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Local Government Yorkshire and Humber

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Low carbon and renewable energy capacity in Yorkshire and Humber

Final report – Executive Summary

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Final report

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Executive Summary

1 Executive Summary

This study was commissioned by Local Government Yorkshire and Humber to assess the resource for low carbon and renewable energy generation across the Yorkshire and Humber region. The findings of this study provide an evidence base to assist sub-regional stakeholders and local authorities in the preparation of their own targets, policies and strategies for renewable energy development at the sub-regional and local levels.

1.1 The opportunity

Through the Climate Change Act, the UK has established a legally binding target to reduce carbon emissions by 80% on 1990 levels by 2050. The UK is also committed to generate at least 15% of energy demand from renewable energy sources by 2020. This will require new approaches to the way we generate and supply energy and manage energy demand.

The geographical characteristics of the Yorkshire and Humber region, combined with a comprehensive infrastructure network inherited from its legacy of industry and energy production, means that the region has great potential to exploit a range of renewable energy technologies.

Renewable energy has the benefit of zero net carbon dioxide emissions, and can play an important role in enabling the Yorkshire and Humber region to meet its share of national carbon targets.

Renewable energy can also deliver substantial economic, social and environmental benefits at the local and regional level, by creating jobs, through the manufacture, installation, operation and maintenance of renewable energy technologies, as well as providing a new impetus for rural diversification and regeneration.

1.2 Objectives of the study.

The objectives of this study were:

- To provide an assessment of the potential for low carbon and renewable energy across the region in a clear and justifiable way that is consistent with the other English regions, and meets the requirements of national government for such studies;
- To provide a common and robust evidence base on the potential for renewable energy to inform and support policy making by individual local authorities in the region, as part of developing their local development documents;
- To identify strategic delivery actions, for each of the four sub regions, to tackle strategic barriers and facilitate deployment of renewable energy opportunities.

1.3 Summary of renewable energy resource

This study has found that by 2025 the region has the potential resource to install approximately 5,500 MW of renewable energy generation capacity (around 3,600 MW of renewable electricity plus around 1,900 MW of renewable heat) and generate around 16,100 GWh of renewable energy annually. (These figures exclude biomass co-firing in coal fired power stations, large scale power generation from dedicated biomass power stations taking imported biomass as feedstock, and offshore wind and marine renewables).

This would represent nearly a fivefold increase on existing operational and consented capacity. The main contributions to the resource, excluding offshore technologies and biomass co-firing, come from commercial scale wind and biomass energy generation. The resource is spread across the sub regions (see Figure 1 below).

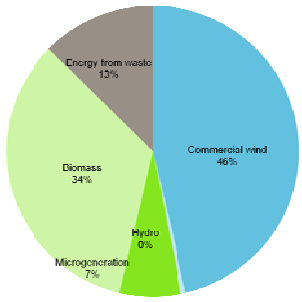

Figure 1 Distribution of potential renewable energy resource (annual energy output) in Yorkshire and Humber by technology

Yorkshire and Humber is currently slightly behind the other English regions in terms of installed renewable energy capacity, but is catching up fast. Further activity to encourage wider understanding of renewable energy amongst planning officers, members and local communities through education and awareness raising could help to increase deployment. Region wide or sub-regional guidance for planning officers on the interpretation of planning application material would be welcomed by developers. Adopting design principles, such as those produced by Scottish Natural Heritage on the cumulative effect of wind farms, could also encourage consistency in assessing applications.

1.4 Larger scale renewable electricity generation

Commercial scale wind energy represents a key opportunity for increasing the renewable energy capacity. Most of the economically viable resource lies in a band going through the centre of the region from north to south and along the east coast of the region in East Riding of Yorkshire.

Hydropower has an important but limited role to play, particularly by bringing Yorkshire's rich heritage of mills back into use and increasing awareness of the benefit of renewables.

The majority of the potential biomass energy resource is located in York and North Yorkshire, where there are particular opportunities for growing energy crops, whilst avoiding any potential conflicts with food security. Straw also represents a significant resource for the region, with a large potential resource in the Hull and Humber Ports sub-region, and there are proposals for several schemes that could utilise this resource.

Biomass co-firing in the three coal fired power stations in the region is a current and future significant source of renewable energy capacity in the region. There is the potential for a proportion of the region's biomass resource to be used for this co-firing, as well as in dedicated biomass power and CHP plants.

In general, the electricity distribution network is sufficiently equipped to deal with the expected increase in renewable energy deployment, although some parts of the network in the Humber area may need to be upgraded to meet demand.

