delivering community scale energy opportunities which go beyond site boundaries, and obtaining an appropriate financial or delivery contribution from developers towards this.

A key finding, on discussion with the industry, is that a primary obstacle to the deployment of microgeneration technologies is the bureaucracy involved in accreditation of installers, meaning there is a tremendous shortfall in the industry's capacity to develop feed in tariff compliant schemes, even though they might be an attractive investment. The Renewable Heat Incentive is likely to result in a similar increase in the deployment of heat generating, microgeneration technologies such as biomass boilers and heat pumps and stakeholder consultation implies that installers in the region are unprepared for this increased demand.

Investors are increasingly looking at large PV arrays, known as PV farms. Recent moves to allow local authorities to receive payment from selling electricity have transformed the financial performance of medium to large municipal schemes – for example, a 2 MW local authority wind scheme that would previously have received an IRR of 3.6% will now achieve an IRR of around 10%. Tariffs are high enough to allow public bodies and housing associations, which can finance schemes relatively cheaply, to allow the electricity produced to be used free by tenants and still receive enough return from the tariff payments to make investment worthwhile. It should be noted that the attractiveness of such schemes may reduce after 2012, when the feed in tariff is likely to degress.

At commercial scale, the impact of such schemes, such as effect on visual amenity, must be carefully considered.

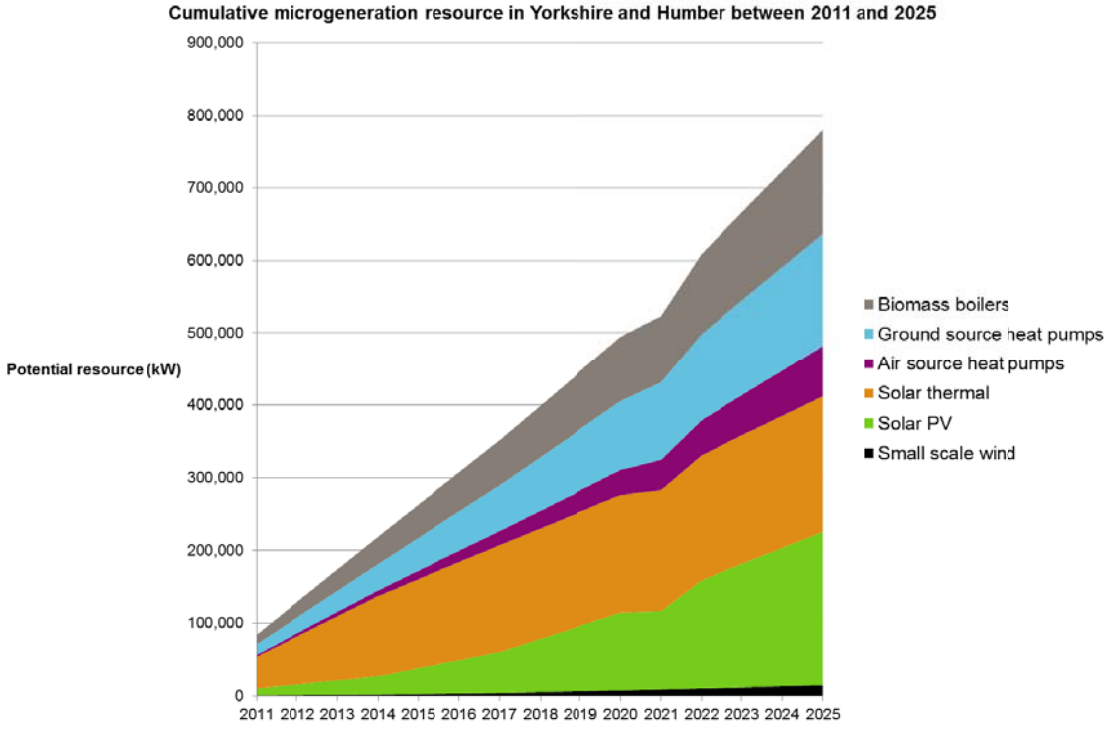

Figure 40 Cumulative microgeneration resource in Yorkshire and Humber between 2011 and 2025, in kW.

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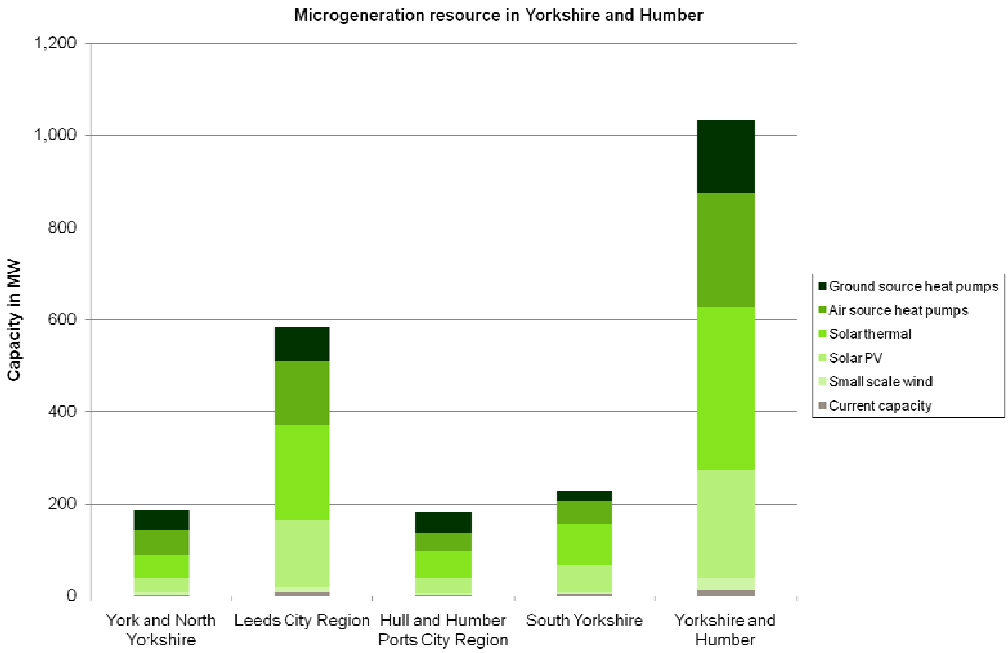

Figure 41 Microgeneration resource in Yorkshire and Humber, by sub region, in terms of potential MW. “Current” refers to facilities that are operational or have planning consent.

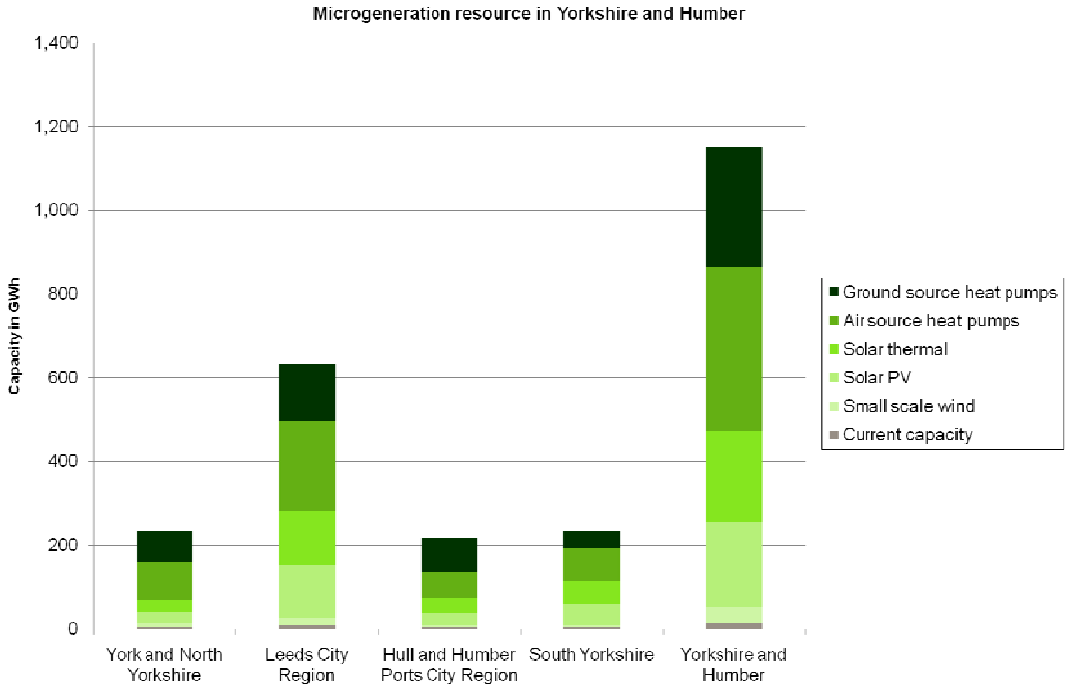

Figure 42 Microgeneration resource in Yorkshire and Humber, by sub region, in terms of annual energy generation in GWh. “Current” refers to facilities that are operational or have planning consent.

5.15 Energy Opportunities Plans

A set of Energy Opportunities Plans has been produced to act as spatial planning tools that will allow assessment and prioritisation of energy opportunities. They show the economically viable resource for those renewable energy technologies that are restricted by geographical constraints. They should assist in developing planning policies, targets and delivery mechanisms within the LDF process of local authorities, and can bring added benefit and support to regional and sub-regional strategy and policies and related corporate documents.

It should be emphasised that although the Energy Opportunities Plans provide an overview of potentially feasible technologies and systems within an area, they do not replace the need for site specific feasibility studies for proposed development sites.

The following information is shown on the Energy Opportunities Plans:

- Current fossil fuel power plants over 1MW (grey cross symbols).
- Current and proposed energy from waste plants over 1MW (black lightning bolt symbols).
- Current and proposed wind farms over 1MW (purple circle symbols).
- Current and proposed biomass plants over 1MW (brown asterisk symbols). Sites where biofuels could be produced are not shown as assessment of these are outside the scope of the study.
- Current landfill sites (orange triangle symbols).
- Current CHP plants over 1MW (yellow star symbols).
- Current district heating or communal heating networks (red star symbols).
- Areas of woodland that could provide biomass (dark green shading).
- Areas of existing energy crop schemes that could provide biomass (brown shading).
- Areas where commercial scale wind turbines could be economically viable (purple shading).
- Areas where commercial scale wind turbines could be economically viable, but the size and scale of turbines may be restricted due to landscape sensitivity or environmental sensitivity concerns (purple, hatched shading).
- Areas with potential for hydropower (blue diamond symbols).
- Areas where there is sufficient heat demand from existing buildings to justify establishing a district heating network with CHP that could be economically viable (red, orange shading).
- Possible heat anchor loads, including public sector assets, leisure centres, schools and hospitals (dark green dot symbols).

Scenarios for energy generation

6 Scenarios for energy generation

Given the uncertainties when considering the timeframe between now and 2025, a scenario approach has been used to illustrate potential outcomes for the renewable energy mix across the region.

The objective of the scenario modelling was to ascertain the contribution that Yorkshire and Humber could make towards achieving the UK's 2020 renewable energy target.

6.1 Targets for renewable energy generation

The UK Government is committed to achieving the UK's renewable energy target by 2020. This requires that 15% of energy consumption (i.e. electricity use plus energy used for heating and cooling plus energy used for transport) should be generated from renewable sources.[36] The UK Renewable Energy Strategy[37] anticipates that renewables will need to contribute around 30% of electricity supply and 12% of heating energy (section 4.2.1). Excluding transport energy, delivering the 15% target equates to 19% of the UK's non-transport energy demand being met by renewables by 2020.

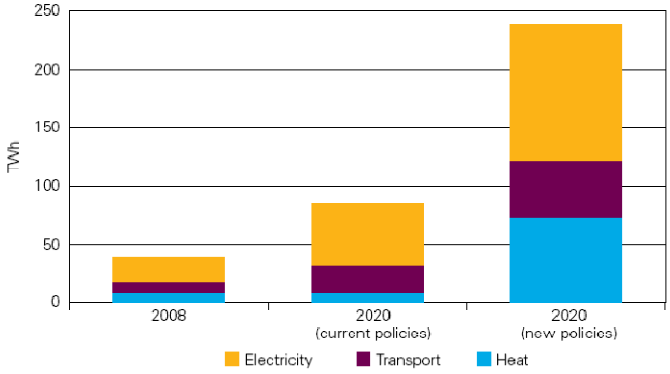

Figure 43 Potential scenario for the UK to reach 15% renewable energy by 2020 (Source: The UK Renewable Energy Strategy, DECC, July 2009)

6.2 Scenarios for energy demand

The first step was to build a picture of how energy demand might change in the region over the next 15-20 years. The DECC Pathways to 2050 study was used to examine the types of changes in energy demand that might be seen for three categories of end use, namely: lighting and appliances (domestic and commercial), industry and heating and cooling (domestic and commercial).[38] Trajectories were developed for the types of changes that might be seen in energy demand. These were designed to cover a broad range of possibilities but are illustrative and are not based on assumptions about future policy and its impacts.

Four energy demand scenarios were developed to represent baseline energy demand in the region in 2025. The modelling assumptions for each scenario are provided in Appendix A.6. The scenarios were as follows and are summarised Table 14.

1. Reference case. This represents the "Business as usual" situation. It assumes little or no attempt to decarbonise or change or only short run efforts; and that unproven low carbon technologies are not developed or deployed.
2. Ambitious but reasonable effort across all sectors to increase energy efficiency. This scenario describes what might be achieved by applying a level of effort that is likely to be viewed as ambitious but reasonable by most or all experts.
3. Very ambitious attempt to increase energy efficiency across all sectors. This describes what might be achieved by applying a very ambitious level of effort that is unlikely to happen without significant change from the current system. It assumes significant technological breakthroughs.
4. Large scale electrification of regulated energy use in the building sector.

