

improving infrastructure

wind resource study for the West Midlands Region



Advantage West Midlands

The Regional Development Agency (RDA) for the West Midlands Region

Advantage West Midlands is the Regional Development Agency (RDA) for the West Midlands and one of nine RDAs in England.

Our role is to lead the economic development of the West Midlands Region, working alongside public, private and voluntary sector partners to help our region to prosper. We build upon our region's many strengths and address our unique challenges.

Our key task is to lead the development and delivery of the **West Midlands Economic Strategy (WMES)**, the framework for our region's growth. Through working in partnership, we speak with one voice for the region and make a far greater impact than we would acting in isolation.

We have an annual budget of over £300 million to invest in the West Midlands Region and, at any one time, we manage around 2,500 projects which change the lives of people across our region. We drive economic development by identifying where we can make the greatest impact, either by targeting specific needs or investing in success.

For more information visit www.advantagewm.co.uk



Cover image: Rugby-based manufacturer **Converteam** is the UK's largest exporter of technology to both the on-shore and off-shore wind industry. Their 'direct-drive' generators operate at the speed of the wind turbine's rotor, halving the number of components required in the nacelle at the top of a wind tower. This enables their generators to comply with the very latest grid codes. Converteam has exported more than 2500 MW of power conversion equipment to the industry.

Converteam's success was supported by the **WindSupply project**. First recognised and supported by **Advantage West Midlands**, the WindSupply project commenced in late 2002/2003 to develop and promote the UK component supply chain. It started with in detail research into the existing mainland Europe supply chain, and detailed product designs and specifications.

What is Wind Resource?

Wind resource refers to the potential energy that can be captured and converted to other forms of energy such as electricity or mechanical power energy from the conversion of wind energy through a turbine. Wind power has the potential to generate clean, renewable energy to power homes and businesses.

Why was the study undertaken?

The study builds on work originally done in 2001 for Government Office for the West Midlands and which has been partially updated in 2004 for the Regional Energy Strategy. The 2007 Energy White Paper (EWP) asked Regional Development Agencies (RDAs) to identify opportunities as to how they could bring forward Decentralised Energy (DE) projects. Advantage West Midlands published the UK's first low-carbon regional economic strategy "Connecting to Success" in December 2007 and delivery plan in April 2008. This work was commissioned in response to the EWP and "Connecting to Success". This study fulfils commitments within the "Connecting to Success" and Regional Climate Change plan.

What does the study show?

The study reviews the economically viable wind resource across the West Midlands Region and key wind development constraints based on the current status of wind technology. The study maps potential opportunities for deployment of wind turbines in the region, once these constraints have been factored in.

The study uses the new 'Geographical Information System (GIS) Mapping Tool' developed by Halcrow to provide information about the spatial relationship between potential sites for wind energy developments in the West Midlands and constraints which may restrict such development.

What were the key findings and recommendations?

The study reveals that approximately 59% of the total area of the West Midlands (c. 767k hectares) is estimated to have an Annual Mean Wind Speed (AMWS) above the 6 metres per second financial threshold. This is known as the 'technical resource'.

The areas identified as having suitable technical resource were then filtered as part of a second stage of screening to identify those areas free from major constraints on wind development including: the 400m buffer zone from urban areas; the 200m topple/safety distance from transport infrastructure, and; the statutory designated areas, such as areas of outstanding natural beauty, where development is not likely to be allowed. These areas are designated as having 'high level practical resource'.

This screening process identified that 30% (398k ha) of the West Midlands has high level practical resource.

A third screening process was performed to identify those areas where aviation activities were accounted for.

These areas were designated as having 'prioritised practical resource'.

The study reveals that 2% of the West Midlands, equivalent to 30 kilo hectares (30k ha), has prioritised practical wind resource available. Data provided by the British Wind Energy Association reveals

that the potential for deployment of wind turbines is in the region of up to twenty 1.5MW turbines over an area of 100 hectares. Given this nominal deployment level, the study shows that an upper limit on regional wind power generation would be in the region of 9000MW

should all sites be developed to the limit of their capacity. This is the equivalent of the annual electricity consumption of 4.5 million homes. However, the practical level of deployment and generation potential across the region or at any individual site depends on a site-specific

	Wind Resource	Airport interference	Radar interference
Priority 1	Good	Low	Low
Priority 2	Moderate	Low	Low
Priority 3a	Good	Medium	Low
Priority 3b	Good	Low	Medium
Priority 4a	Good	Medium	Medium
Priority 4b	Moderate	Medium	Low
Priority 4c	Moderate	Low	Medium
Priority 5a	Good	High	Low
Priority 5b	Good	Low	High
Priority 5c	Good	High	Medium
Priority 5d	Good	Medium	High
Priority 5e	Moderate	Medium	Medium
Priority 6a	Moderate	High	Low
Priority 6b	Moderate	Low	High
Priority 6c	Moderate	High	Medium
Priority 6d	Moderate	Medium	High
Priority 7a	Good	High	High
Priority 7b	Moderate	High	High