1.5 Larger scale renewable heat generation

There is potential for new biomass and waste energy facilities in the region to be configured and operated in a Combined Heat and Power (CHP) mode, to enable them to supply heat as well as generate electricity. This has the potential to maximise the efficiency of any facility, in terms of the useful energy recovered from the fuel, as well as any carbon savings. However, this requires such facilities to be co-located with heat demands, either residential, commercial or industrial loads that can be supplied heat via a district heating network.

The study has found that district heating with CHP could be viable in the majority of the region's urban settlements. However, installing a district heating network is a major capital investment and there is a limited range of proven stewardship and procurement models. The biomass fuel supply chain in the Yorkshire and Humber region is currently in its infancy and the market conditions are variable. There is a potential role for local authorities to collaborate with the sub-regional bodies to establish a supply chain to provide some degree of long term stability.

At least three energy from waste plants are currently in development in the region. A number of waste disposal contracts are due to be retendered in the short to medium term and these could provide the opportunity to co-locate energy from waste facilities with major heat loads and the opportunity for stakeholders in the region to maximise the energy and carbon benefit of these schemes by stipulating that they supply low carbon heat into local heating networks.

1.6 Production of biogas

Biogas can be produced from anaerobic digestion of crops, segregated food waste, and mixed municipal, commercial and industrial waste streams. Landfill gas and sewage gas production currently represents around 20% of regional renewable energy generation, and it is all used to generate electricity.

With appropriate cleaning techniques, biogas can be injected directly into the existing gas network and used in homes without modification to appliances and avoiding the need for investment in new distribution infrastructure. The region has an extensive and robust gas distribution network but policy needs to provide the necessary incentives in order to encourage synthetic gas production. This will be out of the hands of local authority and sub regional partners, although lobbying of government on the issue may help to form policy development.

1.7 Microgeneration

Microgeneration typically refers to the array of small scale technologies that can be integrated into new building development or retrofitted to existing buildings. The Feed In Tariff has resulted in a dramatic increase in the number of electricity generating, microgeneration technologies installed in the region. The Renewable Heat Incentive is likely have a similar effect on the deployment of heat generating, microgeneration technologies.

Capabilities on project:
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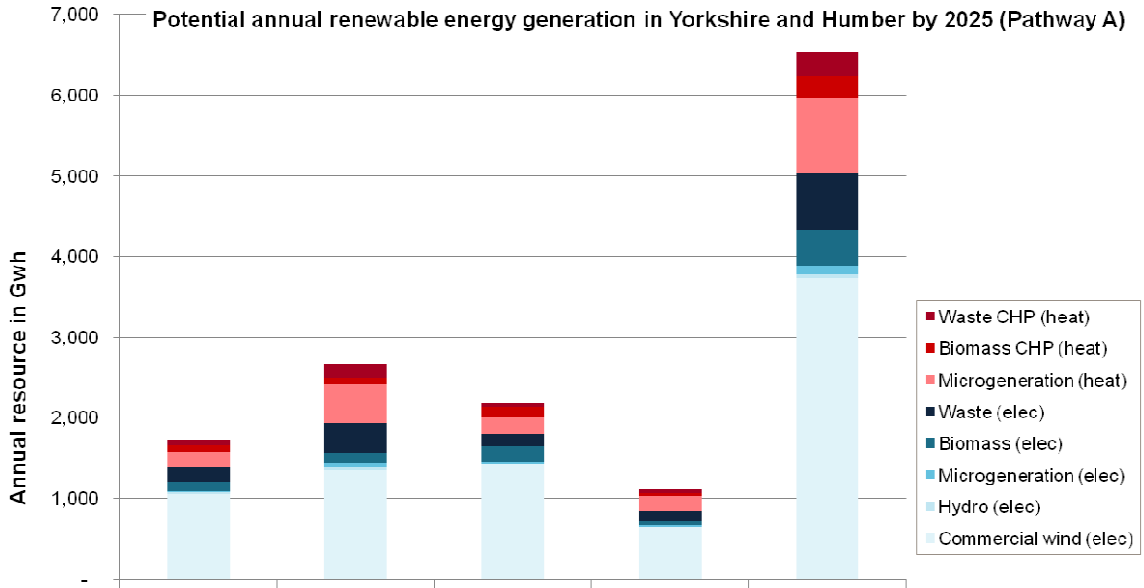


	York and North Yorkshire	Leeds City Region	Hull and Humber Ports City Region	South Yorkshire	Yorkshire and Humber
Waste CHP (heat)	70	162	55	58	296
Biomass CHP (heat)	76	81	123	32	276
Microgeneration (heat)	195	488	207	183	926
Waste (elec)	178	359	160	122	706
Biomass (elec)	122	130	197	52	442
Microgeneration (elec)	16	63	16	25	106
Hydro (elec)	17	34	0	5	44
Commercial wind (elec)	1,050	1,344	1,428	642	3,736

Figure 2 Distribution of renewable energy resource for Yorkshire and Humber by sub region (for renewable energy Pathway A)

1.8 Using the resource effectively

Scenario modelling suggests that with an ambitious but reasonable attempt to increase energy efficiency of the building stock, it should generally be possible for the Yorkshire and Humber region to meet its share of the UK's 15% renewable energy target, mainly due to the significant resource for renewable electricity generation from commercial scale wind energy turbines and the significant contribution from biomass co-firing. Achieving the necessary levels of renewable heat generation is likely to be challenging.