Energy scenario	Heat demand (GWh/ yr)	Electricity demand (GWh/yr)	Total energy demand (GWh/yr)
1	84,088	36,727	122,514
2	47,490	34,403	107,311
3	48,858	30,234	103,576
4	32,344	37,371	107,481

Table 14 Projected energy demand (excluding transport) for Yorkshire and Humber in 2025 under each energy scenario.

[36] Directive 2009/28/EC of the European Parliament and of the Council on the promotion of the use of energy from renewable sources, April 2009

[37] The UK Renewable Energy Strategy, DECC, July 2009

[38] 2050 Pathways Analysis, DECC, July 2010

The total energy demand is slightly higher than the sum of the heat and electricity demand, because it includes use of solid and liquid hydrocarbons for uses other than heating, such as for lighting and appliances, and for industry.

For each scenario, the mix of renewables that could meet in the region of 10-20% of non-transport energy demand was assessed based on the available resource for the region. Although the deadline for the target is 2020, we have modelled the potential renewable energy proportion of energy demand in 2025, to fit with the time frames of local authority local development frameworks.

Four illustrative pathways were then developed showing the mix of renewables that could be used to meet the UK renewables targets by 2025. These are described below and shown in detail in appendix A.6.7. 'Successful' pathways are those that achieve the target.

A. Pathway A illustrates a pathway with largely balanced effort across all types of resource, based on physical and technical ambition. In this pathway, there would be a concerted effort to maintain a moderate uptake of all renewables as well as district heating.

B. Pathway B looks at what would happen if the region achieved a deployment level of A plus a greater uptake of the potential for commercial scale wind energy generation.

C. Pathway C looks at what would happen if the region achieved a deployment level of A plus a greater uptake of the potential for biomass energy generation (covering wood waste, straw, energy crops, biomass co-firing, and dedicated biomass power stations fuelled by imported biomass).

D. Pathway D looks at what would happen if the region achieved a deployment level of C, plus a greater uptake of heat from renewable CHP (from biomass and energy from waste), as well as microgeneration.

6.3 Effect of co-firing

The following co-firing limits have been applied to the coal power stations in the region, based on information received from operators and in forward plans (Table 15). This would result in 5,058 GWh energy generated annually from biomass co-firing. This is taken to be the maximum potential for biomass co-firing in the region, although the proportion of this maximum which is realised various depending on the four pathways modelled.

Power station	Installed capacity by 2025 (MW)	Co-firing limit
Drax	3750	12.5%
Eggborough	1960	10%
Ferrybridge "C"	961.5	5%

Table 15 Co-firing limits applied to Yorkshire and Humber coal power stations for scenario modelling.

6.4 Effect of offshore technologies

6.4.1 Offshore wind

In December 2007, the UK government set out its ambition to expand offshore wind capacity, with up to 25GW of new offshore wind capacity to be installed by 2020 in addition to the 8GW already proposed, [39]

We have assumed an "ambitious but reasonable" effort occurs to increase the uptake offshore wind (as defined in the DECC Pathways to 2050 report), resulting in approximately 30 GW of capacity installed by 2025. This has been scaled down to fit the Yorkshire and Humber using population ratios, to estimate that around 2,600 MW of the total installed offshore wind capacity could be allocated to the Yorkshire and Humber region by 2025.

6.4.2 Wave and tidal stream technologies

In early 2010 the Government announced a vision for the marine energy sector in the future, and set out the key steps both industry and the Government will need to take to achieve mainstream deployment of wave and tidal stream energy around the UK's coasts by 2020/2030.

We have assumed an "ambitious but reasonable" effort occurs to increase the uptake of wave and tidal stream technologies.. This has been scaled down to fit the Yorkshire and Humber using population ratios, to estimate that 8 MW of the UK's installed wave capacity and 2 MW of the installed tidal stream capacity by 2025 could be allocated to the Yorkshire and Humber region.

6.4.3 Tidal range technologies

Most of the exploitable, tidal range resource in the UK is located down the west coast, though there are possible sites on the east coast in the Wash and at the Thames Estuary. The largest single site is the Severn Estuary, which could, if harnessed, generate 5% of UK electricity demand. Plans for a

[39] UK Offshore Energy SEA - Scoping for Environmental Report, BERR, December 2007

Severn estuary barrage tidal energy project were scrapped in response to the conclusions of the Severn Tidal Power Feasibility Study[40].

We have assumed that either the Mersey or Solway scheme comes to fruition by 2020, representing 400MW of installed capacity and consequently around 12 MW of the installed tidal range generation capacity could be allocated to the Yorkshire and Humber region by 2025.

6.4.4 Summary of impact of offshore renewables on targets

If the potential contribution from offshore (and tidal barrage) renewables to the UK target is factored in, this means that the proportion of UK energy non-transport energy demand that has to be met from onshore renewable to meet the 2020 target will be less than 19%.

As mentioned above, the potential offshore resource for the UK, when applied pro-rata to the Yorkshire and Humber region, amounts to a total potential annual energy generation of just over 8,000GWh. This would amount to between 7-12% of the region's total non-transport energy demand by 2025, depending on which energy demand scenario is used. This means that, to be in-line with UK targets, the region would need to meet 12% of its non-transport energy demand from on-shore renewables, for energy demand scenario 1, and about 9% for energy demand scenarios 2 and 3.

[40] Severn Tidal Power Feasibility Study Conclusions and Summary Report, DECC, October 2010

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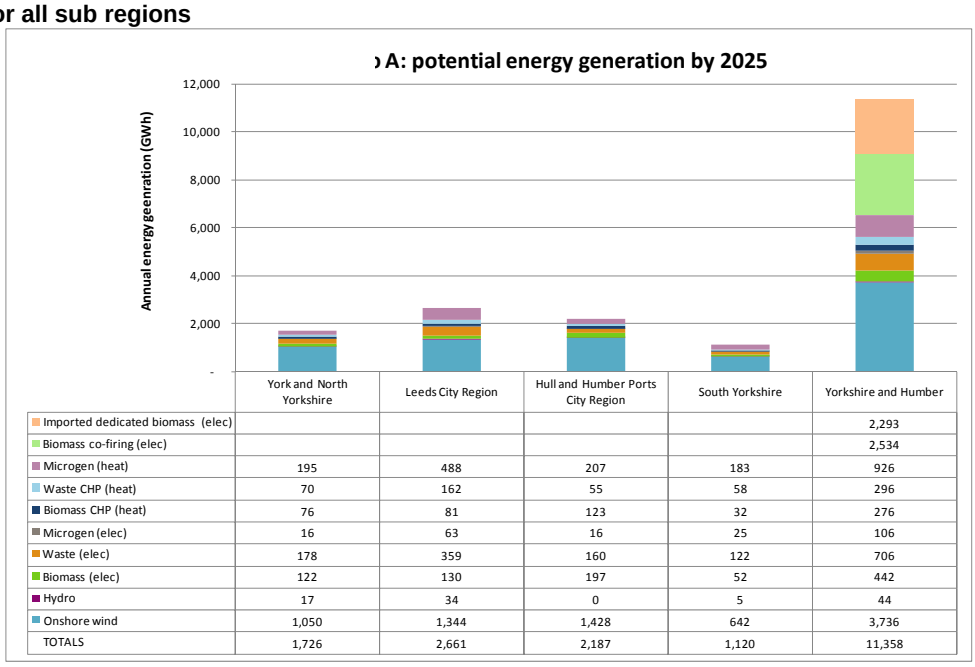
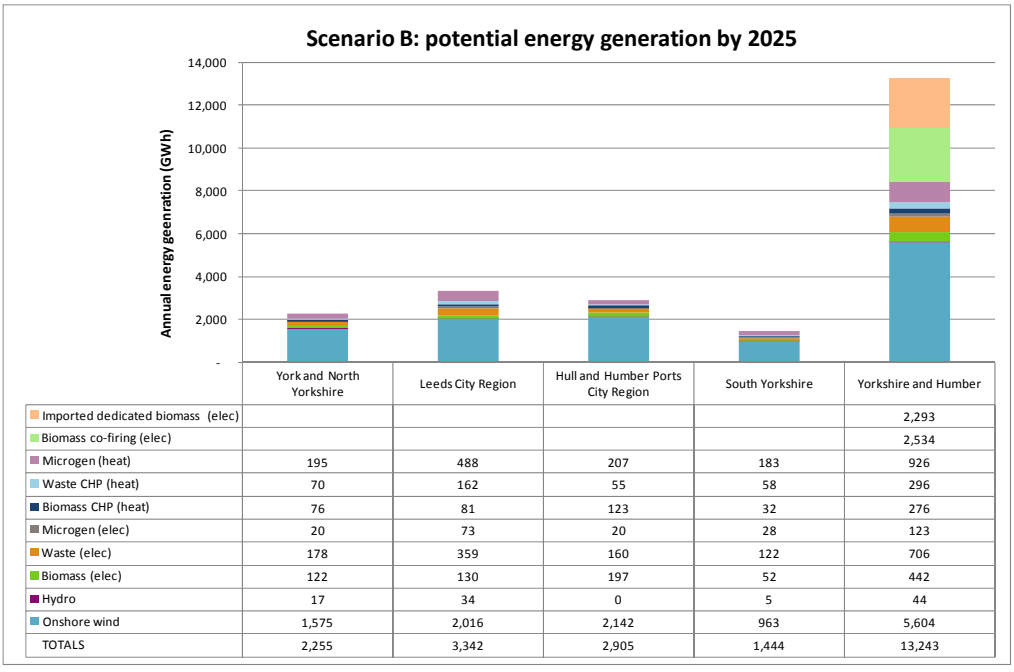
6.5 Results

6.5.1 Results for all sub regions



	York and North Yorkshire	Leeds City Region	Hull and Humber Ports City Region	South Yorkshire	Yorkshire and Humber
Imported dedicated biomass (elec)					2,293
Biomass co-firing (elec)					2,534
Microgen (heat)	195	488	207	183	926
Waste CHP (heat)	70	162	55	58	296
Biomass CHP (heat)	76	81	123	32	276
Microgen (elec)	16	63	16	25	106
Waste (elec)	178	359	160	122	706
Biomass (elec)	122	130	197	52	442
Hydro	17	34	0	5	44
Onshore wind	1,050	1,344	1,428	642	3,736
TOTALS	1,726	2,661	2,187	1,120	11,358

Figure 44 Effect on Yorkshire and Humber sub regions of scenario modelling of renewable energy Pathway A



	York and North Yorkshire	Leeds City Region	Hull and Humber Ports City Region	South Yorkshire	Yorkshire and Humber
Imported dedicated biomass (elec)					2,293
Biomass co-firing (elec)					2,534
Microgen (heat)	195	488	207	183	926
Waste CHP (heat)	70	162	55	58	296
Biomass CHP (heat)	76	81	123	32	276
Microgen (elec)	20	73	20	28	123
Waste (elec)	178	359	160	122	706
Biomass (elec)	122	130	197	52	442
Hydro	17	34	0	5	44
Onshore wind	1,575	2,016	2,142	963	5,604
TOTALS	2,255	3,342	2,905	1,444	13,243

Figure 45 Effect on Yorkshire and Humber sub regions of scenario modelling of renewable energy Pathway B

