab - Energy Systems Catapult
- 6 West Midlands RESO Project
- 7 Repowering the Black Country
- 8 Midlands Digital
- 9 5G Connected Forest
- 10 Zero Carbon Rugeley
- 11 Multi-city 5G Testbed
- 12 Smart Energy Network Demonstrator (SEND) - Keele University
- 13 National Grid
- 14 E.ON - Smart Energy Grid
- 15 Hyperbat
- 16 Siemens
- 17 Centre for Climate Data - Energy Capital



CASE STUDIES

SIEMENS

Siemens have demonstrated potential cost-effective decarbonisation through more effective utilisation and coordination of current and planned generation assets. Siemens experts worked with a wide range of local stakeholders using bespoke digital modelling tools, based on real-time data, and have shown how a more coordinated net zero system could supply up to 50,000 users with carbon neutral electricity or supply Birmingham airport with green electricity, heating and cooling.

▶ DISCOVER THE PROJECT

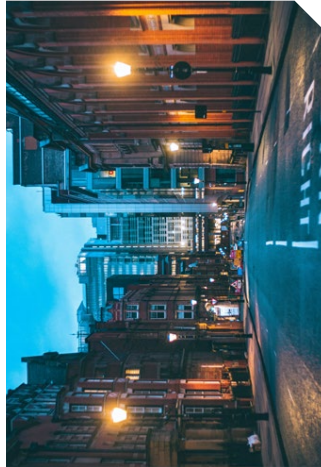


Birmingham East Corridor, Tyseley Energy Park

E.ON - SMART ENERGY GRID

E.ON is the energy consultant for GreenSCIES, providing advisory and technical oversight for a revolutionary low carbon smart energy grid in the West Midlands. This smart energy grid will harness waste heat from office buildings, data centres and the public transport network and share it locally as a lower impact and lower cost transport, power and heat source. It will provide an answer to the challenges of powering inner cities of the future and combating the climate crisis, and transforming lives, homes and businesses into sustainable energy districts.

▶ DISCOVER THE PROJECT



1 Advocate on behalf of the region for major new initiatives associated with the digital energy sector

Promoting improved smart infrastructure across the region which will involve: piloting smart energy network demonstrators that encompass business, industry and housing; enhancing digitalisation of our regional city energy systems; developing local area energy plans; and ensuring capacity to connect low and zero carbon technology.

2 Ensure greater data consistency, data sharing and transparency

Working with the Midlands Engine Observatory and the West Midlands Centre for Climate Data, create a regional data network, bringing together local authorities, customers, operators and investors to identify and overcome key barriers and to support the planning and implementation of new projects, of which digitalisation, data capture and transparency are integral components of infrastructure development.

3 Work in partnership with the Midlands Energy Hub and key stakeholders to evaluate the impact of the Midlands Low Carbon Sector Study

With a view to providing an updated evidence-base to understand the current state of the Low Carbon Environmental Goods and Services Sector in the Midlands, where support is needed to help grow this sector, and the role the sector can play in driving low carbon recovery from Covid-19.

4 Ensure continued investment in the Midlands Engine Partnership's digital connectivity and digital competitiveness goals

To enable infrastructure applications to be delivered with greatest impact and to provide the infrastructure within which an ecosystem can grow for green energy and smart energy application roll out.

IMPACT POTENTIAL

EFFECTIVE ENERGY USAGE REDUCING CO₂

Economic

The National Infrastructure Commission estimates that smart energy management can save Midlands energy consumers >£1 billion a year by 2030. This will enable consumers to make green choices and adapt to changes in future demand, create more opportunities for businesses offering energy services, and reduce fuel poverty.

250 KtCO₂ PER ANNUM (0.5% OF 2018 EMISSIONS)

Carbon

Government research shows we can make energy savings of more than 10% in the commercial sector, just by managing energy smartly. This would equate to a Midlands GHG emissions saving today of 250ktCO₂ (0.5% of 2018 emissions) and £85m per annum.

£1 BILLION SAVINGS TO MIDLANDS RESIDENTS

Sustainable development goals

By embracing the smart energy revolution we can generate economic growth (SDG8) and increase our ability to use clean energy (SDG7), whilst reducing bills and increasing competitiveness (SDG1).



▶ DISCOVER THE GOALS

MIDLANDS ENGINE

INDUSTRY PARTNERS

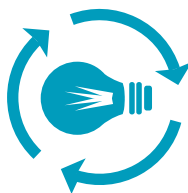


“A drive to grow skills, investment and jobs in smart technologies is crucial in delivering net zero, for both homeowners and to large-scale industry alike. We need a smarter, greener economy for the Midlands and the UK.”

Dr Nina Skorupska CBE, Chief Executive, Association for Renewable Energy and Clean Technology (REA)



ENABLERS



8 GREEN INNOVATION
Green design and making for economic growth



9 ENERGY WORKFORCE
Highly skilled, inclusive and diverse



10 GREEN FINANCE
Invest and enable to unlock opportunity



8

GREEN INNOVATION Green design and making for economic growth

The shift to low carbon is a huge opportunity for business, industry and job creation in the Midlands. We will foster a rich innovation environment, supporting our world-leading inventors, entrepreneurs, leaders and researchers to develop and commercialise new ideas for the economic good of our region and nation, and for wider societal benefit. By investing now in next generation manufacturing processes and resilient supply chains, we can minimise environmental impact and resource use.

AIMS

- Reduce greenhouse gas emissions**
- Support investment in decarbonisation**
- Reduce energy costs**
- Drive economic growth**
- Establish the UK and Midlands as a centre of excellence**
- Futureproof business strategies**

OPPORTUNITY

The Midlands is the undisputed manufacturing heartland of the UK. Of the 2.7 million people employed countrywide in this sector, almost 556,000 are based in the Midlands - equal to 12.5% of our region's total employment and a much higher percentage than England's average of 7.9%.¹ We export around £50 billion worth of goods each year and 86% of this is manufactured goods, in both cases more than any other region.²

► Leadership in green making

Such renowned leadership in manufacturing represents a corresponding opportunity for leadership in low carbon manufacturing. The Midlands is home to some of the UK's most innovative businesses in this area including major global names and established SMEs, as well as a nationally significant transport and mobility cluster, and all have been swift to develop new products and services that will enable net zero.

