Communities and Local Government

Renewable Energy Capacity in Regional Spatial Strategies

Final Report

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Final Report

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July 2009
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July 2009

Product Code: 09PREP05996

ISBN: 978 1 4098 1583 9

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Chapter 1
Executive Summary

Arup were commissioned by Communities and Local Government (CLG) in February 2009 to undertake a piece of research to establish what is known about the potential renewable energy capacity in England, as delivered through regional spatial strategies (RSS). The findings of the research will be used to inform the planning elements of the final UK renewable energy strategy (RES) and ensure that the policy required to deliver a comprehensive strategy is developed from a strong evidence base.

The research has identified all policies and targets relating to renewable energy, in both published RSSs and those under review in all nine English regions. It has also identified and considered the evidence bases supporting these targets. Investigation of current monitoring practices across the region and identification of further work commissioned on renewable energy was also undertaken.

A comprehensive set of renewable energy policies and targets have been devised within RSSs – although as expected, there are considerable inconsistencies between the targets and accompanying polices across the regions. Inconsistencies relate to definitions, terminology, content, level of detail, presentation – and, more importantly, in how the targets have been established. Areas of particular inconsistency relate to the inclusion of offshore wind within overall targets, adoption of sub-regional targets, specification of renewable energy technologies and treatment of targets as binding or indicative. It is however worth noting that a considerable number of the renewable energy assessments and reports that comprise the renewable energy evidence bases on which the policies and targets are based were undertaken prior to the publication of planning policy statement 22 *Planning for renewable energy* in 2004.

Research also considered progress towards renewable energy targets for 2010 and 2020. Progress against current 2010 renewable electricity targets is variable. In the majority of cases there is considerable work to do if targets are to be achieved by 2010. There is a large delivery gap in respect of the 2020 targets. Of more significance however is that in the majority of cases both 2010 and 2020 targets have been generally set at a modest level in respect of the resources available. There is not however always a clear linkage between the evidence base and the subsequent targets adopted.

Current 2020 targets are set well below that required to deliver 30-35% renewable electricity by 2020 as envisaged by the draft RES. This research confirms the suggestion of the RES that a 10-fold increase in the amount of renewable electricity is needed in most regions to move from where we are now to the UK's envisaged commitments under the EU Renewable Energy Directive. The current RSS policies as currently adopted lack the scale of ambition to achieve this target.

In addition, the current informal assumption is that each English region plans for only 20% of its electrical consumption from renewables by 2020, regardless of the resources available. A 'top-down' analysis such as that undertaken for this study would suggest that some regions will have to plan for a greater level of deployment of renewables to achieve an all England 20% (or even 35%) contribution, as some are severely resource constrained.

In summary, these findings suggest that there is an urgent need to further review the evidence base(s) being used in many regions and examine the data with a view to understanding the regional limits to the deployment of renewables in England. A consistent methodology is needed for future reviews of renewable energy resources to ensure that both the evidence base and the subsequent regional targets are set on the same basis, using the same terminology and method and thus that the data used is directly comparable.

Chapter 2 Introduction

2.1 Introduction

Arup were commissioned by Communities and Local Government (CLG) in February 2009 to undertake a piece of research to establish what is known about the potential renewable energy capacity in England, as delivered through regional spatial strategies (RSS). The findings of the research will be used to inform the planning elements of the final UK renewable energy strategy (RES) and ensure that the policy required to deliver a comprehensive strategy is developed from a strong evidence base. Key objectives of the research were:

- to identify policies and targets relating to renewable energy in both published RSSs and those under review in all nine English region
- to consider regional progress against targets
- to identify and review the evidence bases used to underpin renewable energy policies and
- to identify further work currently being undertaken to inform future RSS revisions

The research methodology comprised the following:

- a review of published and draft RSSs to identify renewable energy policies and targets
- a desk based review of existing evidence base documents underpinning regional renewable energy targets
- comparison between renewable energy targets, progress towards meeting them and current energy consumption levels, using data provided in annual monitoring reports (AMR), BIS Energy Statistics on installed renewable energy generating capacity and energy consumption and
- Interviews with lead renewable energy policy officers to cover issues relating to:
  - current work being undertaken to update renewable energy polices
  - monitoring and renewable energy data collection methods
  - outstanding issues relating to regional policy and evidence base research