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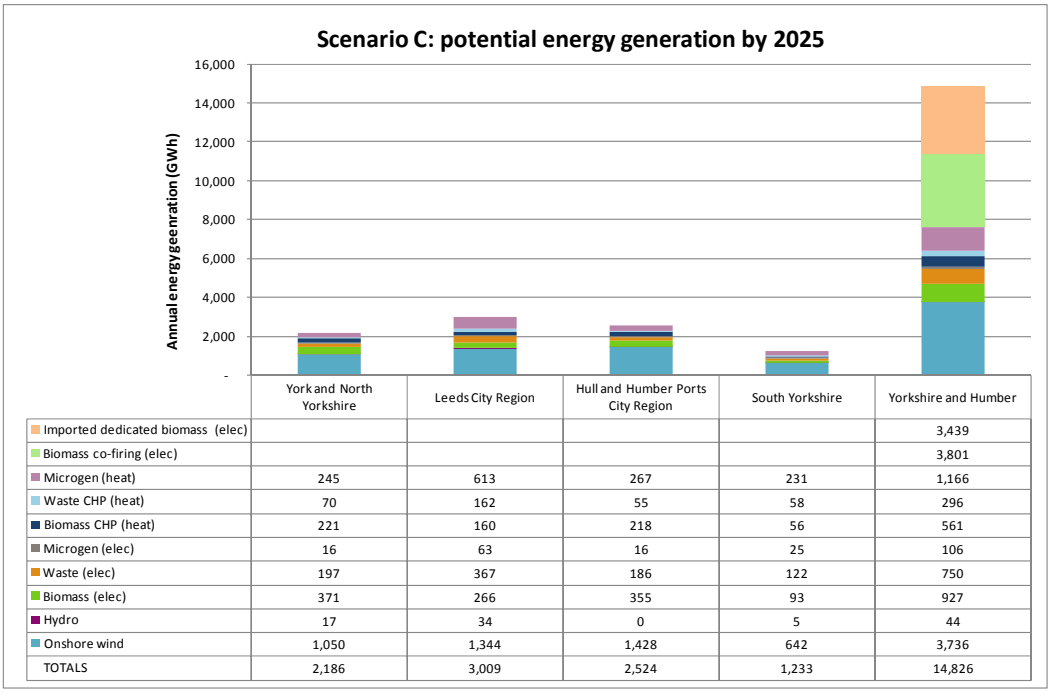
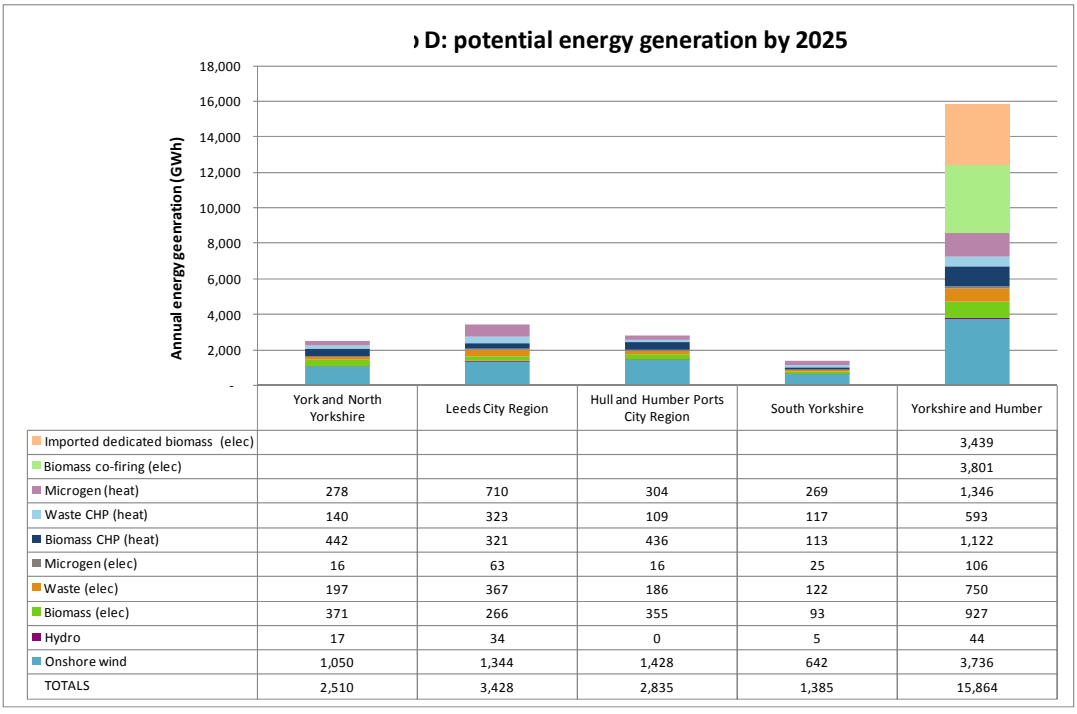


	York and North Yorkshire	Leeds City Region	Hull and Humber Ports City Region	South Yorkshire	Yorkshire and Humber
Imported dedicated biomass (elec)					3,439
Biomass co-firing (elec)					3,801
Microgen (heat)	245	613	267	231	1,166
Waste CHP (heat)	70	162	55	58	296
Biomass CHP (heat)	221	160	218	56	561
Microgen (elec)	16	63	16	25	106
Waste (elec)	197	367	186	122	750
Biomass (elec)	371	266	355	93	927
Hydro	17	34	0	5	44
Onshore wind	1,050	1,344	1,428	642	3,736
TOTALS	2,186	3,009	2,524	1,233	14,826

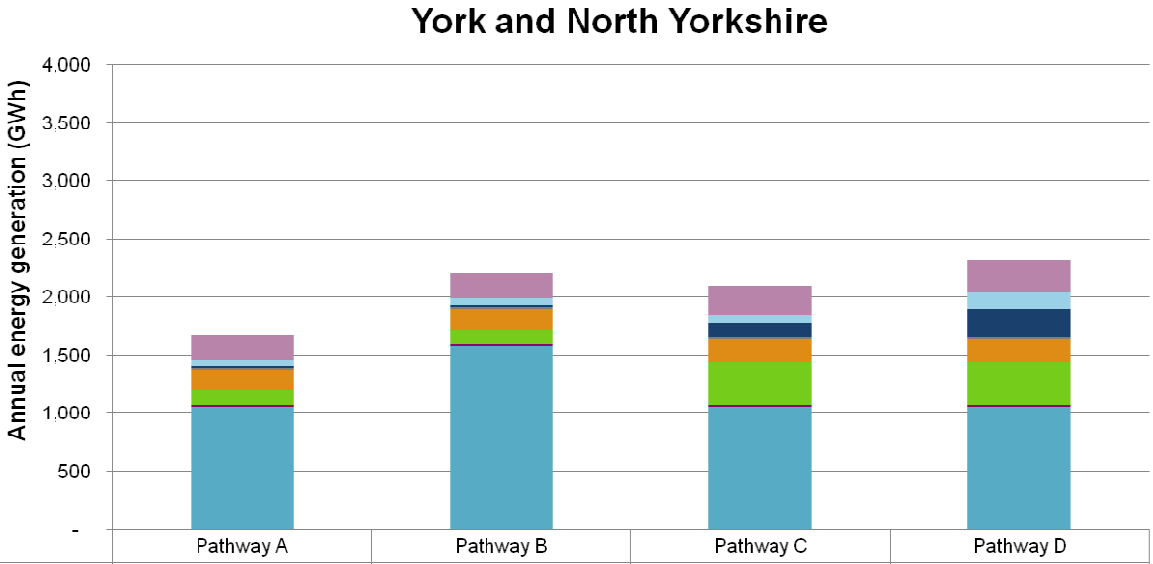
Figure 46 Effect on Yorkshire and Humber sub regions of scenario modelling of renewable energy Pathway C



	York and North Yorkshire	Leeds City Region	Hull and Humber Ports City Region	South Yorkshire	Yorkshire and Humber
Imported dedicated biomass (elec)					3,439
Biomass co-firing (elec)					3,801
Microgen (heat)	278	710	304	269	1,346
Waste CHP (heat)	140	323	109	117	593
Biomass CHP (heat)	442	321	436	113	1,122
Microgen (elec)	16	63	16	25	106
Waste (elec)	197	367	186	122	750
Biomass (elec)	371	266	355	93	927
Hydro	17	34	0	5	44
Onshore wind	1,050	1,344	1,428	642	3,736
TOTALS	2,510	3,428	2,835	1,385	15,864

Figure 47 Effect on Yorkshire and Humber sub regions of scenario modelling of renewable energy Pathway D

6.5.2 Results for the York and North Yorkshire sub-region



	Pathway A	Pathway B	Pathway C	Pathway D
Imported dedicated biomass (elec)	-	-	-	-
Biomass co-firing (elec)	-	-	-	-
Microgen (heat)	202	202	255	288
Waste CHP (heat)	70	70	70	140
Biomass CHP (heat)	10	10	122	243
Microgen (elec)	16	20	16	16
Waste (elec)	178	178	197	197
Biomass (elec)	122	122	371	371
Hydro	17	17	17	17
Onshore wind	1,050	1,575	1,050	1,050
TOTAL	1,666	2,195	2,097	2,322

Figure 48 Effect of scenario modelling of renewable energy pathways on York and North Yorkshire resource in 2025.

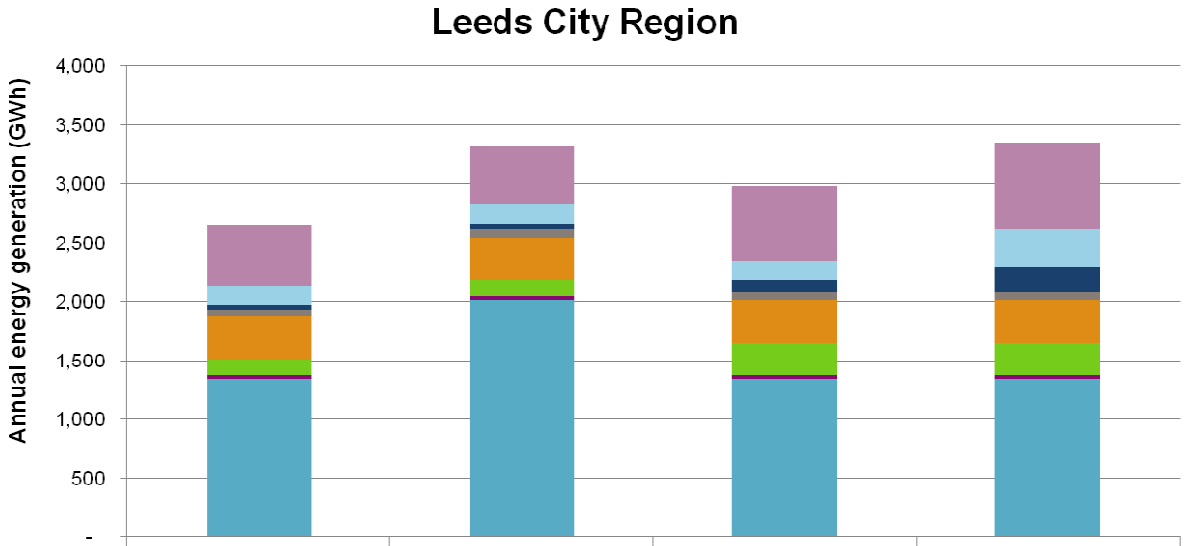
Energy scenario	Heat demand (GWh/ yr)	Electricity demand (GWh/yr)	Total energy demand (GWh/yr)
1	11,233	4,906	16,367
2	6,344	4,596	14,336
3	6,527	4,039	13,837
4	4,321	4,992	14,358

Table 16 Energy demand scenarios for York and North Yorkshire in 2025.

Figure 48 shows that the most successful pathways are D (effort to increase renewable heat uptake) followed by B (effort to increase commercial wind energy).

If it is assumed that offshore wind and marine technologies will contribute towards renewable energy targets, then all pathways are successful in achieving the resultant 12% generation target, except for the “equal effort” Pathway A under a “Business as usual” scenario. This implies that some level of energy efficiency is likely to be necessary to meet targets.

6.5.3 Results for Leeds city region



	Pathway A	Pathway B	Pathway C	Pathway D
Imported dedicated biomass (elec)	-	-	-	-
Biomass co-firing (elec)	-	-	-	-
Microgen (heat)	505	505	638	735
Waste CHP (heat)	162	162	162	323
Biomass CHP (heat)	46	46	107	214
Microgen (elec)	63	73	63	63
Waste (elec)	359	359	367	367
Biomass (elec)	130	130	266	266
Hydro	34	34	34	34
Onshore wind	1,344	2,016	1,344	1,344
TOTAL	2,642	3,323	2,981	3,346

Figure 49 Effect of scenario modelling of renewable energy pathways on Leeds City region resource in 2025.

Energy scenario	Heat demand (GWh/ yr)	Electricity demand (GWh/yr)	Total energy demand (GWh/yr)
1	38,311	16,733	55,818
2	21,637	15,674	48,892
3	22,260	13,775	47,190
4	14,736	17,026	48,969

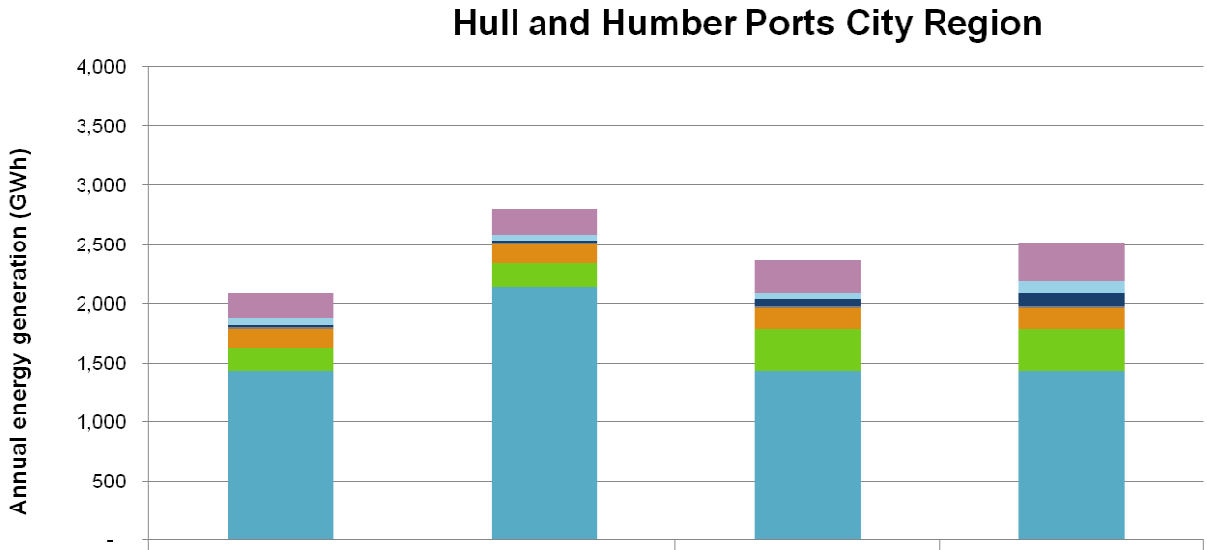
Table 17 Energy demand scenarios for the Leeds City region in 2025.

Due to the greater renewable energy resource in the Leeds City Region, all pathways are successful in achieving the 12% renewable energy target under all energy scenarios (including a contribution from offshore and marine technologies).