Midlands innovation stakeholders include large firms such as Jaguar Land Rover, that recently announced a new strategy to go all-electric by 2025. Our region's SMEs are also responding to

revolution. Plus, located in the Port of Grimsby, and part of the Offshore Renewable Energy Catapult, is the UK Operations and Maintenance Centre of Excellence (O&M CoE), which is a national hub for enhancing the UK's leading position in offshore wind operational performance.

► Powerhouse for research and development

As identified by UKRI, the Midlands has the greatest geographical concentration of R&D infrastructures in the energy sector across the UK. This provides the most significant national potential to drive innovation in the development of low carbon systems and it is a leading position that the Midlands Engine will reinforce.

R&D programmes are already focusing on areas such as battery developments, software for connected and autonomous vehicle-related analysis, sustainable energy sources and fuel cell technologies. Our region has pioneered hydrogen for heat through the HyDeploy programme, established a template for the integration of smart energy systems in new build housing at the Trent Basin and pioneered low carbon transport such as hydrogen-powered

trains. Rugeley power station stands as a national benchmark in how to transition from high to low carbon, and support community development. Plus, our region's strength in wind make this key low carbon area worth £4.4 billion through activities such as control systems development and manufacture, and drive train development.

► Supporting innovation

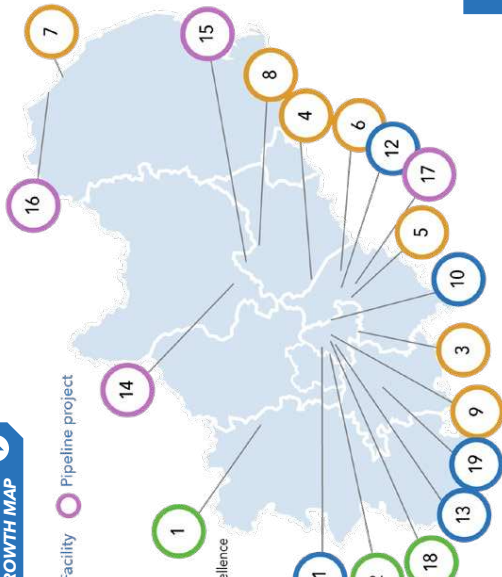
We will continue to foster our region's rich innovation environment. A combination of a diverse R&D landscape coupled with input from a wide range of industries and supported by our region's Catapults will enable our green recovery and create a mutually beneficial competitive advantage for the region. This will bring affordable energy solutions to consumers - stimulating growth in the Midlands and the rest of the UK.

¹ Office for National Statistics, (2019) Business Register and Employment Survey [online]. Available at: <https://www.ons.gov.uk/surveys/informationforbusiness/businesssurveys/businessregisterandemploymentsurvey> (Accessed: May 2021)
² HMRC, 'Regional trade statistics analysis: fourth quarter 2020', [online]. Available at: <https://www.gov.uk/government/statistical-data-sets/regional-trade-statistics-analysis-fourth-quarter-2020> (Accessed: May 2021)
³ Catapult Network, 2021, 'About the Catapult Network' [online]. Available at: <https://catapult.org.uk/about-us/why-the-catapult-network/> (Accessed: May 2021)

REGIONAL ASSETS GO TO DIGITAL GREEN GROWTH MAP

- Current project
- Industry
- Facility
- Pipeline project

- 1 Hands Free Farm (HFF) Project
- 2 WMCU Core Programme
- 3 High Value Manufacturing Catapult
- 4 MIRA Technology Park
- 5 Warwick Manufacturing Group (WMG)
- 6 Manufacturing Technology Centre
- 7 UK Operations and Maintenance Centre of Excellence
- 8 The Interdisciplinary Centre for Circular Chemical Economy
- 9 Energy Systems Catapult
- 10 Uniper
- 11 Make UK
- 12 Hyperbat
- 13 Atkins
- 14 Nuclear AMRC Infinity Park
- 15 East Midlands Freeport
- 16 Humber Freeport
- 17 Gigafactory
- 18 West Midlands Circular Economy Routemap
- 19 Materials Solutions Ltd



£26.6BN SALES
IN LOW CARBON & ENVIRONMENTAL GOODS & SERVICES



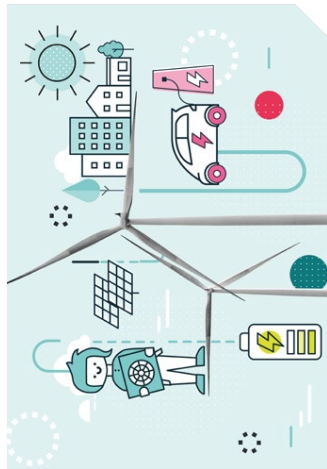
HOME TO 6 CATAPULT BASES AND CENTRES

ENERGY & LOW CARBON BUSINESSES
99% SMES

CASE STUDIES

ENERGY SYSTEMS CATAPULT

Energy Systems Catapult was set up to accelerate the transformation of the UK's energy system and ensure UK businesses and consumers capture the opportunities of clean growth. The organisation works with innovators from companies of all sizes to develop, test and scale their ideas. Projects in the Midlands such as the Innovator Challenge support our region's SMEs to develop and commercialise products and services to enable low carbon solutions.



DISCOVER THE PROJECT

UNIPER

Uniper is exploring a range of lower carbon energy projects, including the development of an energy from waste facility at its Ratcliffe-on-Soar power station site before the coal-fired power station closes in line with government policy by 1st October 2025. Known as the East Midlands Energy Re-Generation (EMERGE) Centre, the proposed facility would help meet the UK's ambitions to reduce waste and manage its impact on the environment, reducing CO₂ emissions, and meet landfill diversion targets. EMERGE is part of a wider vision for Ratcliffe to move towards becoming a zero carbon technology and energy hub for the East Midlands.