Findings and baseline data from this research are presented in the following report, the structure of which is as follows:

- chapter 3 provides some further background to the study
- chapter 4 presents an outline of key findings
- chapter 5 provides a summary of findings from each English region
- appendix A provides a summary table of regional renewable energy targets and progress towards these targets, with an accompanying explanation of assumptions and methodology used in making the required calculations
- appendices B to J provide further details of renewable energy planning policies, evidence bases and monitoring practices in the regions and
- appendix K provides document references and web links for all evidence base documents available on the internet

Chapter 3
Background

3.1 *Introduction*

Several key documents provide a backdrop to this research:

- in 2002, Arup and OXERA Environmental undertook research into renewable energy targets and assessments in England. Since then, considerable further work has been undertaken. When drawing conclusions in relation to our own research, it is useful to reconsider the findings and recommendations made by Arup and OXERA in 2002

- in 2004 *Planning Policy Statement 22: Renewable Energy* was published. This provided valuable guidance to planning authorities with regards to assessing renewable energy potential, setting regional targets and formulating policy

- in 2007 the *Planning and Climate Change Supplement to Planning Policy Statement 1* was published. The supplement sets out how planning can contribute to reducing emissions and stabilising climate change through measures such as renewable energy

- the draft UK *Renewable Energy Strategy* (RES) was published for consultation in June 2008. The findings from this research are expected to input into the planning elements of the final strategy

The following sections provide a brief review of these documents, drawing out in particular those observations and recommendations that provide the context and framework for our own analysis.

3.2 *Planning Policy Statement 22 – Renewable Energy, 2006*

In reviewing RSS polices and targets, it is useful to consider existing planning policy guidance on target setting and renewable energy policy, as set out in PSS22. This provides a useful benchmark against which to compare current regional renewable energy policies and evidence bases:

- **RSS should include a target for renewable energy capacity in the region**, derived from assessments of the region's renewable energy resource potential, and taking into account the regional environmental, economic and social impacts (either positive or negative) that may result from exploitation of that resource potential

- **targets should be expressed as the minimum amount of installed capacity for renewable energy in the region, expressed in megawatts, and may also be expressed in terms of the percentage of electricity consumed or supplied. Targets should be set for achievement by 2010 and by 2020**

- **where appropriate, targets in regional spatial strategies may be disaggregated into sub-regional targets**

- **targets for specific technologies should not however be set** given that rapid technological change may mean that new sources of renewable energy may be developed in the longer term

- regional planning bodies and local planning authorities **should not make assumptions about the technical and commercial feasibility** of renewable energy projects (e.g. identifying generalised locations for development based on mean wind speeds). Technological change can mean that sites currently excluded as locations for particular types of renewable energy development may in future be suitable

- **progress towards achieving these targets should be monitored by regional planning bodies**. Targets should be reviewed on a regular basis and revised upwards (if they are met) subject to the region's renewable energy resource potential and the capacity of the environment in the region for further renewable energy developments

- as offshore renewable generation projects are not covered by the land-use planning system, **RSSs should contain an indication of the output that might be expected to be achieved from offshore renewables, based on where the electricity comes ashore. The potential to generate substantial amounts of renewable energy from offshore projects should not be used as a justification to set lower targets for onshore projects**

- criteria based policies should be set out in regional spatial strategies where these can be applied across a region, or across clearly identified sub-regional areas. These criteria should then be used to identify broad areas at the regional/sub-regional level where development of particular types of renewable energy may be considered appropriate

3.3 Planning Policy Statement: Planning and Climate Change – Supplement to PPS1, 2007

The Climate Change supplement to PPS1 sets out how planning can contribute to reducing carbon emissions and stabilising climate change. In terms of regional planning, it emphasises that 'climate change should be a key and integrating theme of the RSS and be addressed in conjunction with the economic, social and environmental concerns that together inform the overall spatial strategy and its components'. In particular, regional planning bodies are expected to set regional targets for renewable energy generation ensuring that that their ambition fully reflects opportunities in the region; are consistent with the Government's national targets and, where appropriate in the light of delivery, are periodically revised upwards.

