

Midlands Engine Energy Conversation

Roundtable Read Out

This report summarises the discussion to date from the focused Energy Conversation roundtable event held in November and industry partner dialogue that was carried out through a survey and 1 to 1 interviews held with key stakeholders. It provides a snapshot of the current/ongoing activities, challenges and opportunities in the Energy sector. The conversation will continue in the months ahead and we welcome everyone's continued involvement.

Energy Conversation - the story so far

Midlands Engine, in partnership with Browne Jacobson LLP and the Energy Research Accelerator, are facilitating a pivotal pan-regional energy conversation to drive forward a partnership approach to evidencing, addressing and resourcing sustainable, green solutions to overcome challenges presenting a barrier to economic growth.

The Energy Conversation began in July 2020 with an initial roundtable connecting leaders from across the Midlands. Industry partner dialogue throughout the summer and autumn of 2020 has helped build a detailed picture of pan-regional capabilities - and in November, the Midlands Engine partnership took the conversation further still. Partners from every part of the region were invited to share intelligence and experience - and to participate in a further focused Energy Conversation roundtable event. The event brought together leaders across the region's energy sector who tackled wide ranging discussion on existing and upcoming solutions as well as debate around the challenges and opportunities for green growth in the Midlands.

Energy Themes: Activity, Challenges & Opportunities

The Energy Conversation presented several examples of ongoing projects from across the Midlands, recognising that the regional green landscape is connected yet distinct, with different characteristics and needs. The summary below gives a flavour of the scale of the green economy in the Midlands, which has identified five key themes:

1. **Energy Generation and Fuels**
 - Hydrogen, Nuclear, Wind, Renewables.
2. **Low Carbon Application**
 - Transport, Heating and Homes.
3. **Infrastructure**
 - Digital, Networks (e.g. grids, charging points).
4. **Enablers**
 - Skills, Legislation and Policy, Finance.
5. **Innovation and Enterprise**
 - SMEs and Supply Chains, Large Corporate Organisations, Civic Organisations, Research Organisations.

Theme 1: Energy Generation and Fuels

The region is leading the way in sustainable, green fuels, with incredible strengths in hydrogen powering homes and transport, and advances in nuclear technology which could provide a reliable supply of affordable low carbon energy. Other renewables, in particular offshore wind represent a huge and current opportunity for the region with Lincolnshire being the home of the largest Operations and Maintenance base in the World.

Hydrogen

Ongoing Activity:

- Worcester Bosch has developed hydrogen-ready boilers - work is being undertaken to increase the availability of these appliances domestically.
- Tyseley Energy Park in Birmingham has the UK's first multi-fuel, open access, low and zero carbon refuelling station and is able to refuel both commercial and private hydrogen vehicles.
- There is ongoing grid stability work in the region, particularly due to the closure of coal fire plants, in respect of which hydrogen will likely play a key role.

Challenges:

- Further research and investment will be needed to make hydrogen affordable and sustainable at a volume to meet anticipated demand.

Opportunities:

- Hydrogen will be a key technology for decarbonising transport and heating.
- There is a good chance for the region to take a lead on the deployment of hydrogen into domestic settings, hydrogen technology in vehicles, and transport infrastructure.
- The region's strategy on hydrogen and fuel cell technology needs to be clear, as this could lead to an inwards opportunity investment for the region.
- There is a high demand for hydrogen in the commercial food logistics environment.

Nuclear

Ongoing Activity:

- Rolls Royce's Small Modular Reactor (SMR) technology could play a key role in creating a reliable supply of affordable low carbon energy.
- Nuclear technology can be used in conjunction with other green energy technologies, such as the production of hydrogen.

Challenges:

- There is still a need to educate and win the hearts and minds with regards to nuclear, to convince people that it is safe - this will be important to reach net-zero targets.

Opportunities:

- Small Modular Reactors are very useful when designing power networks due to their relative size to the grid and can deliver certain capacity with low environmental impact.
- There is an opportunity to leverage the excellent nuclear capability in our region, as it will no doubt play a key role in the Government's overall energy strategy.

Wind

Ongoing Activity

- The Greater Lincolnshire LEP has grant funding to unlock land earmarked for the development of the ABLE Marine Energy Park (AMEP).
- Currently under construction and anticipated to be complete in 2022, Hornsea Two will be the biggest and best value offshore wind farm in the world - with its 165 8MW wind turbines, covering a distance of 462 km², Hornsea Two will generate 1.4GW of clean power, enough to supply over 1.3 million homes in the UK with green energy.