Image courtesy of Uniper

DISCOVER THE PROJECT

MIDLANDS ENGINE

PARTNERS

“The Midlands is a bedrock of manufacturing, home to the first industrial revolution and now well placed to lead the green revolution. Industry is innovating to create new technologies, jobs for the future and achieving net zero.”
Charlotte Horobin, Region Director Midlands and East of England, Make UK

ACTIONS

- 1 Develop an innovation pathway to promote sustainable technologies and enable the development of system level demonstrators**
From early technology readiness levels through to local community pilots and scale-up of production - ensure that we join the dots between demand for sustainable solutions and potential technologies being developed and that we investigate investment and business models and develop new ways of thinking to allow low carbon solutions to be rapidly integrated.
- 2 Convene a steering group to support the mapping and development of green and low carbon manufacturing and supply chains across the Midlands**
Working through the Midlands Engine Observatory, and capitalising on our region's rich manufacturing heritage, strengths and assets such as the Manufacturing Technology Centre and the Warwick Manufacturing Group and our region's SMEs, this group will focus on identifying and implementing enablers to augment, strengthen and grow low carbon manufacturing sectors and supply chains.
- 3 Review rapidly the Midlands energy R&D infrastructure to support commercial development and investment**
Work will consider how facilities can support translation, commercial development and innovation, and what opportunities exist for clustering R&D, innovation and commercialisation to foster and incubate innovation, accelerate economic impact and deliver growth.
- 4 Work with partners, including Sustainability West Midlands, to examine pan regional opportunities for circular economies**
Capitalising on opportunities to decouple economic growth from the consumption of finite resources.

IMPACT POTENTIAL

£5 BILLION

MIDLANDS IS HOME TO 22% OF ENGLAND ENERGY AND LOW CARBON BUSINESSES

44,000 JOBS

Economic

The government has announced an increase of R&D investment to 2.4% of GDP by 2027. This amounts to £2.3 billion annual increase in research and development spend in the Midlands, providing the potential to create tens of thousands of jobs.

Carbon

Research and development will be required in the continuous improvement of the existing technologies which will lead us most of the way to net zero, as well as the future technologies which will be required for the reduction of emissions in the most challenging sectors.

Sustainable development goals

Green Innovation (SDG9) is required to solve some of the challenges that remain. It will generate local jobs (SDG8), whilst addressing global climate change, (SDG13).



DISCOVER THE GOALS



ENERGY WORKFORCE

Highly skilled, inclusive and diverse

The low carbon energy transformation cannot happen without the right skills. From apprenticeships to PhDs and workplace learning, the scale of upskilling and reskilling required is enormous. One in four of all England's jobs in energy are in the Midlands and key energy regional priorities, such as retrofitting buildings, heating, manufacturing and automotive, will place huge demands on skills. We will invest now to build tomorrow's energy workforce with diversity at its heart, not just for our region but for the whole UK low carbon sector.

AIMS

- Create high-value jobs
- Join up reskilling programmes by building sector networks
- Drive economic growth
- Support the transition to net zero

OPPORTUNITY

There is opportunity for our region to have a better-paid workforce, developing and implementing solutions for the low carbon transition and beyond.

The transformation to sustainable energy systems requires new skills growth, upskilling and reskilling in order to provide this growing sector with carbon literate expertise and leadership. We must keep pace with emerging skills requirements as technologies shift. Our region's large scale coal stations have long been responsible for meeting a significant proportion of UK power generation. The transition from carbon intensive to zero carbon will provide a valuable opportunity to reskill the existing workforce and create high-value new jobs to meet the low carbon energy skills needs of the future.

Across the Midlands, there could be an estimated 194,000 jobs working in low carbon sectors by 2050.¹ Key to this in the Midlands are the retrofitting of homes and buildings and the heat and automotive sectors. There is also an opportunity to focus on SMEs and their business needs, since SMEs make up 99% of the regional economy.²

As technologies develop, skills requirements will change and we must adapt quickly and flexibly in our skills provision. The region's skills providers must work collaboratively, building on our world class Higher Education and Further Education network, to provide progressive pathways to learners at all stages of their careers. Having a curriculum focused on net zero ambitions is key and it will be important to provide opportunities and facilities to learn on the job, trialling new technologies and hands-on experience at large scale demonstration sites across the region.

The Midlands is already home to green skills assets:

- **The District Heat Academy at Stoke-on-Trent College** will meet the skills needs over the coming decades of the Stoke-on-Trent District Heat Network infrastructure project.
- **City of Wolverhampton College** is working in partnership with the West Midlands Combined Authority and Duplex Business Services (DBS) to deliver a range of programmes in electric vehicle and green technologies to address this skills gap, providing our local community with the knowledge, skills and qualifications needed to access these new job opportunities.
- **WMG Academy Trust** operates **WMG Academy**

Coventry and **WMG Academy Solihull**, with the aim of encouraging young people to study science, technology, engineering and maths.

The Academy is supported by a number of industry partners including Aston Martin, Balfour Beatty, Jaguar Land Rover, National Grid, Oleo, Rolls-Royce, Tata Motors and Vinci.

- **The Uniper Engineering Academy** offers innovative, accredited and engaging technical training programmes for the engineering, manufacturing and energy sectors, including apprenticeships and bespoke training solutions.
- **The Association of School and College Leaders (ASCL)**, based in Leicester, is the leading professional association and trade union for all school and college leaders. They support and represent more than 20,500 school and college leaders of primary, secondary and post-16 education from across the UK and will be instrumental in engaging pupils in Green Growth topics.
- **The East Midlands Development Corporation** is working with partners to provide continuous

pathways for learning across net zero priorities and aims to use their physical development sites as live learning environments.