Heat generating microgeneration technologies are likely to be extremely important in achieving targets.

With a significant increase in energy efficiency (Energy Demand Scenario 3) and an effort to push onshore, commercial scale wind, the sub region could generate up to 24% of energy consumption from onshore renewable energy.

6.5.4 Results for the Hull and Humber Ports sub region



	Pathway A	Pathway B	Pathway C	Pathway D
Imported dedicated biomass (elec)	-	-	-	-
Biomass co-firing (elec)	-	-	-	-
Microgen (heat)	215	215	279	316
Waste CHP (heat)	55	55	55	109
Biomass CHP (heat)	11	11	49	98
Microgen (elec)	16	20	16	16
Waste (elec)	160	160	186	186
Biomass (elec)	197	197	355	355
Hydro	0	0	0	0
Onshore wind	1,428	2,142	1,428	1,428
TOTAL	2,083	2,800	2,367	2,509

Figure 50 Effect of scenario modelling of renewable energy pathways on Hull and Humber Ports resource in 2025.

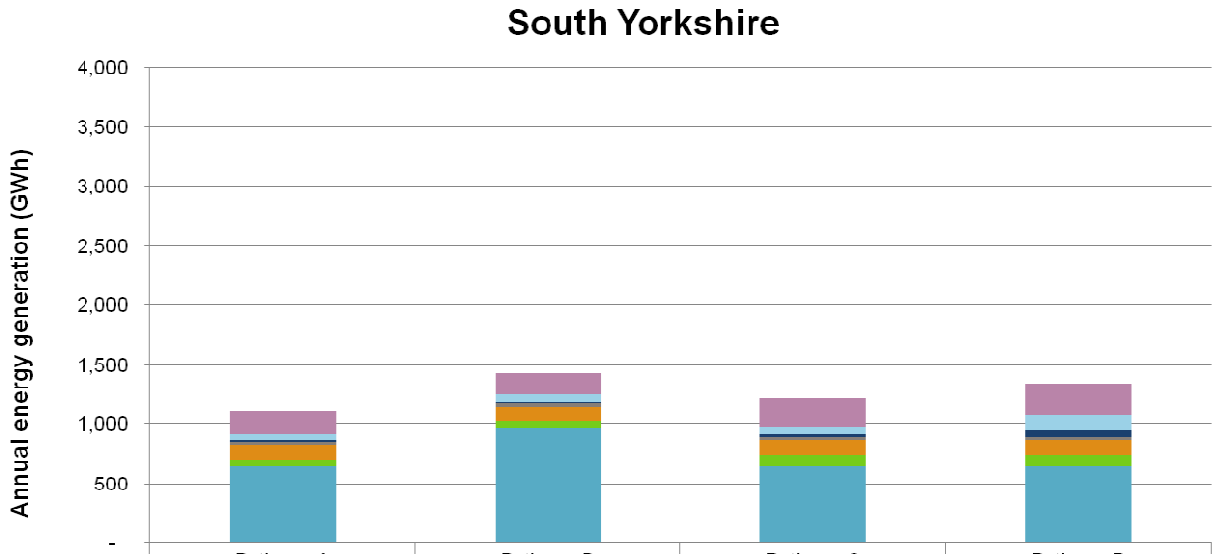
Energy scenario	Heat demand (GWh/ yr)	Electricity demand (GWh/yr)	Total energy demand (GWh/yr)
1	27,061	11,820	39,428
2	15,283	11,072	34,535
3	15,724	9,730	33,333
4	10,409	12,027	34,590

Table 18 Energy demand scenarios for the Hull and Humber Ports sub region in 2025.

Figure 50 shows that if it is assumed that offshore wind and marine technologies will contribute towards renewable energy targets, then all pathways are successful in achieving the resultant 12% generation target, although the “equal effort” Pathway A is only just successful under a “Business as usual” scenario. This implies that some level of energy efficiency is likely to be necessary to meet targets.

Commercial scale wind energy is likely to be extremely important in achieving targets.

6.5.5 Results for the South Yorkshire sub region



	Pathway A	Pathway B	Pathway C	Pathway D
Imported dedicated biomass (elec)	-	-	-	-
Biomass co-firing (elec)	-	-	-	-
Microgen (heat)	190	190	241	278
Waste CHP (heat)	58	58	58	117
Biomass CHP (heat)	16	16	32	63
Microgen (elec)	25	28	25	25
Waste (elec)	122	122	122	122
Biomass (elec)	52	52	93	93
Hydro	5	5	5	5
Onshore wind	642	963	642	642
TOTAL	1,110	1,434	1,218	1,345

Figure 51 Effect of scenario modelling of renewable energy pathways on South Yorkshire resource in 2025.

Energy scenario	Heat demand (GWh/ yr)	Electricity demand (GWh/yr)	Total energy demand (GWh/yr)
1	17,758	7,756	25,873
2	10,029	7,265	22,663
3	10,318	6,385	21,874
4	6,830	7,892	22,698

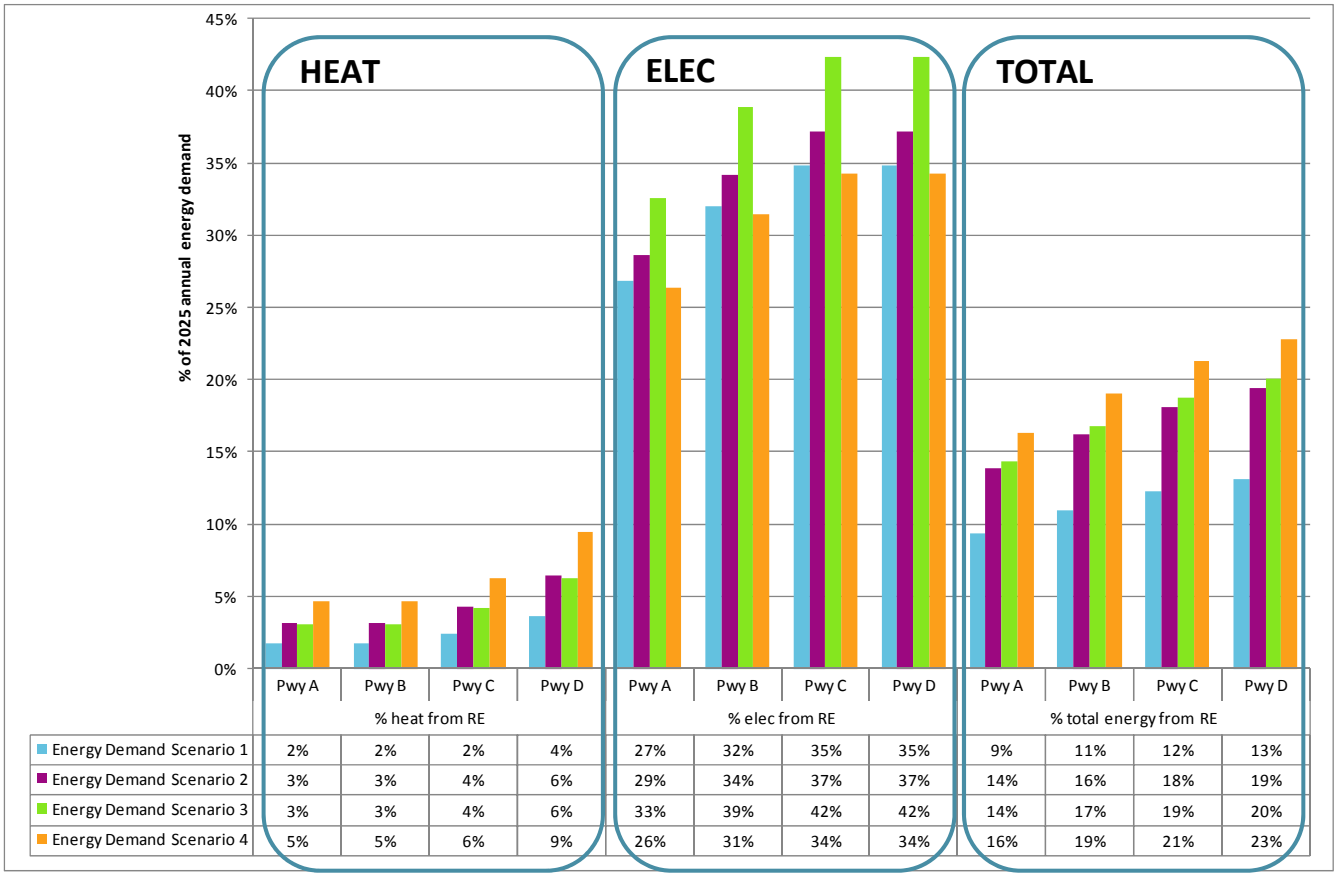
Table 19 Energy demand scenarios for the South Yorkshire sub region in 2025.

As the sub region with the lowest renewable energy resource, it will be extremely difficult for South Yorkshire to meet renewable energy targets.

Figure 51 suggests that none of the pathways will be successful in meeting targets, even with a dramatic increase in energy efficiency.

The results suggest that the sub region could achieve up to 10% of energy demand generated by onshore renewables. This could take place under Pathway B (high levels of onshore, commercial wind).

6.5.6 Overall results



	% heat from RE				% elec from RE				% total energy from RE			
	Pwy A	Pwy B	Pwy C	Pwy D	Pwy A	Pwy B	Pwy C	Pwy D	Pwy A	Pwy B	Pwy C	Pwy D
Energy Demand Scenario 1	2%	2%	2%	4%	27%	32%	35%	35%	9%	11%	12%	13%
Energy Demand Scenario 2	3%	3%	4%	6%	29%	34%	37%	37%	14%	16%	18%	19%
Energy Demand Scenario 3	3%	3%	4%	6%	33%	39%	42%	42%	14%	17%	19%	20%
Energy Demand Scenario 4	5%	5%	6%	9%	26%	31%	34%	34%	16%	19%	21%	23%

Figure 52 Options for achieving renewable energy targets in Yorkshire and Humber.

Figure 52 shows that in terms of renewable heat; all the pathways are unsuccessful. It is likely to be a major challenge for the region to generate 12% of its heat demand from renewable energy, as is thought to be necessary to meet UK renewable energy targets. The best performing pathway in terms of heat occurs under pathway D, which represents a major effort to deploy heating from microgeneration as well as securing heat from renewable CHP to meet domestic, commercial and industrial heat loads via heating networks.

In contrast, there are several pathways that could allow the region to meet 30% or more of electricity demand from renewable sources.

In terms of the overall UK renewable energy target, then, for energy demand scenario 1, only pathways C and D could meet the level of onshore deployment required (12%), after the offshore contribution is factored in. Under energy demand scenario 2, all of the pathways could deliver the required onshore deployment.

6.6 Conclusions from scenario modelling

The above analysis suggests that as part of a “no regrets” strategy, the region and sub regions should focus on the following approaches to help deliver their share of onshore renewable energy deployment:

- Actions to maximise energy reduction and efficiency, to move towards energy demand scenarios 2 or 3 rather than scenario 1
- Actions to facilitate the greater deployment of renewable heat, including from CHP, as well as maximising use of the biomass resource, as well as biomass co-firing.

Strategic barriers and opportunities

7 Strategic barriers and opportunities

Developing the knowledge and the understanding of the potential for renewable energy is only the first step in the process. Building from this understanding, a strategy needs to be developed to identify key partners and approaches to deliver the potential of the region.

This chapter describes the opportunities and barriers surrounding delivery of the renewable and low carbon energy opportunities identified in the Energy Opportunities Maps.

7.1 Delivering at the right scale

This study has considered the defined region of Yorkshire and Humber, and the four sub-regions within it. While the regional level no longer has a governmental role, there are a range of resources and a variety of collaboration that occurs at both a regional and sub-regional level.

The map shown in Figure 53 shows the four sub-regions within the Yorkshire and Humber regional boundary considered by this study. Sheffield City Region also includes local authority areas that are within the East Midlands regional area, and have not been considered specifically in this study. Sub-regions have unique environmental and economic characteristics as well as a level of coordination and partnership already in operation. Hence, sub-regions have the ability to both recognise their collective potential, but to share resources to deliver opportunities in priority areas.

Increasingly, local authorities and communities will take a central role in leading initiatives and installing renewable technologies. However, it is recommended that a number of actions are coordinated at a regional or sub-regional level, to ensure:

- Cross-boundary issues and opportunities for renewable energy are recognised, with a consistent approach being taken spatially where similarities exist across neighbouring authorities. For example, a consistent approach to cumulative effects of wind energy on landscape value would be valuable across the region.
- Policies and targets should be coordinated on a broad scale to ensure that the areas that show the greatest potential for renewable energy are supported through targeted local policy that builds from the evidence base.