3.4 *Draft UK renewable energy strategy*

In 2007, the UK and other EU member states agreed to a binding target that 20% of the EU's energy consumption must come from renewable sources by 2020. The European Commission has proposed that the UK's contribution to this should be to increase the share of renewables in our energy mix from around 1.5% in 2006 to 15% by 2020.

The RES proposes a wide range of additional measures that will be required to deliver these targets:

- extending and raising the level of the renewables obligation to encourage up to 30-35% of our electricity to come from renewable sources by 2020
- introducing a new financial incentive mechanism to encourage a very large increase in renewable heat
- delivering more effective financial support for small-scale heat and electricity technologies in homes and buildings
- helping the planning system to deliver, by agreeing a clear deployment strategy at regional level similar to the approach established for housing
- ensuring appropriate incentives for new electricity grid infrastructure and removing grid access as a barrier to renewable deployment
- exploiting the full potential of energy from waste, by discouraging the landfilling of biomass as far as is practical
- requiring all biofuels to meet strict sustainability criteria, to limit adverse impacts on food prices, or other social and environmental concerns
- promoting the development of new renewable technologies, through effective support particularly where the UK has the potential to be a market leader
- maximising the benefits for UK business and jobs, by providing a clear long-term policy framework, working with regional development agencies to tackle key blockages, considering support for specific technologies and addressing skills shortages

In terms of regional planning, the RES proposes the following approach to renewable energy planning and delivery:

- regional spatial strategies should include targets for the minimum amount of installed capacity for renewable energy in the region to be achieved by 2010 and 2020. These targets should be derived from assessments of the region's renewable energy capacity and be ambitious. Monitoring against these targets should be reported in the annual monitoring reports (AMR) produced regionally and locally

- targets would be informed by the potential for renewables across the regions and could be informed by, and in turn inform, the national targets detailed in the national renewables action plan. There is a possibility that regional targets could be disaggregated to the local authority areas

- targets must be based on a rigorous assessment of potential in the region which would need to be adequately resourced. In order to avoid further delay in the handling of planning applications, there is a need for an approach that provides greater clarity on the land resource available for renewables in a way that ensures that innovation is not stifled. In particular, proposals should not be rejected solely because they were outside an area identified for energy generation

- a possible example of how incentives could be used to encourage renewable energy developments might be something like renewables growth points. This could involve inviting proposals from localities which felt particularly able and willing to be pace-setters in providing renewable energy generation. Subject to the availability of funding, these localities could be supported in their efforts through a package of community benefits

- the Planning Act 2008 makes provision for the introduction of a new community infrastructure levy (CIL), by which developers can be asked to contribute to the cost of infrastructure needed to support development. The particular needs and circumstances of the renewables sector will be considered further in developing the detailed design of the CIL.

3.5 Regional renewable energy assessments, 2002

In 2002, Arup and OXERA Environmental undertook an assessment which examined whether the targets proposed by the different English regions in their renewable energy assessments would together be sufficient to achieve the national target for renewable energy generation, comparing amongst other things, the assumptions underlying the proposed targets. The team made several observations relating to assumptions and areas of uncertainty within regional assessments as published in 2002. The following provides a brief commentary upon these findings in relation to how evidence base work and target setting has progressed since these observations were made.

- "*The regional assessments also vary in the way they treat offshore wind. Most assessments assume no turbines within 5 km of the shore*".

Restrictions on the depth and distance of offshore wind farms have been reduced following a review by the Crown Estate. This should increase the number of offshore developments across the UK coastline and help regions understand a more accurate resource catchment for this technology.

- "*There are important uncertainties attached to the regional targets. The likelihood of hitting the target depends on whether the economic, technological and planning assumptions turn out to be reasonable by 2010*".

  This still remains the case, however regional assessments have been keen to identify constraints on resource potential by considering different scenarios and their chances of delivery/ implementation.

- "*It is clear that if the rate of build of renewable energy capacity is limited by planning control, then the higher of the two regional targets will have to be delivered in order to achieve the national target*".