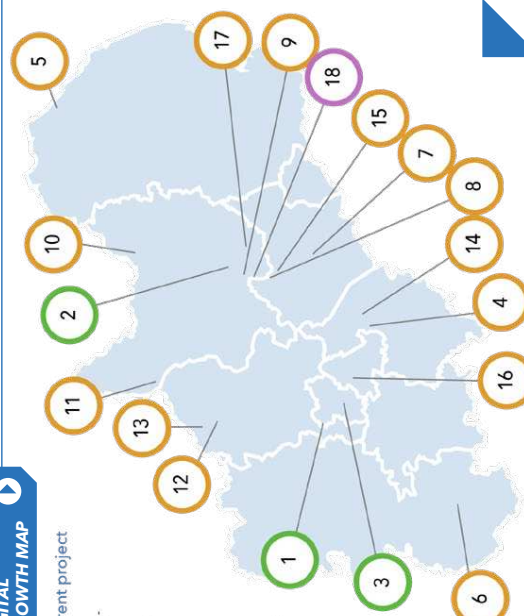
The energy sector remains one of the least diverse sectors, both in the UK and internationally. This poses a significant risk to the future workforce, in terms of limiting creativity and restricting access to talent, at a time when both will be in high demand to meet the needs of the sector in rising to the challenge of net zero carbon. Diversity is also important in addressing the socio-technical challenges that the UK faces; a diverse team has a better understanding of how change will impact a wider sector of society, along with a broader set of perspectives to approach a problem. In the Midlands we plan to develop reskilling programmes with diversity and inclusion at their heart.

¹ Ecuity, Local Governments Association, 'Local green jobs - accelerating a sustainable economic recovery', [online], Available at: https://www.ecuity.com/wp-content/uploads/2020/06/Local-green-jobs-accelerating-a-sustainable-economic-recovery_final.pdf (Accessed: May 2021)

² Office for National Statistics, 'UK business: activity, size and location: 2020', [online], Available at: <https://www.ons.gov.uk/releases/ukbusinessactivitysizeandlocation2020> (Accessed: May 2021)

REGIONAL ASSETS GO TO DIGITAL GREEN GROWTH MAP

- Facility
 - Pipeline project
 - Current project
- 1 Sector-Based Work Academy Programmes (SWAPs) - City of Wolverhampton College
 - 2 ERA doctoral training opportunities
 - 3 Green Homes Grant Skills Training - Dudley College of Technology
 - 4 WMG Academy Trust
 - 5 CATCH - industrial business support facility
 - 6 New Model Institute for Technology & Engineering (NIMITE)
 - 7 Association of School and College Leaders (ASCL) and Energy (C-DICE)
 - 8 Centre for Doctoral training on Infrastructure, Cities and Energy (C-DICE)
 - 9 Uniper Engineering Academy
 - 10 National Fluid Power Centre
 - 11 Health and Safety Executive
 - 12 District Heat Academy - Stoke-on-Trent College
 - 13 City Learning Trust
 - 14 Institute for Advanced Manufacturing
 - 15 Centre for Renewable Energy Systems Technology (CREST)
 - 16 GBSTEP Skills and Apprenticeship Hub
 - 17 British Geological Survey
 - 18 East Midlands Development Corporation live learning



£114,443 GVA
PER ENERGY & LOW CARBON EMPLOYEE

ESTIMATED
GREEN JOBS
68%
BETWEEN 2030 TO 2050

ENERGY & LOW CARBON
JOBS
WILL RAISE MEDIAN INCOME

CASE STUDIES

CATCH - INDUSTRIAL BUSINESS SUPPORT FACILITY



Image courtesy of CATCH

CATCH is an industry-led partnership that supports the process, energy, engineering and renewables industries in Yorkshire and the Humber. It has a number of member networks, including on industrial decarbonisation and hydrogen, as well as training packages for people working in the sector in the Humber region. CATCH operates the world renowned £12 million training facility in North East Lincolnshire and boasts impressive facilities including a live three-storey process plant, as well as engineering workshops and classrooms.

▶ DISCOVER THE PROJECT

NEW MODEL INSTITUTE FOR TECHNOLOGY AND ENGINEERING



Image courtesy of NMITE

NMITE is a new higher education institution in Hereford which focuses on engineering subjects. Although still a relatively small sector, environmental technologies represents one of the fastest growing sectors in the Marches. NMITE as an organisation has invested in its own green solutions including solar panels and an electric-only vehicle policy and their engineering team is passionate about designing energy efficient, low carbon products that are fit for today's purpose without compromising our future.

▶ DISCOVER THE PROJECT

1 Bring together skills leads from across the region to deliver a Green Growth skills supply and demand assessment, responding to a dynamic sector

Make evidence-led recommendations for interventions and skills accelerators which allow industry needs to be met, aligning pathways of qualifications from Levels 2 to 9, based on employer requirements.

2 Advocate for funding and investment to support new low carbon skills programmes

Working across the Action Points of this Plan, continue work to stimulate collaboration of all stakeholders in the Midlands low carbon energy sector and promote the establishment of low carbon energy skills initiatives and local skills strategies such as the WMCA's Green Skills Strategy. This will also include promoting blended learning, where appropriate, combining face-to-face and hands-on learning experiences with the use of digital-based provision.

3 Develop a programme to support the growth of a diverse and inclusive Green Growth and energy workforce

Focus on engaging initiatives to establish and share best practices which grow and promote opportunities for people from all sections of our community to be part of a diverse, inclusive low carbon energy and Green Growth workforce, taking into account the Government's Skills for Jobs White Paper.

IMPACT POTENTIAL

£10.7 BILLION

5.5 MtCO₂
(10% OF 2018 CARBON EMISSIONS)

94,000 JOBS

Economic

There are expected to be 700,000 more jobs in the UK low carbon sector by 2030, of which nearly 100,000 would be in the Midlands. We need the workforce to undertake them. This is particularly important as jobs in the low carbon sectors are paid almost 23% (~£6,500 more per annum) more than the average wage.