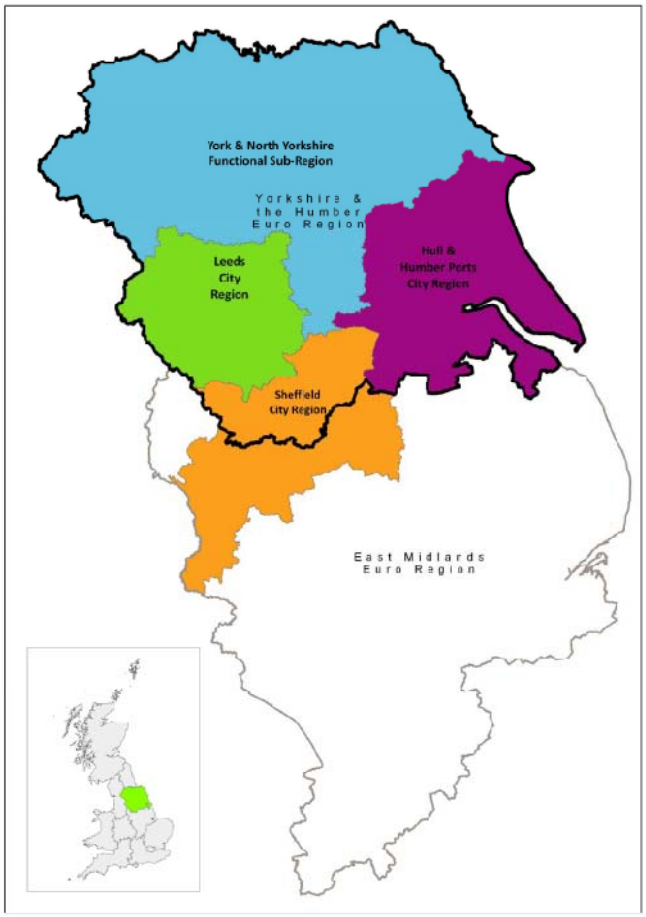


Figure 53 Location of the four functional sub-regions in Yorkshire and Humber

7.2 Delivery partners

It is clear that a collaborative and planned approach is necessary, with local targets complemented by spatial and infrastructure planning. Success will depend on coordination between planners, other local authority departments (including the corporate level), local strategic partners, local communities and various bodies who operate at a regional or national level.

There are a range of partners active in the Yorkshire and Humber region, and it will be important to harness these resources and partnerships to drive forward action and ensure activity is coordinated and cost-efficient. The table below includes a list of key partners and their current scale of operation.

Key Partner	Scale of Operation
21 Local Authorities in the region	Local
North York Moors, Yorkshire Dales and Peak District National Parks	Sub-Regional
Parish Councils and Neighbourhood Authorities	Local
Communities and Co-operatives	Local
Businesses	Local
Local Strategic Partnerships	Local
Private Sector Liaison Groups	Local
Local Enterprise Partnerships	Local / Sub-Regional
Housebuilders / Developers	Local / Sub-Regional / National
Energy Service Providers (ESCo) / Utility Providers	Local / Sub-Regional
Climate Change Skills Fund Facilitators	Regional
Yorkshire Forward	Regional
CO_2 Sense Yorkshire	Regional
Yorkshire & Humber Microgeneration Partnership	Regional
Energy Developers	National
Carbon Trust	National
Energy Saving Trust	National
Finance Institutions	National

Table 20 Key partners and their scale of operation

7.3 Strategic barriers

The following present strategic barriers to delivery of renewable energy in the region. These have been identified through consultation with local stakeholders.

1. *Limited resource* - The scenario modelling has shown that the onshore, economically viable renewable energy resource is limited in comparison to regional energy demand (section 6). Planning policy and delivery mechanisms can focus on driving uptake of on-site microgeneration as high as possible in new and existing buildings to supplement the region's limited off-site capacity, perhaps to standards beyond those required by the Building Regulations.
2. *Fatigue* – Some areas of the region have delivered relatively high levels of renewable energy in recent years, and there is a level of fatigue evident in both stakeholders and local communities in those areas feeling that they have contributed enough. It will be important to maintain local drive and enthusiasm but also to ensure delivery is in priority areas where the potential is the greatest.
3. *Political Opposition* – Related to the previous point, is the formation of significant levels of political opposition to some renewable energy technologies in areas of the region. Education and awareness activities will play an important role in changing views and creating a positive local reputation for renewable energy.
4. *Lack of Coordination* – While there has been a level of coordination from the regional level, with the abolishment of the RSS and the associated governance bodies, this coordination within and between sub-regions will need to be fostered through active local partnership.
5. *Protecting Natural Assets* – Yorkshire and Humber contains some very important landscape and biodiversity assets that will need to be protected from potential impacts associated with renewable energy infrastructure. A consistent approach is needed across the region to protecting key assets like the North York Moors and Yorkshire Dales National Parks, but also managing cumulative impacts on treasured rural landscapes.
6. *Technical Uncertainty* – Some renewable technologies are still in development, and hence there is a high level of risk and cost associated with their delivery. Partnerships in research and development in the region could aid trialling and confidence in emerging technologies.
7. *Biomass Fuel Supply* – While there are a number of biomass resources available in the region these need

to be coordinated, processed and supplied locally to ensure biomass can be substituted for fossil fuels as a low carbon fuel.

8. *Supporting Infrastructure* – Delivery of renewable energy also requires the distribution infrastructure to support it. There are constraints to grid capacity and connections in some areas of the region. The use of renewable heat technologies is also constrained through the lack of delivery of heat networks.

9. *Financial Barriers* – The high capital cost, low operational cost, nature of many renewable energy technologies means they require significant up-front capital investment. Securing sufficient finance can however be difficult, particularly for smaller sized schemes.

10. *Renewable energy targets* – Absence of targets in local, structure and unitary development plans mean there is no consequence for local authorities when renewable energy schemes are rejected.

11. *Viability Concerns* – While the RSS enforced a target of 10% renewable energy on new development sites, local authorities have expressed concern in raising local targets above that level due to possible impacts on viability in constrained housing markets. These viability concerns can be tested through analysis of suitable targets in a localised study, possibly at a housing market area scale. In the absence of local authority wide target for new development, specific targets can be set for strategic sites, where targets can be tested through a site-wide energy strategy.

12. *Mature LDF Development* – As shown in the diagram below (Figure 54), most authorities in the region have significantly progressed their Core Strategies towards adoption. Accordingly, the direct opportunity for the inclusion of progressive and consistent localised targets and policies for renewable energy may have passed in some cases. However, opportunities can be explored to include strong policies in LDFs still in Development Plan Documents and in Area Action Plans, Supplementary Planning Documents and development briefs.

13. *Housing targets* – Some of the opportunities for renewable energy generation will need be delivered in association with new development. The revocation of the RSS has introduced considerable uncertainty over the number of new homes that will come forward across the region. This will affect the opportunities for initiating community schemes through new development, or for increasing microgeneration capacity as a result of Building Regulations requirements.

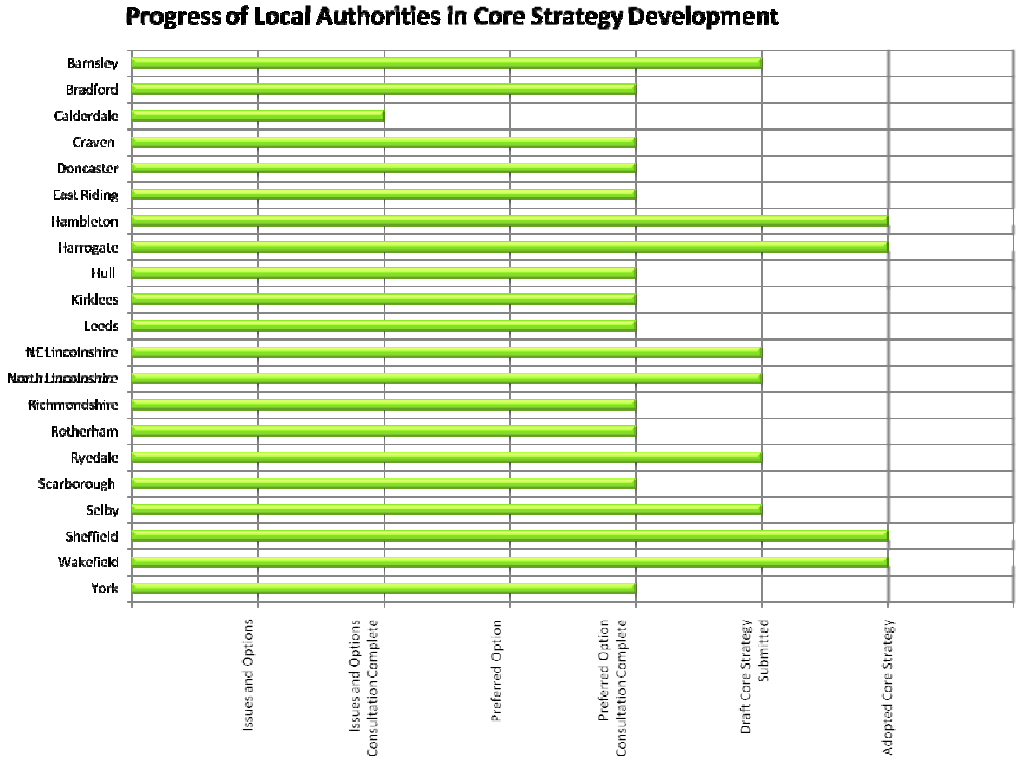


Figure 54 Relative progress in LDF development for local authorities in the Yorkshire and Humber region.

7.4 Strategic opportunities

The following present current opportunities for renewable and low carbon energy development in the Yorkshire and Humber region. These are overarching opportunities that should be coordinated and delivered across the region, with action being led at a sub-regional or local level.

1. *Experience with Technologies* – Across the region, there has been significant delivery of a variety of types of renewable energy on a large scale, including wind energy, hydro installations, district heating networks and biomass energy initiatives. The scale of delivery thus far gives the region a wealth of knowledge that will enable the region to keep delivering and to demonstrate that both technical and financial barriers can be overcome. There is a need utilise local experience and maintain region-wide networks that share knowledge and best practice.
2. *Variety and Security* – Compared to the installed capacity, Yorkshire and Humber as a region has a wealth of potential for renewable energy, and the options available are also varied in nature. With a mixture of both open rural land and dense urban centres, a range of technologies are deliverable in the area. This means that significant advances can be made in renewable energy delivery, with different partners concentrating on different priorities.
3. *Community Involvement* – Building on the localism agenda but also on the recent success of community cooperatives, local communities are becoming a key delivery partner for renewable energy. Community delivery guarantees that the economic benefits of renewable energy will be seen locally, and also helps to foster local support for renewable energy installations where the benefits are clear.
4. *Local Production* – Renewable energy delivery could also have significant local economic benefits, if production and supply chains can be created in the region. With guaranteed delivery, the region could

become a hub for production, simultaneously reducing the cost of renewables and providing local jobs and knowledge development.

5. *Redevelopment of Brownfield Land* – Integration of renewable energy as part of regeneration plans in existing areas should be encouraged and facilitated by planning authorities.

6. *Using Growth as a Driver* – Significant new development and housing growth is expected in parts of the region, with some of that growth being delivered as large urban extensions or new settlements which are of a scale that they can fund and drive significant installations of renewable energy. As carbon reduction requirements for new development become more challenging through proposed changes to Building Regulations, on-site renewable energy will become common-place. Larger developments may find it more cost-effective to invest in larger installations such as district heating or wind energy, and these initiatives can be used to drive wider decentralised schemes in the local area.

7. *Coordinating New Development Contributions* – New development will also begin to generate local funding for renewable energy schemes in the form of 'Allowable Solutions'. It will also be possible to utilise the Community Infrastructure Levy (CIL) to contribute towards local renewable energy schemes. It will be essential to develop a coordinated approach to allocating funding to priority projects. There may be opportunities to utilise sub-regional partnerships to identify and prioritise opportunities.

8. *Integrating Financial Support* – A number of new support mechanisms could have a decisive impact on commercial viability of many renewable energy projects. These include the Feed-In Tariff, Renewables Obligation, Renewable Heat Incentive, and a range of national capital grant programmes. Resources will be needed across the region to identify and coordinate funding bids.

9. *Revolving Renewable Energy Funds* – Kirklees Metropolitan Council already has a successful revolving renewable energy fund scheme in operation, which other local authorities in the area could use as a model. This provides seed-funding for renewable projects and then reinvests income into further schemes.

10. *ESCos and Local Delivery Vehicles* – Delivery can be greatly assisted through the establishment of a focussed delivery vehicle. These can be private delivery vehicles or Energy Service Companies (ESCOs) or there is an opportunities for Local Authorities or partners to set up a delivery vehicle. The skills needed to do this will likely need development, but this is not an insurmountable barrier. A growing number of local authorities are engaging in similar activities in energy as well as other areas. The key to success is likely to be leadership: from senior local authority management or, at least initially, from committed individuals in planning or other departments. Delivery vehicle models range from fully public, through partnerships between public, private and community sectors to fully private. In general, the greater the involvement of third parties, the lower the risk to the authority, but importantly, the less control the authority will have. Whichever model is chosen, putting the delivery vehicle in place as early as possible is important. This ensures that technical and financial requirements can be understood prior to negotiations with potential customers.

11. *Local Energy Planning* – A number of councils, including Harrogate, Kirklees, Calderdale, East Riding and Hull, have developed local energy planning studies where opportunities for renewable energy are strategically reviewed across a locality and potential projects have been identified. These planning exercises provide a locally focussed and more detailed examination of opportunities. This study forms a founding base with consistent information for more detailed local studies to build from.

12. *Local Targets and Policy* – Using this evidence base along with localised studies, local authorities should put in place core strategy policies that encourage deployment of suitable renewable energy installations. Targets and requirements can also be set for new development and strategic sites where delivery of levels of on-site renewable energy in excess of building regulations is deemed viable.