Challenges:

- There are issues with regards to land availability and resistance from residents to have wind turbine installations near their local area.

Opportunities:

- ‘Power to liquids’ - take low carbon electricity generated from wind to electrolyse water to produce green hydrogen

Renewables

Ongoing Activity:

- The Midlands Energy Hub have projects in the pipeline which focus on solar and wind energy.
- There is ongoing work regarding development of waste disposal technologies.
- There is an ongoing project investigating ways of decarbonizing the country’s gas networks by introducing more ‘green’ gases such as biomethane with more efficient gas distribution.
- Various forms of Carbon Capture and subsequent utilisation and storage are being developed.
- The Ratcliffe on Soar power plant decommissioning is due in 2025 and there are talks to discuss a more renewable replacement.

Challenges:

- There are issues with regards to land availability and resistance from residents to have renewable installations near their local area.

Opportunities:

- Within the Greater Lincolnshire LEP there is a large agricultural and food logistics environment, which deals with 60% of the UK’s logistics and 20% of the UK’s arable output - lots of opportunity here including in respect of Anaerobic Digestion.
- Solar can help where there are space restrictions - major energy users in the region are looking at widespread installation of solar panels on their commercial buildings.

Theme 2: Low Carbon Application

Transport and heating and homes are the two focal points for low carbon energy in the Midlands and the case studies noted below are some examples of the region’s efforts in reaching net zero targets.

Transport

Ongoing Activity:

- Battery Electric Vehicles (BEVs) are being developed by private sector expertise in the Midlands (Jaguar Land Rover and Aston Martin Lagonda being examples).
- Electric vans are being developed and built in the Midlands and are already being adopted into the fleets of logistics companies such as UPS.
- There is a huge amount of innovation in this space taking place within Midlands universities.
- There are ongoing low carbon rail projects such as the energy work (including use of hydrogen fuel cells in trains) being undertaken by the Birmingham Centre for Railway Research and Education.
- Aerospace companies in the Midlands are at the forefront of R&D in development of low carbon Sustainable Aviation Fuels (“SAFs”).

Challenges:

- The switch to BEVs will see electricity demands grow - a major grid upgrade is likely to be needed to support this rise in demand, which may be a slow process.

Opportunities:

- The Midlands is home to the UK automotive industry and ideally located geographically for implementation of new transport infrastructure projects.
- The Midlands is also the home to most UK distribution hubs - implementation of new technologies to reduce HGV emissions will be of significance to the region.

Heating and Homes

Ongoing Activity:

- There are projects around the installation of District Heating and Minewater Heat Recovery which present new methods of distributing and generating heat in a more efficient and greener fashion.
- There is significant ongoing work on the use of hydrogen in the context of heating with Midlands based manufacturers Worcester Bosch and Baxi Boilers at the forefront of this work.
- There have been pilot schemes in the Midlands to retrofit new heating systems into existing homes.
- A large-scale pipe replacement project is underway following significant research on the underlying boiler infrastructure and how existing systems can be retrofitted.

Challenges:

- Decarbonisation of heat remains a significant technical challenge in the quest for net zero.
- The pipework in existing houses may not support changes in the heating source.
- It is easiest to improve energy performance in new homes via new technology. Retrofitting old housing stock is far more difficult and pilots in the Midlands

have shown that deep retrofit might not be sustainable unless costs can be reduced significantly - an urgent change in building regulations standards is needed, if unnecessary retrofitting is to be avoided.

Opportunities:

- The region is well placed to overcome the challenge around decarbonisation of heat as it is home to key operators in the heat industry, has a uniquely representative mixture of residential housing stock and its manufacturing base has a significant gas and heat demand.
- The proposed National Centre for Decarbonisation of Heat would also provide a fantastic opportunity to take advantage of the Midlands' unique status.
- Reliance on incumbent fuel sources could be combatted by the prospect of future bans, e.g. on oil, log and coal heaters in new build properties

Theme 3: Infrastructure

There is significant work ongoing in the region in regard to digital and physical infrastructure to provide the foundations for green growth at-scale.

Digital

Ongoing Activity:

- Collation of data regarding the efficiency of energy usage in housing is being undertaken.
- Substation analysis and software platforms are being developed to provide effective monitoring.
- There is also ongoing work on data integration, cybersecurity and digital systems by the Birmingham Centre for Railway Research and Education.

Challenges:

- A lack of pooling of data is reducing the potential effectiveness of energy-saving technologies such as smart metres.
- Challenges arising from competitive constraints over the sharing of data.