Carbon

The conversion of gas boiler installers towards low carbon alternatives will enable the reduction of 5.5MtCO₂ (10% of 2018 carbon emissions) domestic emissions per annum by 2041.

Sustainable development goals

Enabling the workforce to make the change to low carbon industries will provide secure and productive employment and decent work for all (SDG8) and provide more clean energy, (SDG7).



▶ DISCOVER THE GOALS

MIDLANDS ENGINE

PARTNERS



“Partnerships between industrial training providers, such as Uniper’s Engineering Academy and universities, schools and colleges, are essential to delivering the green skills needed to enable a decarbonised future.”

Nick Booth, Head of Engineering Academy, Uniper



10 GREEN FINANCE

Invest and enable to unlock opportunity

Investment in our region's net zero energy infrastructure, including wind and solar, low carbon heating, greener buildings and transport, will require access to public and private sector finance. In the Midlands, we are trialling new models of sustainable finance to unlock green sector funding. By collaborating with the finance sector, we will maximise investment opportunities and ensure fair distribution of finance, supporting our region's world-leading innovation and dynamic SME community.

AIMS

- ✔ **Unlock innovation and decarbonisation initiatives**
- ✔ **Drive economic growth**
- ✔ **Fund nature's recovery**
- ✔ **Fund net zero energy infrastructure**
- ✔ **Aggregate investment opportunities**
- ✔ **Facilitate deployment of projects at scale**

OPPORTUNITY

New approaches for financing projects, such as green bonds, will give the Midlands Engine an opportunity to unlock financing of infrastructure projects allowing deployment at scale.

In 2021, two key initiatives are driving green finance and investment and we expect continued growth in this market:

- The new UK Infrastructure Bank will be allotted £12 billion in capital to fund at least £40 billion worth of public and private projects, beginning in spring 2021¹
- £15 billion will be deployed into green bonds, including for retail investors, to help fund the country's transition to net zero by 2050²

The Midlands has considerable opportunities to invest in the net zero transition. Further public and private investment will support an already thriving environment to achieve greatest impact and more profitable collaboration, accelerating our region's leadership in energy and transport infrastructure development, and our path to zero and low carbon innovation.

Analysis linked to the levelling up agenda highlights that the Midlands has received significantly less public sector funding in a range of areas, including infrastructure, than other regions, particularly London and the South East.³ There is now significant political interest in reversing this trend. Similarly, regional investment in R&D has been recently identified as being imbalanced across the UK, with the Midlands receiving the lowest public sector investment in the UK.⁴

The growing interest from the finance sector is an opportunity to work in partnership to develop investment programmes that will deliver new green infrastructure, from low carbon generation through to greener buildings and homes. There is huge potential to develop programmes that are attractive to investors, while ensuring that some less attractive but essential propositions also benefit to avoid cherry picking. Initiatives such as the Green Entrepreneurs Programme, which is being delivered by the University of Derby in partnership with Derbyshire County Council, provide funding for businesses interested in developing and investing in green energy and carbon reduction schemes. There will be a need for the public and private sectors to work hand in hand to maximise the potential of public investment.

To support innovation and the SME community, aggregating regional innovation, as opposed to a dispersed innovation base, will also provide a more attractive proposition to the investment community. Such a scale is required to increasingly attract investors and demonstrate competitiveness and capability compared to other areas such as the golden triangle of Oxford, Cambridge and London.

Investment opportunities

- Hydrogen freight and logistics demonstration and scale-up programmes
- Implementation of next generation nuclear
- Expansion of low carbon transport and infrastructure
- Business support programmes to replace existing ERDF programmes
- Nature recovery network projects and nature-based solutions
- Natural capital development
- Blue and green infrastructure programmes
- Support for the development of a heat manufacturing and services sector

- Expansion of underpinning research and innovation
- Duplicate the successful development of the offshore wind sector in the Humber region to shape investment into renewable generation using onshore wind and solar
- The next phase of heat retrofit and prototyping projects and low carbon heating finance
- The transition of our coal power stations
- Decarbonisation of our industry and manufacturing base
- Building green homes at scale
- Developing the Freeport around East Midlands Airport integrating low carbon solutions.

¹ HM Treasury, 'Budget 2021', (2021), [online], Available at: <https://www.gov.uk/government/publications/budget-2021-documents/budget-2021.html>. (Accessed: May 2021)

² Energy Digital, 'UK Budget: retail investors to be targeted with green bonds' (2021), [online], Available at: <https://energydigital.com/sustainability/uk-budget-retail-investors-buy-green-bonds> (Accessed: May 2021)

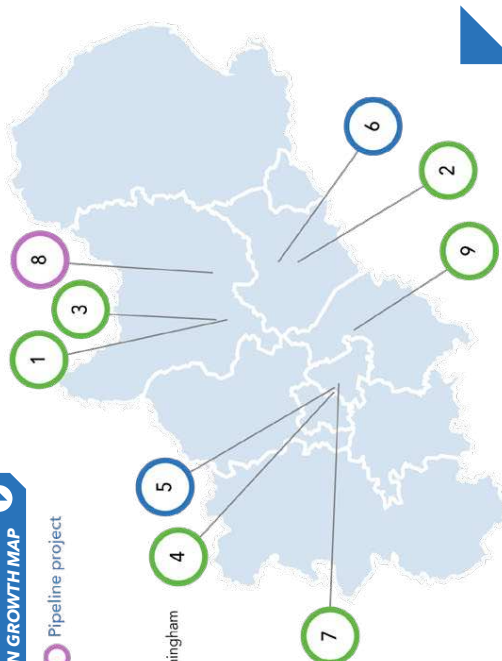
³ Institute for Fiscal Studies Green Budget, (2020), 'Levelling up: where and how?' [online], Available at: <https://www.ifs.org.uk/uploads/Green-Budget-2020/Levelling-up-where-and-how.pdf> (Accessed: May 2021)