Capabilities on project:
Building Engineering - Sustainability

	Private Sector Led ESCo	Public Sector Led ESCo
Advantages	▪ Private sector capital ▪ Transfer of risk ▪ Commercial and technical expertise	▪ Lower interest rates on available capital can be secured through Prudential Borrowing ▪ Transfer of risk on a District heating network through construction contracts ▪ More control over strategic direction ▪ No profit needed ▪ Incremental expansion more likely ▪ Low set-up costs (internal accounting only)
Disadvantages	▪ Loss of control ▪ Most profit retained by private sector ▪ Incremental expansion more difficult ▪ High set-up costs	▪ Greater risk ▪ Less access to private capital and expertise, though expertise can be obtained through outsourcing and specific recruitment

Table 21 Advantages and disadvantages of ESCos and other delivery vehicle models

Action plans for delivery

8 Action plans for delivery

This chapter discusses the characteristics of each sub-region and provides an action plan for delivery of low carbon and renewable energy for each of the four functional sub regions in Yorkshire and Humber.

We have also reviewed the progress made on actions recommended in the SREATS study.

The action plans have been developed based on the results of the study and discussions with key stakeholders in a workshop environment.

8.1 Hull and Humber Ports sub-regional action plan

8.1.1 The potential of the sub-region

This subregion comprises of the local authorities of East Riding, Hull, North Lincolnshire and North East Lincolnshire. The most significant opportunities with respect to renewable energy are: imported biomass, wind, straw, energy crops, poultry litter, district heating networks, and renewable energy research and skill development.

This subregion has the highest wind potential in the region. East Riding has the highest potential for wind generation in the region, and there is also significant potential in North and North East Lincolnshire. East Riding already has four major wind projects in operation, with ten more that have planning consent and that are expected to become operational in the next few years. In the short to medium term there may be some issues around grid capacity in the Humber ports area. Issues in relation to visibility of wind farms to the Air Defence radar station at Staxton Wold may also constrain some of the potential wind resource in East Riding in the short to medium term, as may issues around cumulative visual and landscape impacts in certain parts of East Riding.

In terms of biomass, the subregion has the largest straw resource in the region. The straw can either be used for co-firing in coal fired power stations or in dedicated biomass power or CHP stations. This resource is beginning to be tapped, with three straw burning CHP facilities that have planning consent and the Drax straw pelleting facility in Goole.

The major ports on the Humber provide an opportunity for large scale power plants fuelled by imported biomass. There are several proposals for schemes of this type and if they came to fruition they could make a significant contribution to the region's renewable energy capacity. There is also an opportunity for some of these facilities to potentially supply heat to the large industrial heat loads on the south bank of the Humber.

This area also has the largest poultry litter resource in the region, concentrated in North Lincolnshire. This led to the development of the Glanford poultry litter power station in the mid-1990's.

District heating is possible in the majority of the sub-region's more urban settlements. As Hull and Humber's largest urban settlement, Hull's significant heat densities justify making it a priority area for district heating. Other urban areas with heat densities that could support a heat network include: Bridlington, Grimsby, Immingham, Cleethorpes, and Scunthorpe. The potential for each of these settlements to support district heating networks should be investigated further, together with the potential for co-location with any energy generation from biomass or waste.

Hull and Humber is unique in that it has the potential to establish an industry which supports renewable energy development. Hull is home to a biofuels research centre and the University of Hull, which is researching marine renewable energies. These two might represent catalysts in the development of a renewable energy research hub in the unitary authority. Immingham and Grimsby have the two largest ports in the UK, with the capacity and services to support offshore wind farms. Should these ports develop offshore wind support, skills training for these ports could evolve as an industry.

As the UK's largest inland port, the port of Goole could play a part with regards to the potential for shipping and development of renewables energy technologies.

Siemens has recently confirmed that a wind turbine manufacturing factory will be located in Hull, which could attract other manufacturers and investors to the sub-region.

8.1.2 Key actions for the sub-region

The following actions were developed with stakeholders during the studies. They prioritise key immediate actions for the sub-region in particular, but also include a consistent set of actions which are important for the region as a whole. Reference should also be given to the strategic barriers and opportunities discussed in chapter 7 to identify ongoing and long-term actions for the region as a whole.

Capabilities on project:
Building Engineering - Sustainability

Action	Key Partners
Develop local policies and targets to support renewable energy in the LDF, including policies for new development and strategic sites (including viability testing)	Local Authorities Local Enterprise Partnership
Educate communities, authorities and members about appropriate technologies for the sub-region	Climate Change Skills Fund Coordinators Independent organisation lead Energy Savings Trust Members Local Enterprise Partnerships Local Authorities
Develop skills in local communities and support mechanisms help communities deliver renewable energy schemes	Climate Change Skills Fund Coordinators Local Authorities Community Representatives Parish Councils
Investigate and integrate local manufacture and management of renewable energy technologies within local economic strategies	Local Enterprise Partnerships Local Authorities
Identify delivery vehicles, and the role and capacity of local authorities to assist in delivery	Local Authorities ESCos Community Cooperatives
Share local knowledge and skills through a coordinated forum	Climate Change Skills Fund Coordinators Local Authorities Sub-Regional Leads
Stimulate the development of regional biomass supply markets	Farmers Foresters Local Authorities Renewable Energy Industry
Identify a lead coordinator for activity in the sub-region, who can act as a promotional lead and also coordinate funding to local priorities	Local Authorities
Develop greater understanding of the relationship between renewable energy development and the sub-region's landscape character and natural environment	East Riding Council North Lincolnshire Council Northeast Lincolnshire Council
Conduct a District Heating Viability Study to prioritise and test feasibility of district heating	Hull Council

Capabilities on project:
Building Engineering - Sustainability

systems across Hull	
Identify opportunities on brownfield land for renewable energy installations in tandem with regeneration and redevelopment initiatives	Hull Council
Create demonstration schemes and tours for the region to overcome political opposition and foster enthusiasm	Members Local Authorities
Upgrade the electricity grid in the area to allow further renewable installations	Utilities
Create a research and development network in the Humber area to coordinate and foster local research and skill development	Humber Ports University of Hull
Work with local communities and members to emphasise the potential of the sub-region in delivering renewable energy in the region, particularly regarding wind energy	Climate Change Skills Fund Coordinators East Riding of Yorkshire Council North Lincolnshire Council

Capabilities on project:
Building Engineering - Sustainability

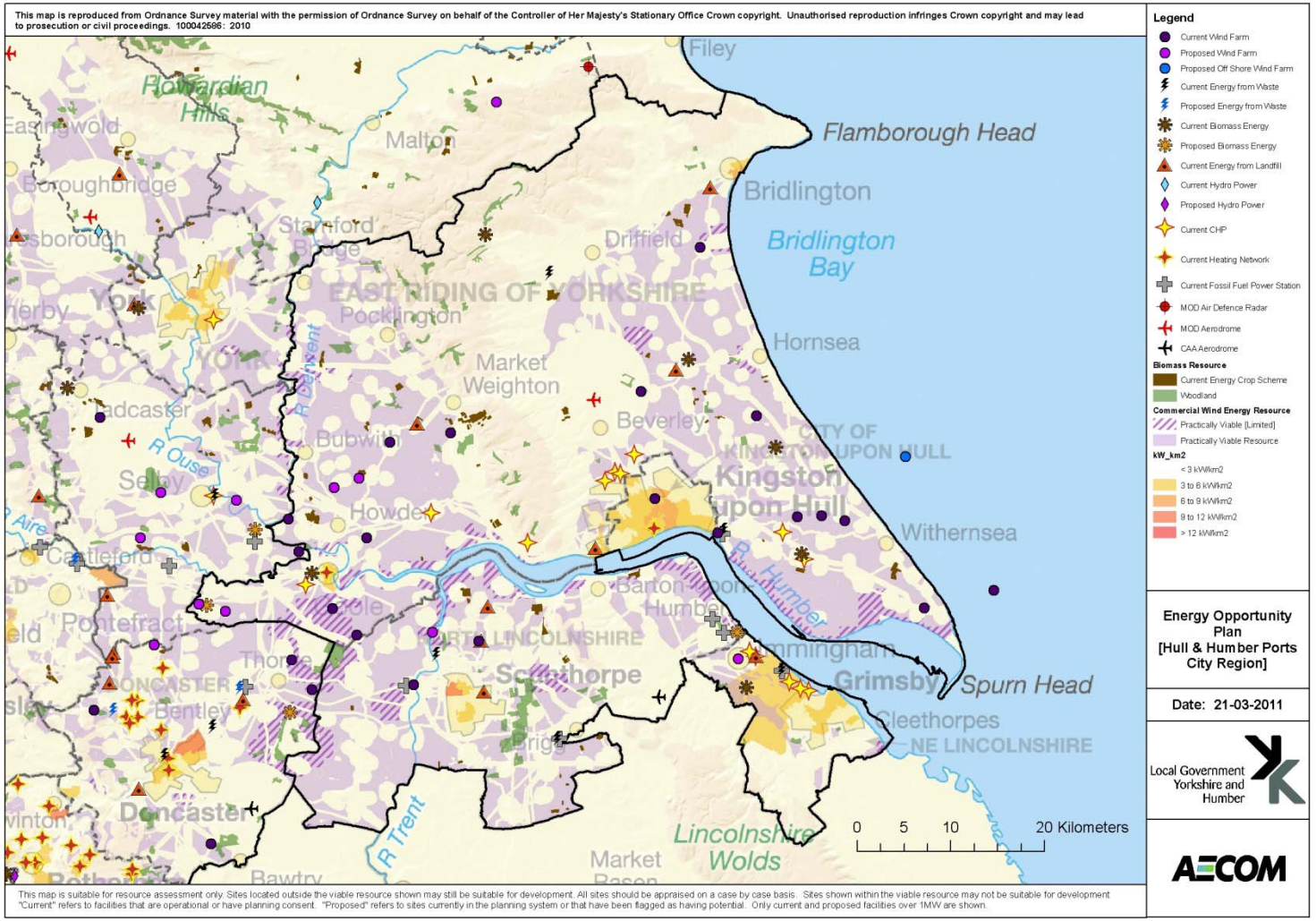


Figure 55 Energy Opportunities Plan for the Hull and Humber Ports sub region. “Current” refers to facilities that are operational or have planning consent. “Proposed” refers to facilities currently in the planning system or sites that have been flagged as having potential. Only current and proposed facilities over 1MW are shown. The areas with purple hatched shading described as “Practically viable [Limited]” represent areas where commercial scale wind energy development should be viable but the number of turbines may be restricted due to environmental constraints. Please refer to appendix A.7 for more details.

8.2 York and North Yorkshire sub-regional action plan

8.2.1 The potential of the sub-region

York and North Yorkshire is geographically the largest sub-region, but it also has some very significant landscape constraints, including the North York Moors and the Yorkshire Dales National Park.

Having said this, the study finds that there may be significant wind power potential in those areas of lower landscape sensitivity, particularly in Selby and Hambleton, although the presence of three RAF airbases in the latter may cause some local radar constraints.

The rural hinterland of the area has significant potential to produce biomass fuel, and significant biomass investment has already been seen in areas like Ryedale and Selby.

In terms of biomass, Selby hosts the Drax and Eggborough coal fired power stations, and therefore has significant renewable energy capacity and potential from biomass co-firing.

The area has the largest potential for growing energy crops in the region, and the second largest for straw. There are three operational biomass CHP facilities in the subregion, (in Ryedale and Selby) but to date the energy crops resource remains largely untapped. There are currently just under 900ha of energy crops being grown, but the potential for almost 39,000 ha, without any conflict with food production. This crop could be used either for biomass co-firing, or for dedicated biomass energy plants.

The sub region has a significant potential resource for energy generation from the anaerobic digestion of animal wastes from the large numbers of livestock kept in the rural areas. However, the economics for using this resource are not currently favourable.

The sub region also has significant potential for energy recovery from MSW, if the proposals for the Allerton Waste Recovery Centre in Harrogate District go ahead.

Some urban areas in the sub-region have load densities suitable for the installation of district heating networks. Some centres including York, Harrogate and Scarborough have small district heating networks in place, and there is the potential to expand these and connect existing properties in the area.

8.2.2 Key actions for the sub-region

The following actions were developed with stakeholders during the studies. They prioritise key immediate actions for the sub-region in particular, but also include a consistent set of actions which are important for the region as a whole. Reference should also be given to the strategic barriers and opportunities discussed in chapter 7 to identify ongoing and long-term actions for the region as a whole.