  Analysis of AMRs indicates that measures are being implemented to ensure that planning restrictions on renewable energy developments are reduced. However, there are still significant issues relating to planning control that could be resolved through a more consistent and streamlined approach to planning decisions and delivery of renewable energy developments.

- "*While it is possible to reach the national target, the technology mix envisaged in the regional assessments may not be identical to the mix offered by the market*".

  Several RSSs have set out a technology mix to accompany their renewable energy targets. However, in the majority of cases, this is only indicative in recognition of the effect that changing economic circumstances and advances in technology will have on the resultant renewable energy mix. The current economic climate and availability of funding are significant concerns in relation to the delivery of existing renewable energy targets.

- "*The major areas of uncertainty appear to be offshore wind and energy from biomass*".

  There is considerable inconsistency in the way that offshore wind energy has been dealt with across the regions. Overall, it is not expected to make a particularly significant contribution to 2010 targets. However, it is anticipated to play an increasingly vital role in increasing renewable energy generation by 2020. Energy from biomass has recently received considerable attention across the regions, reflected in the number of specific studies undertaken in relation to its potential. The key issue however remains whether strong supply chains or evidence of sufficient demand should be the starting point for its establishment as a key renewable resource.

For the full report, please refer to (www.berr.gov.uk/files/file30589.pdf).

Chapter 4
Key findings

4.1 *Regional spatial strategies*

Table 4.1 summarises the current status of RSSs across England. In most cases, RSSs have recently or are in the process of being published. It should be noted that with the commencement of the Local Democracy, Economic Development and Construction Bill, RSSs combined with regional economic strategies (RES), will become single regional strategies, which may provide the opportunity for further review of existing renewable energy policies and targets.

Table 4.1 regional spatial strategy Progress and Review

Region	*Latest spatial strategy*	*Timescale*	*Current planned revisions*
East Midlands	East Midlands plan published March 2009	2021	Renewable energy to be considered as part of a forthcoming partial review. 2005 plan reviewed in 2006; consultation on proposed changes ended October 2008; Secretary of State expected to issue approved new regional plan early 2009. Public consultation on further partial review (partial review draft project plan and statement of public participation) launched to consider planning issues up to 2031 ended December 2008. Key issues to be considered: • planning for the impact of projected population growth on the demand for new open market and affordable housing • ensuring that transport infrastructure and services can meet the needs of a growing population in a sustainable manner • dealing with the causes and effects of climate change by generating more power from renewable sources and managing the potential impacts of sea level rise on the Lincolnshire Coast
East of England	East of England plan Published May 2008	2021	Review to 2031 in early stages – Stage 2 – Evidence Base and technical studies currently being commissioned (to early 2009) Stage 3 – Prepare development scenarios, including sustainability appraisal, strategic environmental assessment and habitats directive and consult on options. Revise generic policies (Jan – July 2009)

Table 4.1 **regional spatial strategy Progress and Review – *continued***			
Region	*Latest spatial strategy*	*Timescale*	*Current planned revisions*
London	London plan, consolidated with alterations since 2004, 2008	2025/26	Full revision of London plan has begun, with a view to adoption by 2011. Renewable SPG to be produced in summer 2009. December 2008 proposed amendment – the use of planning obligations to fund Crossrail Mayor has consulted on his proposed approach to revising the London plan (ended Nov 08). Work is starting immediately on a full revision of the London plan, with a view to its formal publication in the winter of 2011. Revised sustainable design and construction and renewable energy SPG to be produced in 2009.
North East	North East of England plan Adopted July 2008	2021	No RSS review planned. Integrated regional strategy: Currently undertaking preparatory evidence base work. North WestNorth West of England plan Published September 20082021Partial review currently being undertaken, focusing on a limited number of discrete technical issues addressing strategic gaps in RSS policy relating to gypsies and travellers; travelling show people and car parking. 4NW in the process of creating North West regional strategy 2010. Currently undergoing 12 week consultation on principles and issues paper. • refresh and revise economic development actions and priorities building on the regional economic strategy 2006-09 • focus on setting out a vision and key principles on strategic issues • integrate spatial and housing priorities with actions to achieve sustainable economic growth • prepare the region to work swiftly and effectively on a statutory Single regional strategy after any necessary legislative changes • build upon work undertaken to date on the partial review of regional spatial strategy
South East	South East plan is due to be published spring 2009	2026	Currently working on timetable for possible revisions to South East plan. Undertaking preparatory evidence base work for single regional strategy.
South West	Regional planning guidance adopted 1999 Draft RSS published 2006; proposed changes published RSS due to be published summer 2009	2026	Consultation on proposed changes ended October 2008; final RSS expected early 2009