⁴ Nesta, 'The Missing £4 Billion', [online], Available at: <https://www.nesta.org.uk/report/the-missing-4-billion/> (Accessed: March 2021)

REGIONAL ASSETS GO TO DIGITAL GREEN GROWTH MAP

- Current project
- Industry
- Pipeline project

- 1 Green Entrepreneurs Fund - Derbyshire
- 2 Green BELLE - Leicester & Leicestershire
- 3 De-Carbonise - Derby & Derbyshire
- 4 Pilot Low Carbon Grant Fund - Greater Birmingham & Solihull
- 5 Energy Capital
- 6 Empire Finance
- 7 HSBC - Regional SME Support Programme
- 8 ERA - Regional SME Support Programme
- 9 Green Business Programme - Coventry & Warwickshire



INCREASE IN 14% LOW CARBON & GOODS & SERVICES SECTOR INVESTMENT
SINCE 2017/18

ENERGY & LOW CARBON GVA £3,000 ABOVE ENGLAND AVERAGE

IN LAST YEAR NUCLEAR, ALTERNATIVE FUELS & BUILDING TECHNOLOGIES NEARLY HALF MIDLANDS LOW CARBON INVESTMENT

CASE STUDIES

BRITISH BUSINESS BANK INVESTMENTS LTD - GREEN FUNDS



The British Business Bank Investments Ltd unlocks new forms of finance to support small businesses. It has invested in various green-related funds, including £6 million into WHEB's private equity fund, 'Green Growth Fund 2', which has raised £118 million with the balance coming from private sector investors; and investment into the UK Future Technology Fund and Hermes Environmental Innovation Fund which together make up £22 billion of investment capital for important sectors like clean technology and advanced manufacturing.

▶ **DISCOVER THE PROJECT**

DE-CARBONISE PROJECT



Operating in Derby and Derbyshire, DE-Carbonise offers a comprehensive programme of assistance for SMEs seeking to reduce their carbon emissions in operations, production and supply chain. SMEs access a suite of carbon reduction support including a carbon reduction audit and report; grant funding (between £1,000 and £20,000) to implement carbon reduction recommendations; technical support, consultancy and process improvements from academic teams within Derby University; and cohort-based learning and development for smart manufacturing and sustainable supply chain innovation.

▶ **DISCOVER THE PROJECT**

MIDLANDS ENGINE

PARTNERS



“Sustainability presents a growth opportunity for businesses. The most significant contribution HSBC can make to tackling climate change is financing the transition to net zero and that starts with companies here in the Midlands.”

Suzu Verma, Head of Business Development, Midlands Region, HSBC UK

ACTIONS

- 1 Identify and support expanded and innovative methods of securing investment and raising capital for businesses in the region**
 Exploring new funding routes and working with partners, together with Government to:
 - Create an investable pipeline of Green projects.
 - Raise funds to invest in projects and enable re-financing out of initial government investment.
- 2 Provide rapid, clear routes to funding for regional R&D and innovation**
 Working with national funding bodies (e.g. BEIS, Innovate UK) to deliver scale of investment and appropriate funding for our region. Work with partners, including local government, to attract investment into incubation and business development facilities for SMEs, accelerating commercialisation.
- 3 Explore the creation of a fund to directly support green sector start-ups**
 With particular attention focused on strategic areas, consider how to optimise links between R&D funding and investment in industry, to attract venture capital, start-up entrepreneurs and investors into our region to grow a larger and dynamic start-up community.
- 4 Advocate on behalf of the region for the work of the Midlands Energy Hub**
 - Work to match developing projects through the Midlands Energy Hub with green investors and other key stakeholders.
 - Champion achievements and advocate for contiguous investment programmes, linked to a clear investment pipeline, around which long term economic growth and supply chain resilience can be enabled.

IMPACT POTENTIAL

NEW MODELS GREEN FINANCE UNLOCKING FUNDING TO MIDLANDS RESIDENTS

Economic

Based on the UK R&D investment target, private sector investment in R&D in the Midlands will need to increase by £1.9 billion annually by 2027. We will need to work with Government and the finance industry to develop models of green finance to unlock funding from both the public and private sector to support Green Growth.

4.7 MtCO₂ PER ANNUM (8.3% OF 2018 EMISSIONS)

Carbon

Meeting the Net Zero target will require unprecedented levels of investment, and therefore green finance is central to meeting our ambitions. For example, home improvement loans aimed at owner-occupiers in the Midlands (able-to-pay market) to install low carbon heating and energy efficiency could lead to 4.7 MtCO₂ reductions in 2040 (8.3% of 2018 emissions).

8.2% CO₂ EMISSIONS REDUCED VIA NEW HOME EFFICIENCY











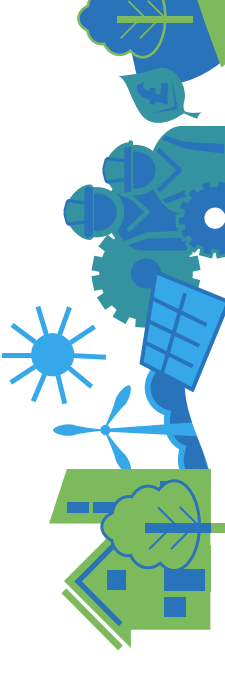

Sustainable development goals

Green finance will unlock economic growth (SDG8), develop the infrastructure we need (SDG9) and accelerate action on climate change, (SDG13).