Action	Key Partners
Develop local policies and targets to support renewable energy in the LDF, including policies for new development and strategic sites (including viability testing)	Local Authorities Local Enterprise Partnership Yorkshire Dales National Park Authority
Educate communities, authorities and members about appropriate technologies for the sub-region	Climate Change Skills Fund Coordinators Independent organisation lead Energy Saving Trust Members Local Enterprise Partnerships Local Authorities Yorkshire Dales National Park Authority
Develop skills in local communities and support mechanisms help communities deliver renewable energy schemes	Climate Change Skills Fund Coordinators Local Authorities

Capabilities on project:
Building Engineering - Sustainability

	Community Representatives Parish Councils Yorkshire Dales National Park Authority
Investigate and integrate local manufacture and management of renewable energy technologies within local economic strategies	Local Enterprise Partnerships Local Authorities
Identify delivery vehicles, and the role and capacity of local authorities to assist in delivery	Local Authorities ESCos Community Cooperatives
Share local knowledge and skills through a coordinated forum	Local Authorities Sub-Regional Leads
Stimulate the development of regional biomass supply markets	Farmers Foresters Local Authorities Renewable Energy Industry
Identify a lead coordinator for activity in the sub-region, who can act as a promotional lead and also coordinate funding to local priorities	Local Authorities
Develop greater understanding of the relationship between renewable energy development and the sub-region's landscape character and natural environment	North Moors National Park Yorkshire Dales National Park Local Authorities, particularly rural authorities
Conduct a District Heating Viability Study to prioritise and test feasibility of district heating systems in York, Selby, Harrogate and Scarborough	York Council Selby Council Harrogate Council Scarborough Council
Identify opportunities on brownfield land for renewable energy installations in tandem with regeneration and redevelopment initiatives	York Council Selby Council Harrogate Council Scarborough Council
Training for officers, members and statutory consultees on technologies	Climate Change Skills Fund Coordinators Statutory consultees Local Authorities
Establish a sub-regional mechanism to share knowledge across Local Authorities	Local Authorities

Capabilities on project:
Building Engineering - Sustainability

	County Council Climate Change Skills Fund Coordinator
Engage with private woodland owners in the area to facilitate biomass management	Woodland Trust County Council Local Authorities Forestry Commission Yorkshire Dales National Park Authority
Establish a ‘go-to’ body for the sub-region that provides renewable energy advice and expertise	Climate Change Skills Fund Coordinators Yorkshire Micro-generation Partnership Energy Savings Trust Local Authorities

Capabilities on project:
Building Engineering - Sustainability

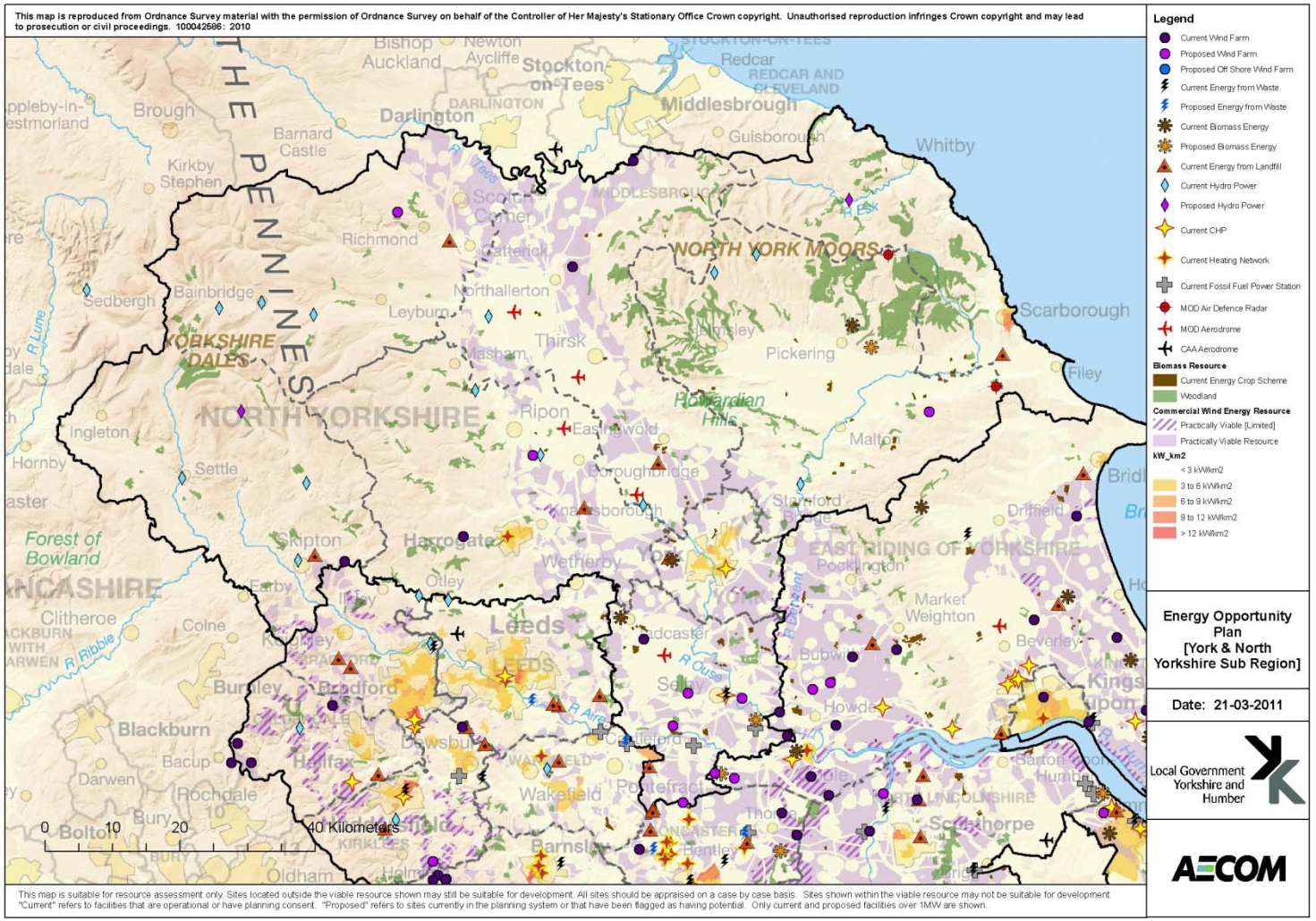


Figure 56 Energy Opportunities Plan for the York and North Yorkshire sub region. “Current” refers to facilities that are operational or have planning consent. “Proposed” refers to facilities currently in the planning system or sites that have been flagged as having potential. Only current and proposed facilities over 1MW are shown. The areas with purple hatched shading described as “Practically viable [Limited]” represent areas where commercial scale wind energy development should be viable but the number of turbines may be restricted due to environmental constraints. Please refer to appendix A.7 for more details.

8.3 Leeds City sub-regional action plan

8.3.1 The potential of the sub-region

Leeds City Region is a sub-region with diverse opportunities for renewable energy. It is made up of Bradford, Leeds, Calderdale, Kirklees, and Wakefield, but in addition includes Selby, York, Harrogate and Craven, which also form part of the York and North Yorkshire sub region, and Barnsley, which forms part of the South Yorkshire sub region.

The sub-region has many urban settlements, and the majority of them have heat densities that meet the required threshold to support a district heating network. The towns of York, Selby, Huddersfield, Halifax, and Bradford each show a significant potential to support one. Barnsley Council has taken the initiative to connect their buildings to a biomass heating scheme, and to source their biomass locally. District heating networks already operating in the sub-region include one in each of Harrogate, Leeds, and Wakefield. These towns represent the urban settlements with the greatest potential; however, there are a number of other opportunities in the sub-region.

Leeds City Region also has a number of biomass energy schemes. There is existing and future potential for biomass co-firing in the coal fired power stations of Drax and Eggborough in Selby, and Ferrybridge in Wakefield. At the time of writing there is also a proposal for a 290MW_e dedicated biomass facility at Drax, to be fuelled by imported biomass.

The other key opportunity in the Leeds City Region is wind power. Although the largest resource is in Selby, wind opportunities are scattered throughout the sub-region, with eight wind projects in operation, and another three that have planning consent.

The sub region also has significant potential for energy recovery from MSW, if the proposals for the Allerton Waste Recovery Centre in Harrogate District go ahead. Leeds also has plans for an energy recovery facility to deal with residual MSW. The latter may present an opportunity for supplying heat from such a facility into a district heating network, as is the case in Sheffield. There are also proposals for facilities to take residual C&I waste, at the Ferrybridge site in Wakefield and at Skelton Grange in Leeds. Again, if these schemes were to reach fruition, they may also present an opportunity for low carbon district heating.

8.3.2 Key actions for the sub-region

The following actions were developed with stakeholders during the studies. They prioritise key immediate actions for the sub-region in particular, but also include a consistent set of actions which are important for the region as a whole. Reference should also be given to the strategic barriers and opportunities discussed in chapter 7 to identify ongoing and long-term actions for the region as a whole.

Action	Key Partners
Develop local policies and targets to support renewable energy in the LDF, including policies for new development and strategic sites (including viability testing)	Local Authorities Local Enterprise Partnership
Educate communities, authorities and members about appropriate technologies for the sub-region	Independent organisation lead Energy Savings Trust Members Local Enterprise Partnerships Local Authorities
Develop skills in local communities and support mechanisms help communities deliver renewable energy schemes	Climate Change Skills Fund Coordinators Local Authorities Community Representatives Parish Councils

Capabilities on project:
Building Engineering - Sustainability

Investigate and integrate local manufacture and management of renewable energy technologies within local economic strategies	Local Enterprise Partnerships Local Authorities
Identify delivery vehicles, and the role and capacity of local authorities to assist in delivery	Local Authorities ESCos Community Cooperatives
Share local knowledge and skills through a coordinated forum	Local Authorities Sub-Regional Leads
Stimulate the development of regional biomass supply markets	Farmers Foresters Local Authorities Renewable Energy Industry
Identify a lead coordinator for activity in the sub-region, who can act as a promotional lead and also coordinate funding to local priorities	Local Authorities
Adopt renewables targets for Leeds City Region to give consistency across the area	Local Authorities
Conduct a District Heating Viability Study for the Sub-region	Local Authorities
Identify opportunities on brownfield land for renewable energy installations in tandem with regeneration and redevelopment initiatives	Local Authorities
Develop the Capital and Asset Pathfinder to have a low carbon focus	Public Sector
Use eco-developments as exemplars	Developers Local Authorities
Develop some publically visible projects in an urban context, e.g. renewable street lighting. Engage and promote with members	Members Local Authorities
Coordinate and promote energy efficiency measures across the sub-region	Energy Savings Trust
Integrate renewable energy initiatives with carbon initiatives within the transport strategy	Leeds Institute for Transport Studies Yorkshire Forward

Capabilities on project:
Building Engineering - Sustainability

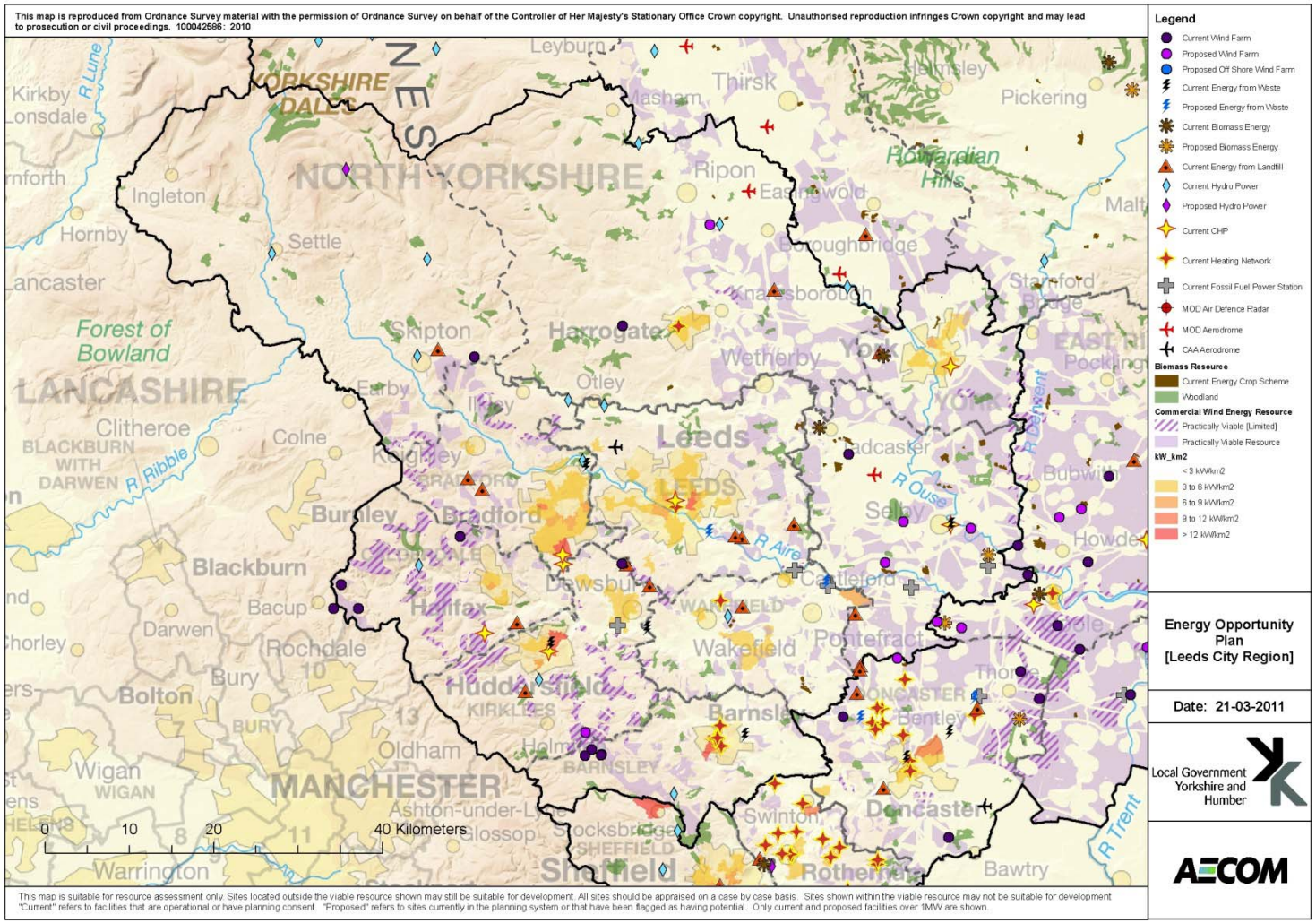


Figure 57 Energy Opportunities Plan for the Leeds City sub region. “Current” refers to facilities that are operational or have planning consent. “Proposed” refers to facilities currently in the planning system or sites that have been flagged as having potential. Only current and proposed facilities over 1MW are shown. The areas with purple hatched shading described as “Practically viable [Limited]” represent areas where commercial scale wind energy development should be viable but the number of turbines may be restricted due to environmental constraints. Please refer to appendix A.7 for more details.