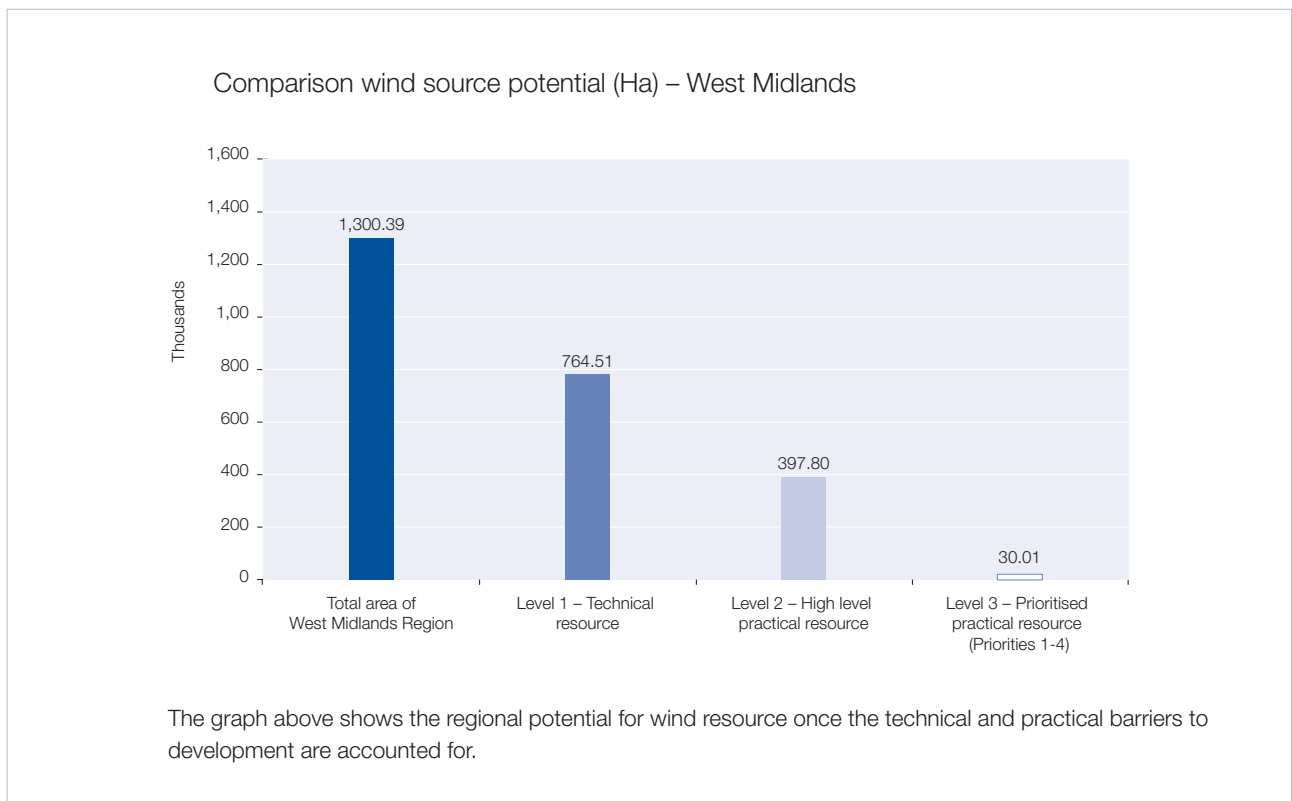
This table shows the prioritisation of areas with wind resource when aviation activities have been acknowledged.

assessment being undertaken and an analysis of locally specific economic and planning restraints should acknowledge the continuous improvements in the wind technology. Sub-regionally, the greatest potential can be identified in Herefordshire 1% (17.17k ha) and Shropshire 0.5% (8.38k ha).

How could this be achieved?

Harnessing the potential of the identified prioritised practical resource could be achieved through support for targeted awareness raising campaigns aimed at providing information to wind power developers and local authorities developing energy strategies to inform their planning policies.

Undertaking further site-level scoping studies for potential deployment is also a necessity to ensure that the most appropriate resources can be exploited to their potential and take into account other local circumstances and priorities.



The future activity could be co-ordinated by Regional Energy Office, working with other key bodies such as the Carbon Trust, Energy Saving Trust and Local Authorities.

What are the benefits to the region?

Regional organisations, businesses and individuals would benefit from improved energy security and reduced costs which would improve the competitiveness of the region.

The region would also look to capitalise on business strengths in manufacturing and engineering to continue to diversify into the wind power supply chain. The experience gained within the region would further support manufacturers looking to specialise in the growing global wind industry and strengthen export opportunities.

How could the results be used by regional organisations?

There are three key constituencies that would find the results of direct relevance to their work:

Public sector agencies such as regional and local bodies, local authorities, and urban regeneration partnerships for:

- Providing an evidence base for policy and delivery
- Developing regional and sub-regional energy strategies
- Identifying locations for site level studies
- Supporting the implementation of decentralised energy solutions, as part of local planning and site development requirements

Service providers, particularly energy companies specialising in wind energy, for:

- Developing strategies for targeting opportunities
- Identifying locations for more detailed site level studies
- Identifying potential partners to work with such as local authorities

Private property developers and land owners, particularly those active in the region, for::

- Considering wind options as part of new development/refurbishment
- Identifying locations for more detailed site level studies
- Strengthening development proposals as part of an overall site development package
- Rural diversification opportunities for farmers

What are the limitations?

The study has been developed using a series of datasets, most of which are in the public domain, but relates to a strategic assessment. Care needs to be exercised by anyone wishing to draw firm, definitive conclusions when using the data or the approaches outlined in the study to specific sites or locations since the methods used are, in the main, based on generic approaches and would not support this type of application.

There are also a range of other local issues that will vary from site to site and will be determined by the local planning authority. However, the study is still valid for the more strategic uses identified previously.

Future Work

Decentralised energy requires not only wind energy generation but also a range of different renewables and lower-carbon generation and the ability to provide electricity back into the district network. Advantage West Midlands is working with partners to address this in studies that will compliment this work.

Advantage West Midlands is also working with partners on a range of schemes to help manufacturers diversify into the centralised energy supply chain and provide investment to help deployment of technology through grants and support for planners.

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For further information about other studies including Heat Mapping and Decentralised Energy Feasibility Study contact:

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