Opportunities:

- The public sector could play a vital role in becoming a conduit for knowledge and data sharing through partnerships and other forms of collaboration.

Networks (e.g. grids and charging points)

Ongoing Activity:

- There is significant ongoing work on grid technologies in the Midlands - this involves smart energy networks such as Keele University's Smart Energy Network Demonstrator, intelligent digital infrastructure and development of decentralised energy networks in cities and regions.
- There are reviews on how best to deploy retrofit programmes in a regional context.
- There is widespread development of electric charging infrastructure - large retailers such as Central England Co-operative are actively looking for solutions to their requirements for EV charging points across their property estate.

Challenges:

- In order to effectively implement new energy solutions, the Midlands needs to better understand energy usage in this region, including consumer behaviours, patterns of usage, what their projected energy requirements will be over the coming years, etc.
- Many consumers are not currently concerned about where their electricity comes from (just that it arrives) -consumer awareness, backed by good data, can help to change consumer demand.

Opportunities:

- Learnings must be taken from other ongoing projects in this field, and other available data sources.

Theme 4: Enablers

In order to better enable us to achieve a green economy and a Green Industrial Revolution, the Midlands Engine Partnership have identified the importance of ensuring our region is equipped with the required skills, legislation & policy and access to finance.

Skills

Ongoing Activity:

- Uniper have started their Academy Skills Development Programme to enhance the skills and competencies of our workforce, particularly in the areas of hydrogen and carbon capture.
- The Energy Research Accelerator has a skills programme to develop and provide skills for the energy leaders of the future and is one of the key drivers behind the Centre for Postdoctoral Development in Infrastructure, Cities and Energy which will develop a deep, technical skills base necessary to tackle the complex interdisciplinary challenges that lie ahead across infrastructure, cities and energy.
- MIRA has a centre of excellence for skills development for transport skills. Specialist engineering and management education training is provided on-site through the MIRA Technology Institute, ensuring that Midlands-based companies are able to recruit and train the skills they need for their operations.

Challenges:

- New technology requires investment in new skills for existing employees - engineers who work on domestic boilers won't be able to easily switch to working on DH networks or hydrogen boilers.

Opportunities:

- With such significant changes to the energy sector likely to take place, it offers significant employment opportunity within the sector in the region. It also offers the opportunity for diversification in the sector.
- The proposed National Centre for Decarbonisation of Heat has been developing a skills agenda to accompany the technical activity.

Legislation & policy

Ongoing Activity:

- Local government plays a critical role, particularly in terms of planning but also coordinating and investing in larger projects and creating demand.
- The Government will shortly be releasing some key documentation on energy, for example:
 - The Energy White Paper - which will define the energy system and how the Government wants the system to work.
 - The Buildings and Heat Strategy - looking at for example, heat pumps, hydrogen systems and hybrid systems, and how the Government wants to deploy these.
 - The Transport Decarbonisation Plan.

Challenges:

- Clear direction of travel with regard to policy and regulation is needed in order to inform investments in technology and infrastructure.
- Major changes to Government standards and legislation may be needed to bring about rapid change.
- Solutions must meet residents' needs and avoid exacerbating fuel poverty.
- The planning system represents an opportunity to drive zero carbon homes - however additional conditions on new homes, for example, making the new homes zero carbon, may negatively affect viability if consumers are not willing to bear the additional costs.
- A key challenge in energy planning is integrating technologies together, for example, the transition from an internal combustion engine to autonomous vehicles requires an integrated energy strategy.

Opportunities:

- Solutions can be encouraged by positive (funding) or negative (taxation) incentivisation.
- Planning local regulation and policy should be aligned with the wider energy strategy and new approaches should be considered, such as futureproofing new housing developments for new technology or removing assumptions about the inclusion of old technology.
- In relation to Covid-19, there is an opportunity to 'build back better', by repurposing city centre offices and shops and revitalising our communities - there is a chance here to create sustainable neighbourhoods, with more walking and cycling.
- There is a responsibility on all of us as individuals to keep the pressure on policy makers to drive innovation and drive the change in the way we live our lives.

Finance

Ongoing Activity:

- Individual projects have been developed with gap funding and co-investment via the Midlands Energy Hub, ERDF programmes and research/innovation funding via ERA and associated research projects.