▶ **DISCOVER THE GOALS**

MIDLANDS ENGINE PARTNERSHIP ACTION FOR GREEN GROWTH

 <p>1. GREEN BUILDINGS Improve energy efficiency and decarbonise heat</p> <ol style="list-style-type: none"> 1. Develop a pan regional zero carbon homes route map 2. Work with partners to undertake a regional study on low carbon buildings and heat 3. Work in partnership to secure the establishment of a National Centre for Decarbonisation of Heat in the Midlands 	 <p>5. LOW CARBON HYDROGEN Pioneer, commercialise and deliver hydrogen solutions</p> <ol style="list-style-type: none"> 1. Establish a Midlands Engine Hydrogen Network and develop a Midlands Engine Hydrogen Technologies Strategy 2. Advocate for a major hydrogen freight and logistics demonstrator linked to our region's two Freeports 	 <p>8. GREEN INNOVATION Green design and making for economic growth</p> <ol style="list-style-type: none"> 1. Develop an innovation pathway to promote sustainable technologies and enable the development of system level demonstrators 2. Convene a steering group to support the mapping and development of green and low carbon manufacturing and supply chains across the Midlands 3. Review rapidly the Midlands energy R&D infrastructure to support commercial development and investment 4. Work with partners, including Sustainability West Midlands, to examine pan regional opportunities for circular economies
 <p>2. NET ZERO TRANSPORT Lead the transition to reduce emissions</p> <ol style="list-style-type: none"> 1. Map and futureproof our region's charging and refuelling infrastructure and connect key stakeholders to foster a coordinated charging and refuelling infrastructure strategy 2. Develop a regional BEV and charging and refuelling skills strategy 3. Develop and promote the Midlands Engine as a centre of excellence for BEVs and charging and refuelling technologies 4. Work through partnership to enable energy and transport infrastructure plan integration across our region 	 <p>6. CLEAN ENERGY Sustainable energy generation and storage</p> <ol style="list-style-type: none"> 1. Ensure the continued growth and jobs creation in the renewable manufacturing sector 2. Enable widespread roll out of renewable energy generation with the BEIS-funded Midlands Energy Hub 3. Enable the scaling up of regional nuclear research and generation activity 	 <p>9. ENERGY WORKFORCE Highly skilled, inclusive and diverse</p> <ol style="list-style-type: none"> 1. Bring together skills leads from across the region to deliver a Green Growth skills supply and demand assessment, responding to a dynamic sector 2. Advocate for funding and investment to support new low carbon skills programmes 3. Develop a programme to support the growth of a diverse and inclusive Green Growth and energy workforce
 <p>3. NATURE'S RECOVERY Protected and productive natural assets</p> <ol style="list-style-type: none"> 1. Establish and convene a Midlands Engine Natural Capital taskforce 2. Develop the Midlands Forest vision with National Forest, Woodland Trust and other partners, expanding forestry and woodland cover across the Midlands 3. Work to shape policies and regional approaches which can significantly increase space for nature and carbon sinks 4. Advocate for the Midlands to be at the forefront of delivering key nature conservation policies 	 <p>7. SMART ENERGY Develop digital infrastructure to decarbonise</p> <ol style="list-style-type: none"> 1. Advocate on behalf of the region for major new initiatives associated with the digital energy sector 2. Ensure greater data consistency, data sharing and transparency 3. Work in partnership with the Midlands Energy Hub and key stakeholders to evaluate the impact of the Midlands Low Carbon Sector Study 4. Ensure continued investment in the Midlands Engine Partnership's digital connectivity and digital competitiveness goals 	 <p>10. GREEN FINANCE Invest and enable to unlock opportunity</p> <ol style="list-style-type: none"> 1. Identify and support expanded and innovative methods of securing investment and raising capital for businesses in the region 2. Provide rapid, clear routes to funding for regional R&D and innovation 3. Explore the creation of a fund to directly support green sector start-ups 4. Advocate on behalf of the region for the work of the Midlands Energy Hub
 <p>4. BLUE-GREEN PLACES Where people and nature flourish</p> <ol style="list-style-type: none"> 1. Convene and advocate for cross-sector and multi-agency collaboration at scale for nature based solutions and catchment scale cooperation 2. Work with Government and partners to deliver proposals for the East Midlands Development Corporation 'Masterplan for Net Zero' 3. Advocate on behalf of the region for connected towns and cities through the creation of natural and active travel corridors 	 <p>(3) Delivering impact through a campaign of regional, national and international events</p>	 <p>(4) Leveraging resource, funding and opportunities to engage with the development of Government policy</p>
<p>UNDERPINNING DELIVERY</p> <p>(1) Empowered partnership; strong regional voice</p>	<p>(2) Evidence and Intelligence Midlands Engine Observatory</p>	

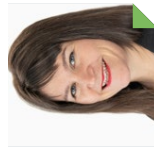
GOVERNANCE OVERVIEW

We have developed our Ten Point Plan in partnership - and we will implement it in partnership

The Midlands Engine Partnership brings together our region's Local Authorities and Combined Authority, Local Enterprise Partnerships, universities, NGOs, and over 800,000 businesses.

Our Partnership has a distributed leadership and distributed delivery model at its heart and as we take forward our Ten Point Plan to mobilisation, this shared approach will continue. Delivery will be co-ordinated by the Midlands Engine Green Growth Board, which will act as a vehicle through which oversight will be brought, actions can be tracked and partner progress can be fed back. The Board will lead the future evaluation of our Plan too - ensuring we achieve the goals set in partnership, and we remain ambitious in future refreshes of our Plan over time.

The Board brings together leaders and experts from right across our Partnership, supported by specialist panels as and when additional technical expertise is required. The Midlands Engine Green Growth Board sits within our wider, existing Partnership structure, benefiting from operational oversight and leadership from the Midlands Engine Operating Board and strategic guidance from our Midlands Engine Executive Board.