Table 4.1 regional spatial strategy Progress and Review – *continued*

Region	*Latest spatial strategy*	*Timescale*	*Current planned revisions*
West Midlands	West Midlands regional spatial strategy, Phase 1 published June 2004, Phase 2 January 2008.	2021	Three phased reviews planned (Phase 3 to include consideration of renewable energy policies): Phase 1 Black Country Study complete (revised WMRSS issued Jan 2008) Phase 2 (housing figures, centres, employment land, centres, transport and waste) consultation ended December 2008, consultation responses to be reviewed by EiP in 2009 Phase 3 preparatory work underway (to cover rural services, culture/recreational provision, various regionally significant environmental issues and the provision of a framework for Gypsy and Traveller sites)
Yorkshire and Humber	regional spatial strategy for Yorkshire and Humber, published May 2008	2021	No review of renewable energy policies currently underway. The RSS is currently under review. The 2009 update will look at housing growth in the region. The RA is currently inviting evidence and analysing strategic options. Policy revisions are due to begin Jan – April 2009; update to be submitted to Secretary of State July 2009, proposed changes 2010. No other reviews are planned (the region will look towards preparing integrated regional strategy, but not work underway towards this yet).

4.2 renewable energy targets and policies

4.2.1 Target setting

Review of regional renewable energy targets reveals considerable variation, in terms of format, content and ambition.

Currently, PPS22 expects regional renewable energy targets to be expressed in terms of minimum installed generating capacity – expressed as megawatts, which may also be expressed as a percentage of electricity consumed or supplied. However, a review of existing regional targets reveals considerable inconsistency in the expression and adoption of regional renewable targets in RSSs:

- presentation of targets as a percentage of total electricity consumption only vs. presentation of targets in terms of installed generating capacity
- inconsistent use of MW or GWh
- inclusion of targets in policy vs. inclusion of targets in supporting text and
- treatment of targets as indicative only

PPS22 recommends against setting technology specific targets. London is the only region to have included targets for specific technologies. However, several of the regions have included an *indicative* breakdown of their renewable energy targets by technology, in recognition of the pace of change in the sector and the variety of ways by which regional targets may be achieved in the future.

Where appropriate, PPS22 states that regional targets may be disaggregated into sub-regional targets, The North East, South West and Yorkshire and Humber have included sub-regional targets, whilst the North West and South East have included indicative sub-regional targets. In most cases, it is acknowledged that further work is required to refine and provide a robust basis for the development and adoption of sub-regional targets.

PPS22 requires regional targets to be comprised of those technologies eligible for the renewables obligation (RO). Table 4.2 provides a breakdown of renewable energy technologies included in regional renewable energy targets for 2010. There is considerable variation in the type and breakdown of technology sub-types across the regions. Most notable variations relate to the inclusion of offshore renewables, treatment of energy from waste and the inclusion and importance accorded to micro renewables (which become increasingly important in 2020). With regards to the latter, although micro renewable installations would not be eligible for the RO, the type of renewable energy that they comprise (e.g. photovoltaics) would be eligible, were it to be installed on a larger scale. Whether or not they should be included in regional energy targets therefore remains an area of uncertainty.

Table 4.2 **Renewable energy technologies included in RSS 2010 targets**

Region	*Renewable Energy Technology Included in 2010 Targets*	
East Midlands	Onshore wind Biomass – wet agricultural waste Biomass – poultry litter Biomass – energy crops Hydro	Microgeneration – wind Microgeneration – PV Landfill gas Anaerobic digestion Offshore wind included as separate target
East of England	Photovoltaics Onshore wind Energy crops and biomass (wood, sawmill by products, organic waste) Energy from agricultural, plant and animal, domestic and industrial waste	Anaerobic digestion CHP (excluding renewable heat) Sewage gas Landfill gas
London	Single large wind turbines Small stand alone wind turbines Building mounted micro wind turbines Biomass fuelled CHP/ Electricity Solar PV (domestic)Solar PV (commercial)	Anaerobic digestion Sewage gas Gasification / Pyrolysis