Challenges:

- The cost of transitioning from current technologies to hydrogen usage in both transport and heating will be huge.
- Investment is hard to obtain as risks are high and returns are long term (15-20 years), whereas investors typically seek short-term gains - more grant support and financial incentives from Government would aid this challenge.
- Getting new technologies through the Technology Readiness Levels and to the point of them being investment grade technology is very difficult.
- One of the main issues is the huge proportion of the overall cost resulting from the cost of capital.

Opportunities:

- It is recognised that ongoing access to funding and greater collaboration across the public and private sector will accelerate progress.
- It may be logical to have a regulated asset-based model for funding. This may decrease the risk profile and cost of capital for investors and allow for pension funds and others to get involved.
- A “Midlands Engine Green Bond” is an option that should be considered further but such bond is likely to require governmental support to push forward.
- Regional powers around delivery and possibly responsibility for net zero and net carbon could be introduced, with the Government releasing certain powers to allow the Midlands to take this independent route.
- There is a need for new methods of attracting private investors and pension funds to invest in these projects.

Theme 5: Innovation and Enterprise

In order to achieve our ambitions for Green Growth it is important to harness the wealth of assets in our region to drive forward innovative solutions. There is significant potential for the Midlands to lead the UK along the path towards green recovery and growth.

Ongoing Activity:

- Ten of the region’s universities are leading the way in innovation and research in energy. Exemplars include the UK’s first grid-injected hydrogen pilot at Keele University, the Manufacturing Technology Centre in Coventry, the Energy Systems Catapult in Birmingham and the Nottingham based Energy Research Accelerator.
- The region is also home to some of the UK’s leading and most innovative businesses across the energy system including in the built environment, transport, infrastructure, industry and energy production. Some examples include Adelan, leading the way in hydrogen and fuel cell technology and Cadent Gas looking at the most cost-effective solutions to increase the amount of renewable gas in the network, using compressors.
- There is over £50m of current ERDF funding across the region to support SMEs in the energy sector and deliver growth.

Challenges:

- ERDF funding is time-limited and there is a risk of these programmes ending without alternative support being found.

- In extraordinarily competitive space, the Midlands needs to develop cutting edge projects which will retain the Midlands' lead in key areas and provide the region with national attention.

Opportunities:

- Despite this competition there is a need to collaborate and to understand the strength this provides in developing the market - isolated products will not promote a national change and the innovation needs to be viewed by the participants as part of a wider project. To this end focus is needed on supporting and developing cohesive supply chains.
- The Energy Research Accelerator are pitching for funding on six projects that could help keep the Midlands in the spotlight and help to develop market-ready solutions in collaboration with industry. These include:
 - Tackling energy storage;
 - The National Centre for Decarbonisation of Heat;
 - Data and digital;
 - Understanding hydrogen use in freight;
 - Use of sustainable fuels.

Next Steps

This report has set out the findings of the Energy Conversation to date, identifying a number of thematic areas. Over the coming months the Midlands Engine partnership will connect these areas along with the Midlands Engine environment work through a series of more in-depth interventions, including more targeted industry research to enhance our knowledge and evidence base, comprehensive mapping of Green Growth activity, challenges and opportunities across the Midlands, and focused thematic workshops to identify key strategic priorities that will deliver the desired impact and step change for the region. The culmination of this activity will be the Midlands Engine Green Growth Action Plan, to be launched in Spring 2021.

We would value and welcome your continued engagement in these conversations and as we look ahead to January, here’s how you can stay involved:

The Midlands Engine Green Growth Workshops

To inform the Midlands Engine Green Growth Action Plan, throughout January 2021 key stakeholders from across the region are being invited to several deep-dive workshops into the five key themes:

Workshop Theme	Date/Time
Energy Generation & Fuels - Hydrogen, Nuclear, Wind, Renewables	Tues 12 Jan, 11:00-12:30
Enablers - Skills, Legislation & Policy, Finance	Wed 13 Jan, 14:00-15:30
Infrastructure - Digital, Networks (e.g. grids, charging points)	Thurs 21 Jan, 14:00-15:30
Low Carbon Application - Transport, Heating & Homes	Fri 22 Jan, 11:00-12:30
Innovation and Enterprise - SMEs & Supply Chains, Large Corporate Organisations, Civic Organisations, Research Organisations	Wed 27 Jan, 14:00-16:00
Workshop roundup - summary of outputs from workshops - play back of draft Action Plan	Tues 2 Feb, 14:00-15:30

Following these five workshops, there will be a final Workshop Roundup in early February to summarise outputs to be included in the Action Plan.

If you would like to be involved in any or all of these workshops, please contact jacob.vivian@midlandsengine.org