It should also be noted that the available renewable energy resource will be under demand from other sectors, such as transport, agriculture, industry and commerce. A coordinated approach to delivery will be necessary to ensure that the available resource is used as efficiently as possible.

1.9 Using the outputs of the study

A suite of Energy Opportunities Plans has been produced as a resource for assessment and prioritisation of opportunities. These should provide a tool when developing planning policies, targets and delivery mechanisms within the LDF process, and can bring added benefit and support to development plan documents. They can be used to support policies that stipulate requirements for renewable energy, whether these are through the setting of targets that exceed Building Regulations, the requirement for Code for Sustainable Homes or BREEAM, or a requirement for connecting to, or investing in, infrastructure to facilitate district heating.

They can also be used to inform actions in corporate strategies, as well as investment decisions taken by the sub regional bodies and local enterprise partnerships.

Although the Energy Opportunities Plans provide an overview of potentially feasible technologies and systems within the region, they do not replace the need for site specific feasibility studies for proposed sites.

1.10 Keeping the study relevant

Collating data on renewable energy installations has proved to be a major challenge and highlights the need for a coordinated approach to be taken to maintaining up to date information on new installations.

Ideally, the conclusions of the study should evolve to reflect changes in policy and targets. The 2010/11 Climate Change Skills Fund for Yorkshire and Humber could be used to facilitate this process. The quantitative information and spatial datasets should be made available to stakeholders in a live format that can be easily kept up to date. A web-based GIS system would be the most accessible way of presenting the information. It could be linked to the Yorkshire and Humber Renewable Energy toolkit, although questions around ownership of the datasets and maintenance requirements would have to be addressed.

An online forum was set up online to encourage discussion amongst stakeholders. This is located at www.yorkshirehumberrenewables.maxforum.org and could also form part of a dissemination package.

1.11 Strategy for delivery

This study provides an action plan for delivery of low carbon and renewable energy for each of the four functional sub regions, developed in collaboration with key stakeholders.

One of the key challenges facing delivery will be constraints on public spending and the availability of public sector funding for infrastructure. Tightening Building Regulations and zero carbon building policy will create demand for low carbon solutions on new developments. This could create a cost effective opportunity to increase the region's low carbon and renewable energy capacity.