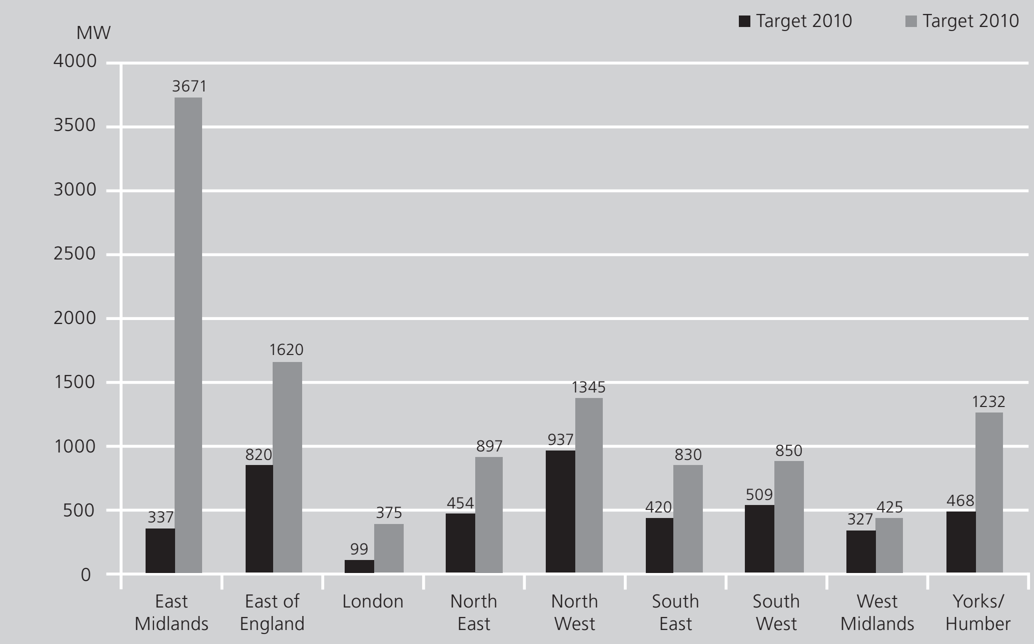
Table 4.2 *continued*		
Region	*Renewable Energy Technology Included in 2010 Targets*	
North East	Onshore wind Domestic scale wind Biomass Landfill Gas Hydro	Sewage gas Municipal EfW Photovoltaics Biomass fired CHP
North West	Offshore wind Onshore wind Building mounted micro-wind turbines Biomass fuelled CHP Biomass Co-firing Anaerobic digestion of farm biogas Small hydro	Solar photovoltaics Tidal energy Wave energy Landfill gas Sewage gas Thermal treatment of municipal / industrial waste
South East	Large CHP/ Electricity Plans fuelled by Biomass waste/ residues and energy crops (15+ MW) Small CHP/ Electricity Plans fuelled by Biomass waste/ residues and energy crops (5-10MW) Wind farms (50-75MW; 20-30 turbines) Small wind clusters (6MW; 4-10 turbines	Single wind turbines/ chargers (0.03MW) Small scale hydro power (0.01 MW) Domestic PV installations (1.5-3kWp) Commercial PV installations (50kWp) Motorway PV installations (160kWp/km) Landfill gas
South West	Onshore wind Biomass – forest residues Biomass – Energy crops Biomass – Straw Energy from waste	Hydro Building integrated Centralised anaerobic digestion Poultry litter Landfill gas
West Midlands	Onshore wind Biomass – Energy crops Biomass – Agricultural Biomass – Forestry Biomass – Wastes	Biomass – Sewage Gas Biomass – Landfill Gas Photovoltaic Hydro
Yorkshire & Humber	Wind Biomass wood Biomass	Hydro PV
PPS22	The technologies covered should be those eligible for the renewables obligation	

PPS22 states that RSSs should contain an indication of the output that might be expected to be achieved from offshore renewables, based on where the electricity comes ashore. The East Midlands, East of England, North East, South East, South West and Yorkshire and Humber have all identified a contribution from offshore renewables, although the way in which this is presented differs considerably. The East Midlands and East of England have identified a separate contribution from offshore renewables that is not included in their overall regional targets. The South East, South West, Yorkshire and Humber and the

North West have included offshore renewables in their overall renewable energy targets, although this can be disaggregated from onshore projects. Owing to their geographical position, neither the West Midlands nor London have identified a contribution from offshore renewables. The North East has not considered offshore renewables in its existing targets, although it is expected that it may play a significant role by 2020.