“We are collaborating with other Green Growth Partners to create our plans in support of actions outlined in this Plan. We see huge potential for creating low carbon hydrogen production clusters in the Midlands helping to decarbonise homes and businesses. This, in turn, will help support innovation and Green Growth.”
Sally Brewis, Head Of Regional Development, Cadent Gas Ltd



“Sustainability West Midlands is committed to supporting the Midlands Engine Partnership in the delivery of this Ten Point Plan and facilitating collaboration between cross-sector stakeholders in the low carbon sector. Our network of stakeholders is extensive and regional knowledge comprehensive - we look forward to being a part of the implementation of the actions in the Plan.”
Anna Bright, Chief Executive, Sustainability West Midlands



“Businesses in the Midlands are creating a greener, cleaner future for the UK. As momentum builds in delivering a greener economic recovery it's important for businesses to have access to funding and support especially for low-carbon projects and sustainable business practices. By working together through the Midlands Engine Partnership, with oversight from the Green Growth Board, there's no doubt that businesses can deliver a low carbon future across the Midlands and the UK.”
Grant Peggie, Director, UK Funding Team, British Business Bank



“We are delighted to be involved in and support the Midlands Engine Partnership in this Green Growth agenda and look forward to working with colleagues in the mobilisation and delivery of an ambitious Ten Point Plan, a plan that aims to benefit all parts of the Midlands as we accelerate programmes and initiatives to reach net zero.”
Steve Scrimshaw, Vice President, Siemens Energy UK&I

NEXT STEPS FOR DELIVERY

Exceptional work in low carbon is already underway across our vast Partnership landscape, making the Midlands a leading location for Green Growth. But the potential for more is phenomenal and this Plan gives us the focus to complement existing partner initiatives, and to co-develop and deliver new innovations and opportunities.

To deliver our Ten Point Plan we will bring together stakeholders from diverse sectors, and commission specialist and technical support where necessary. Work will be driven via clear plans with milestones to ensure that progress is made at pace, overseen by the Green Growth Board and supported by additional panels, working groups and project-specific arrangements as required.

Through the Midlands Engine Partnership, our region's business leaders, parliamentarians, local government champions, thought leaders, researchers and conservation specialists are working to accelerate action and implementation, together.

Through true collaboration and an incredible shared desire to make things happen, we will act on the wealth of opportunities presented by low carbon to benefit every part of our region.

ACCELERATED MOBILISATION

H2GMids Demonstrator

The Midlands is a hive of hydrogen activity, from production and distribution to end-use technology manufacturing. We are also the UK's logistics hub with 35% of all warehouse space and two Freeports. As such, a range of our region's private and public sector partners have put forward a joint-bid to develop a hydrogen fuel cell vehicle demonstration of HGV trucks and so drive forward zero emission transport.



Hydrogen Technologies Strategy

Hydrogen stands at the forefront of the Government's ambitious plans for a Green Industrial Revolution. The Midlands Engine is now working with partners to set out our strategy for how we will contribute to UK hydrogen ambitions. We are home to all elements of the hydrogen value chain and have impressive research expertise. Our strategy is setting out our important role in the UK hydrogen landscape.

Events programme





Underpinning delivery of our Ten Point Plan will be an impressive 12-month campaign of regional, national and international partner events.



TIMELINE FOR GREEN GROWTH ACTIVITY

<p>JULY 2021</p> <ul style="list-style-type: none"> ➤ Midlands Engine Partner Launch Event: Ten Point Plan for Green Growth 	<p>➤ A Partnership celebration bringing together Green Growth Partners and Midlands Engine regional stakeholders to launch our Ten Point Plan.</p>	<p>➤ Showcasing exemplar facilities and projects across the Midlands.</p>
<p>AUTUMN 2021</p> <ul style="list-style-type: none"> ➤ Sector showcases and study visits 	<p>➤ Partnership virtual panel event hosted by HSBC focusing on the role of cities in achieving net zero. Audience will be drawn from local government, business, universities and other related policy organisations.</p>	<p>➤ Partnership Event – to be hosted at Alstom, Derby. A roundtable with industry voices including the Business Council.</p>
<p>SEPTEMBER 2021</p> <ul style="list-style-type: none"> ➤ Cities and Net Zero - Virtual Panel 	<p>➤ This proposed in-person conference, hosted by the British Business Bank, will highlight investment opportunities from our Ten Point Plan and identify innovative methods of securing investment and raising capital.</p>	<p>➤ Decarbonising Industry Event</p>
<p>OCTOBER 2021</p> <ul style="list-style-type: none"> ➤ Unlocking Green Finance Across the Midlands 	<p>➤ Following a series of roundtables the Midlands Engine Partnership will set out the hydrogen narrative and key messages for the Midlands, aligning with the Government's Strategy.</p>	<p>➤ Midlands Engine Observatory Quarterly Economic Briefing - Green Growth</p>
<p>NOVEMBER 2021</p> <ul style="list-style-type: none"> ➤ Midlands Engine Hydrogen Technologies Strategy 	<p>➤ Convening meeting of Green Growth Board.</p>	<p>➤ HM Government Global Investment Summit (London)</p>
<p>SUMMER 2021</p> <ul style="list-style-type: none"> ➤ Ten Point Plan for Green Growth in the Midlands Engine - Industry Roundtable 	<p>➤ Partnership Event – to be hosted by Brown Jacobson LLP, bringing together industry leaders to discuss the opportunities set out in our Ten Point Plan.</p>	<p>➤ COP26 Glasgow Summit</p>
<p>2022</p> <ul style="list-style-type: none"> ➤ Green Growth Seminars and Workshops 	<p>➤ A series of seminars and workshops, hosted across the Midlands Engine Partnership, to help drive regional Green Growth following publication of our Ten Point Plan and ahead of the COP26 Summit.</p>	<p>➤ Young People's Green Growth Assembly</p>
<p>2022</p> <ul style="list-style-type: none"> ➤ Midlands Engine Investment Summit 	<p>➤ A Midlands Engine Partnership event to galvanise investment in our region's industries across multiple sectors including Digital, Health and Green Growth.</p>	<p>➤ An event to showcase the ambition, creativity and thinking of our region's young people for a greener, cleaner and more prosperous future.</p>
<p>2022</p> <ul style="list-style-type: none"> ➤ Green Growth Annual Impact Statement 	<p>➤ Through the Green Growth Board, the Midlands Engine Partnership will review the delivery of our Ten Point Plan and publish the first Green Growth Annual Impact Statement.</p>	<p>➤ Midlands Engine Investment Summit</p>



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01.07.2021 / V1