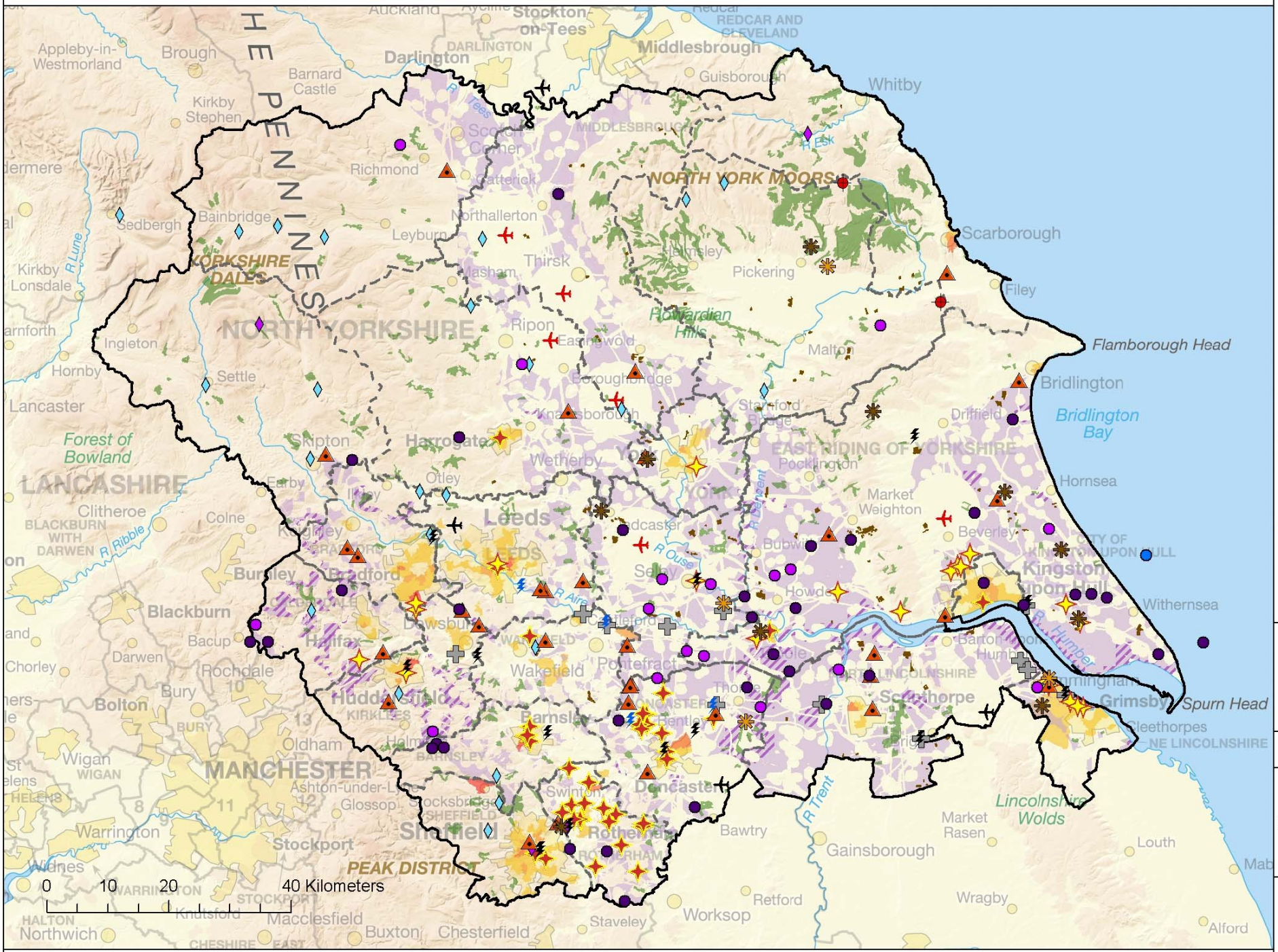
While the study has explored a time horizon of 10-15 years, most of the actions needed to ensure delivery are in the short term. This partly relates to the urgency of mitigating climate change, meeting energy targets and improving security of energy supply, but also to the timing of new development, with many of the major regeneration areas (such as the Aire Valley) already having masterplans or development briefs or in the process of preparing them.

Local authorities and sub regional bodies will also need to ensure that the plans developed take into account the needs and ambitions of the local community and are fully supported. This will require genuine consultation and strong leadership.

1.12 Recommendations

Although there are specific actions and recommendations for each city region/ sub region, there are a number of common key strategic actions to facilitate the deployment of renewable energy. These are as follows:

1. Develop local policies and targets to support renewable energy in the LDF process, including policies for new development and strategic sites (including viability testing).
2. Develop greater understanding of the relationship between renewable energy development and the sub-region's landscape character and natural environment.
3. Educate communities, authorities and members about appropriate technologies for the sub-region.
4. Develop skills in local communities and support mechanisms to help communities deliver renewable energy schemes.
5. Investigate and integrate local manufacture and management of renewable energy technologies within local economic strategies.
6. Identify delivery vehicles, and the role and capacity of local authorities to assist in delivery.
7. Share local knowledge and skills through a coordinated forum.
8. Stimulate the development of regional biomass supply markets.
9. Identify a lead coordinator for activity in the sub-region, who can act as a promotional lead and also coordinate funding to local priorities.
10. Identify opportunities on brownfield land for renewable energy installations in tandem with regeneration and redevelopment initiatives.



Legend

- Current Wind Farm
- Proposed Wind Farm
- Proposed Off Shore Wind Farm
- Current Energy from Waste
- Proposed Energy from Waste
- Current Biomass Energy
- Proposed Biomass Energy
- Current Energy from Landfill
- Current Hydro Power
- Proposed Hydro Power
- Current CHP
- Current Heating Network
- Current Fossil Fuel Power Station
- MOD Air Defence Radar
- MOD Aerodrome
- CAA Aerodrome

Biomass Resource

- Current Energy Crop Scheme
- Woodland

Commercial Wind Energy Resource

- Practically Viable [Limited]
- Practically Viable Resource

kW_km2

- < 3 kW/km2
- 3 to 6 kW/km2
- 6 to 9 kW/km2
- 9 to 12 kW/km2
- > 12 kW/km2

Energy Opportunity Plan

Date: 14-03-2011

Local Government Yorkshire and Humber

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This map is suitable for resource assessment only. Sites located outside the viable resource shown may still be suitable for development. All sites should be appraised on a case by case basis. Sites shown within the viable resource may not be suitable for development "Current" refers to facilities that are operational or have planning consent. "Proposed" refers to sites currently in the planning system or that have been flagged as having potential. Only current and proposed facilities over 1MW are shown.