Figure 4.1 sets out regional onshore renewable energy targets. The East of England and North West have the highest targets for 2010 (820MW and 937MW respectively). By 2020, the East Midlands has the most ambitious target (3,671MW), although over 3,000MW of this is expected to come from microgeneration. London has the lowest targets for both 2010 and 2020, perhaps reflective of its limited capacity to accommodate largescale renewable energy developments and corresponding reliance on micro renewables

Figure 4.1 **Regional renewable energy targets**



Notes:

1. Please refer to Appendix A for more details of research methodology and target derivation.

PSS22 advises that the potential to generate substantial amounts of renewable energy from offshore projects should not be used as a justification to set lower targets for onshore projects. As mentioned previously, the majority of the regions have included an indication (within their overall targets or otherwise) of the expected contribution from offshore renewables, set out in Table 4.3. Interestingly, when offshore and onshore contributions are combined, the proportions of offshore output are substantial. For example, the East Midlands is expected to generate 60% of its total renewable energy 2010 target from offshore renewables, thereby significantly increasing its overall anticipated contribution from renewable energy. By 2020, offshore wind is expected to contribute 50% and 62% towards the North West and East of England's overall targets respectively, although both regions already have some of the highest onshore targets for renewable energy generation.

Table 4.3 Offshore renewables targets

Region	*2010 Target (MW)*				*2020 Target (MW)*			
	Excluding offshore	*Offshore component*	*Total with offshore*	*% offshore contribution to total target*	*Excluding offshore*	*Offshore component*	*Total with offshore*	*% offshore contribution to total target*
East Midlands	337	500	837	60%	3671	1142	4813	24%
East of England	820	372	1192	31%	1620	2630	4250	62%
London	99	–	–	–	375.1	–	–	–
North East	454	–	–	–	897	–	–	–
North West	937	297	1234	24%	1345	1347	2692	50%
South East	420	200	620	32%	830[2]	300	1130	27%
South West	509	56	565	10%	850	400	1250	32%
West Midlands	327	–	–	–	425	–	–	
Yorkshire and Humber	468	240	708	34%	1232	630	1862	34%

Notes
1. Please refer to Appendix A for more details of research methodology and target derivation
2. South East offshore contribution to 2020 target based on 2016 target disaggregation (no disaggregation provided for 2020 targets)

The current Government target for renewable energy generation aims to meet 10% and 20% of electricity consumption from renewable energy sources by 2010 and 2020 respectively. Interestingly only five regions (East of England, North West, North East, South West and Yorkshire and Humber) have adopted renewable energy targets that equate to around 10% total electricity consumption by 2010 (Table 4.4). With the exception of the North East however, this includes offshore wind. By 2020, with the exception of the East of England, the same regions plus the East Midlands have aspired to a target of 20% or more by 2020; in the case of the North West and Yorkshire and Humber, this again includes a contribution from offshore wind.

Table 4.4 Percentage targets for 2010 and 2020

Region	*Target 2010*	*Target 2020*
East Midlands	6.4%	123%[1]
East of England	10%	117%[1]
North East	10%	20%
North West	10%[1]	20%[1]
London	0.6%	3.2%
South East	5.5%[1]	10%
South West	10%[1]	20%
West Midlands	5%	10%
Yorkshire/Humber	9.4%[1]	22.5%[1]

Notes
1. Includes offshore wind; it was not possible to disaggregate % targets by renewable energy technology
2. Please refer to Appendix A for more details of research methodology and target derivation

London and the West Midlands expect to generate the smallest proportion of energy consumption from renewable sources. In both cases the identified potential for renewable energy developments across the regions is more limited, whilst London must contend with a much higher overall energy demand.