8.4 South Yorkshire sub-regional action plan

8.4.1 The potential of the sub-region

South Yorkshire is the smallest sub-region, in terms of geographical area, in Yorkshire and Humber. It consists of the four local authorities areas of Sheffield, Doncaster, Barnsley and Rotherham. The greatest constraint for the South Yorkshire sub-region, in terms of renewable energy, is the Peak District National Park, which covers much of Sheffield Borough's land area.

The local authorities in South Yorkshire also form part of the Sheffield City Region, along with Chesterfield, Derbyshire Dales, North East Derbyshire, Bolsover and Bassetlaw in the East Midlands region. This suggests that cross-boundary collaboration will be particularly important for the Sheffield City Region. Identification of possible heat networks and prioritisation of funding across the City Region will be crucial to pool resources and ensure delivery opportunities are taken. The hinterland around Sheffield will also play a key supporting role to district heating networks and biomass energy use. The areas south of Sheffield, located in the East Midlands Region, have a high coverage of woodland which may be a possible source of local biomass fuel. Local authorities and industry groups in the region should work together to develop local supply chains of biomass from forestry management. The areas bordering the Peak District should also take a coordinated approach to wind development policy, seeking consistency in assessment processes surrounding landscape value considerations.

Despite the limited geographical area, it has considerable potential for renewable energy from wind power, and from energy from waste, including food waste and municipal and industrial general waste.

In terms of wind power, Doncaster has the second largest potential in the region, and there is also a significant resource in Rotherham and Barnsley. The sub region already has six operational wind schemes with a further five schemes that have planning consent, including the 65MW_e Tween Bridge wind farm in Doncaster.

The area also has the most district heating networks in the greater region. In Sheffield, there is the city heat network fed from the energy from waste facility. Rotherham has sixteen community heating schemes in operation, where residential blocks are served from central boilers. Doncaster has one district heating network and other communal schemes, another opportunity exists on the border with Rotherham. This represents an opportunity for Doncaster and Rotherham to work together in expanding the sub-regional heat network. In Barnsley, the Council has taken the initiative to connect their buildings to a biomass heating scheme, and to source their biomass locally.

There is also the potential for energy generation from waste wood. There is a planning consent for a 25MW_e facility at Blackburn Meadows, in Sheffield, and if built, there is the potential for that to also supply heat to neighbouring commercial and industrial businesses.

In terms of energy from waste, the area already has the Sheffield energy recovery facility, which takes MSW as its feedstock. There is also considerable potential for energy from C&I waste in the area, with a planning consent in place for an energy recovery facility at Kirk Sandhall in Doncaster, as well as proposals for a large scale facility adjacent to Hatfield colliery. There is a potential opportunity for these new energy recovery facilities to also supply low carbon heat for heating networks, or for industrial uses.

There is a 2MW_e AD facility under construction in Doncaster which will take retail food waste.

Finally, the South Yorkshire councils of Doncaster, Barnsley and Rotherham are proposing to transform the area through an "Eco-Vision" with the aim of making it the lowest carbon community of its type in the UK within a decade. The plans involve building energy-efficient homes, encouraging new green businesses into the area, enhancement of the natural environment and improving public transport. The Energy Opportunities Plan should prove a resource for delivering this vision.

8.4.2 Key actions for the sub-region

The following actions were developed with stakeholders during the studies. They prioritise key immediate actions for the sub-region in particular, but also include a consistent set of actions which are important for the region as a whole. Reference should also be given to the strategic barriers and opportunities discussed in chapter 7 to identify ongoing and long-term actions for the region as a whole.

Capabilities on project:
Building Engineering - Sustainability

Action	Key Partners
Develop local policies and targets to support renewable energy in the LDF, including policies for new development and strategic sites (including viability testing)	Local Authorities Local Enterprise Partnership
Develop greater understanding of the relationship between renewable energy development and the sub-region's landscape character and natural environment. This is mainly in relationship to Doncaster and Sheffield, with respect to the Peak District National Park, Thorne and Hadfield Moor, European Site designations and other SSSI in the sub area.	Local Authorities Sub-Regional Leads
Educate communities, authorities and members about appropriate technologies for the sub-region	Independent organisation lead Energy Savings Trust Members Local Enterprise Partnerships Local Authorities
Develop skills in local communities and support mechanisms help communities deliver renewable energy schemes	Climate Change Skills Fund Coordinators Local Authorities Community Representatives Parish Councils
Investigate and integrate local manufacture and management of renewable energy technologies within local economic strategies	Local Enterprise Partnerships Local Authorities
Identify delivery vehicles, and the role and capacity of local authorities to assist in delivery	Local Authorities ESCos Community Cooperatives
Share local knowledge and skills through a coordinated forum	Local Authorities Sub-Regional Leads
Stimulate the development of regional biomass supply markets	Farmers, foresters Local Authorities Renewable Energy Industry
Identify a lead coordinator for activity in the sub-region, who can act as a promotional lead and also coordinate funding to local priorities	Local Authorities
Coordinate with the emerging East Midlands Renewable Potential Study to develop priorities for the sub-region	Local Authorities
Conduct a District Heating Viability Study for the Sub-region to prioritise action and link existing systems	Local Authorities

Capabilities on project:
Building Engineering - Sustainability

Identify opportunities on brownfield land for renewable energy installations in tandem with regeneration and redevelopment initiatives	Local Authorities
Undertake feasibility study for power station and district heating in Doncaster	Doncaster Council
Viability study of Barnsley biomass district heating proposal (which includes Town Hall, Library, Westgate Plaza 1 and 2)	Barnsley Council
Determine if there is potential for co-firing at proposed Algreave/Waverline power station in Rotherham	Rotherham Council
Educate communities and authorities about appropriate technologies and set up skills development programs	Local Authorities

Capabilities on project:
Building Engineering - Sustainability

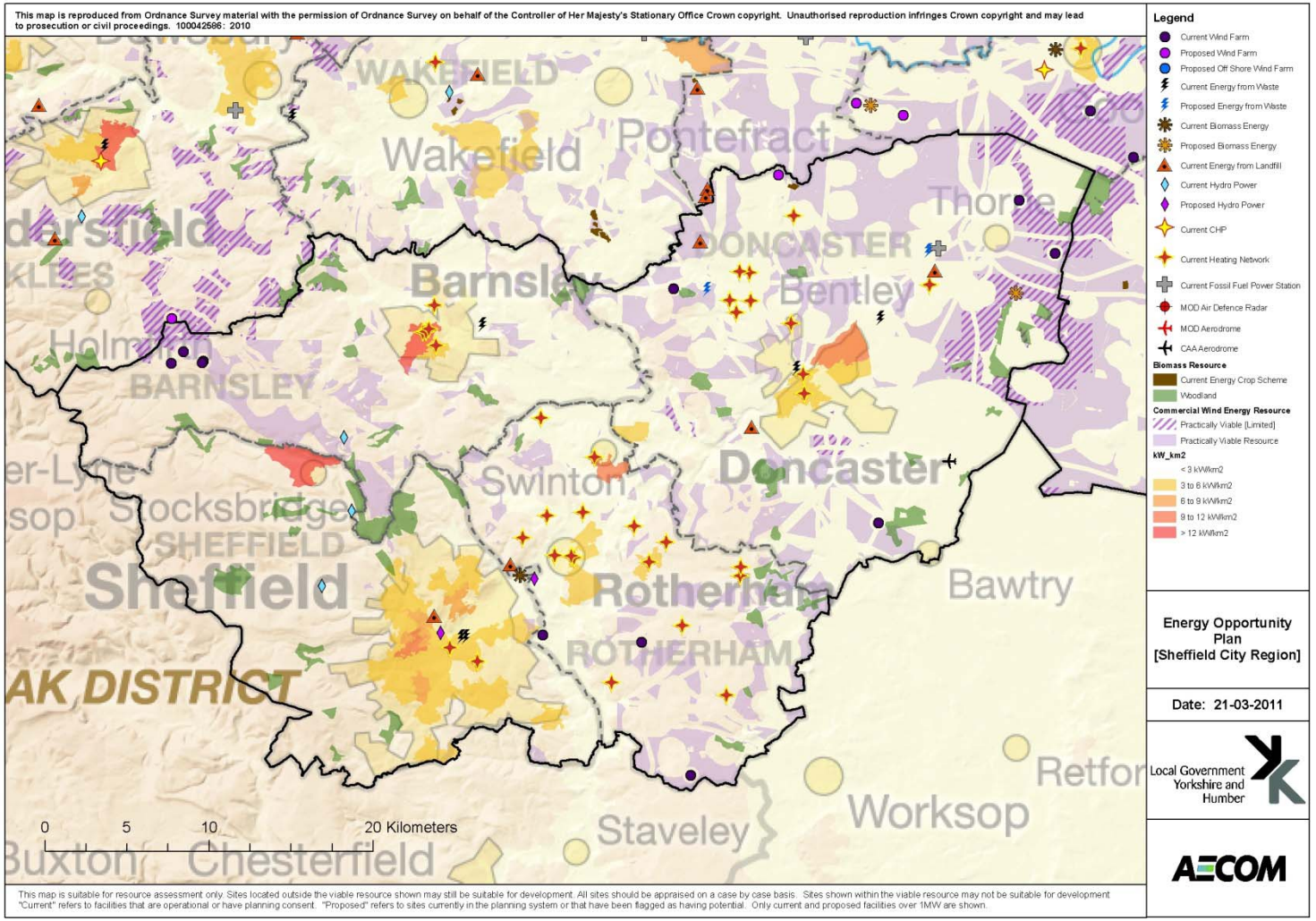


Figure 58 Energy Opportunities Plan for the South Yorkshire sub region. “Current” refers to facilities that are operational or have planning consent. “Proposed” refers to facilities currently in the planning system or sites that have been flagged as having potential. Only current and proposed facilities over 1MW are shown. The areas with purple hatched shading described as “Practically viable [Limited]” represent areas where commercial scale wind energy development should be viable but the number of turbines may be restricted due to environmental constraints. Please refer to appendix A.7 for more details.

Capabilities on project:
Building Engineering - Sustainability

8.5 Review of previous actions

The most recent assessment of the renewable energy resource, SREATS, described a set of actions proposed by stakeholders.

	Action	Description	Who responsible	Timescale	Outcome	Indicators of success	Status of actions
A	Publish summary of current report for wide distribution	The current study has taken the target-setting agenda further forward but has not completed it. A brief summary of the work, coupled with statements of the wider policy context and future regional intentions, would help to tackle one of the key requirements set out above. One aspect of this summary could be to set out what LPAs would be expected to do next.	Government Office and Yorkshire and Humber Assembly	2 months	Relevant reference information in the public domain	Summary published and distributed widely	Completed.
B	Undertake more detailed technical assessments to confirm and refine LPA targets	The current study has used a consistent strategic approach region-wide to promote equity of target-setting. This approach has been unable to fully reflect more detailed local issues (e.g. existing local landscape assessments). Further work – ideally undertaken by sub-regional LPA groupings – would help to further refine the assessments, promoting both equity and technical veracity.	LPAs (individually & collectively)	12-18 months	Increased technical basis for acceptance of targets	Refined local targets accepted and adopted by individual LPAs and sub-regional groupings	Partially complete. Some local authorities have undertaken studies that reflect more detailed issues. These include Hull, Sheffield, South Pennines Landscape Sensitivity study, Kirklees hydro study.
C	Provide a structured framework for support to renewable energy and planning Across the region	A crucial element of local RE target acceptance is the ability to communicate much more information on a wider basis to key stakeholder groups, and to support LPAs to develop and enhance their approach to RE. One model for this could be the approach adopted within the South East. LPAs stressed the significance of outside impartial support, which in some	Yorkshire and Humber Assembly, Government Office, LPAs (individually & collectively)	12-18 months	An informed context for policy- and decision-making for RE at all levels	Greater support for RE within policies and in planning decisions	Partially complete. Some local authorities have incorporated policies requiring a minimum level of renewable energy generation on new development

Capabilities on project:
Building Engineering - Sustainability

	Action	Description	Who responsible	Timescale	Outcome	Indicators of success	Status of actions
		circumstances is perceived by elected Members to provide more persuasive evidence than from Officers.					into DPDs or UDP documents.
D	Encourage Local RE Forums	Practical opportunities for RE developers, LPAs and others to develop broad agreement before schemes are submitted and to identify suitable “areas of search”	Local Authorities (with Yorkshire and Humber Assembly, developers, community groups)	Ongoing	Forums to carry forward the prospective targets at LPA level through devising “areas of mutual interest” for RE implementation, input to Local Development Frameworks	Forums initiated, feedback obtained on “success stories” from this approach	Completed (ongoing). In February 2007, the Renewable Energy Forum developed a regional energy infrastructure to 2010.
E	Collation and dissemination of “Good Practice” information	“Good Practice” information was requested by a number of LPA stakeholders to assist them with both forward planning and development control.	Government Office (with Yorkshire and Humber Assembly)	12-18 months	Guidance used to aid consideration of RE within the planning framework	Guidance available and being used	Completed. Renewable Energy Toolkit launched by Local Government Yorkshire and Humber in 2008 to enable Local Authorities to deal with the issue of microgeneration, decentralised and low carbon energy.

Table 22 Actions for delivery of renewable energy as suggested in SREATs report, 2004.

Recommendations for further work