The South West is currently the only region to have included a target for the generation of renewable heat in its RSS. Whilst the Mayor of London's renewable energy strategy (2004) included a target for renewable heat, this was excluded from the London plan. Several regions are considering the inclusion of a renewable heat target as part of their next RSS revision.

4.3 Evidence bases

There is considerable variation in both the content and scope of evidence bases underpinning regional renewable energy targets. For example, the West Midlands has undertaken very limited research into renewable energy, whilst the Greater London Authority has commissioned a considerable amount of work in relation to specific renewable energy technologies and their implementation.

All the regions have at one time or another undertaken an assessment of renewable energy potential across the region as a whole, although in some cases primary research dates back to 2001. There is considerable variation across the regions as to whether or not further primary research or an update of original assessments was undertaken following the publication of PPS22 in 2004.

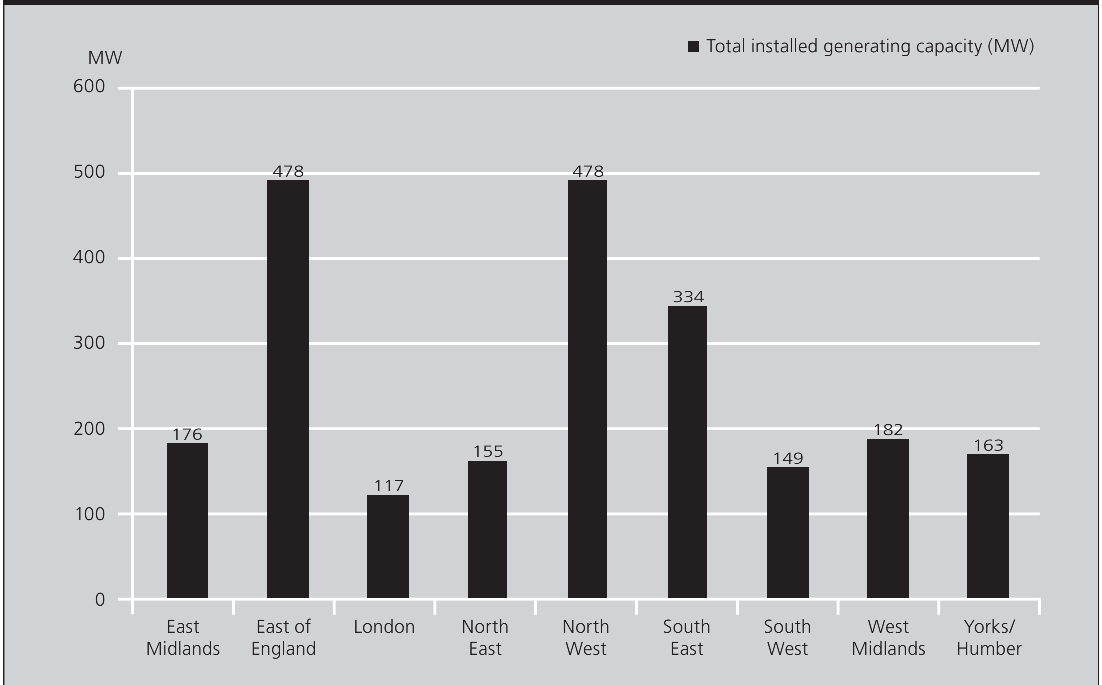
The length of time taken to draft and adopt an RSS has in some instances resulted in the recent adoption of renewable energy policies based on evidence base work undertaken a considerable time ago. In this respect, there is a disconnection between the length of time required to prepare and examine an RSS and the pace of change in the renewable energy technology sector.

Review of existing evidence bases reveals that there is not yet a robust and nationally consistent methodology for assessing renewable energy potential across all regions. Specific renewable energy technologies that have received the most attention are biomass and onshore wind.

4.4 Progress towards targets

Figure 4.2 sets out total installed generating capacity across the English regions. To date, the East of England and North West have the greatest installed renewable energy generating capacity. Figure 4.3 provides an indication of the breakdown by renewable energy technology of current installed generating capacity.

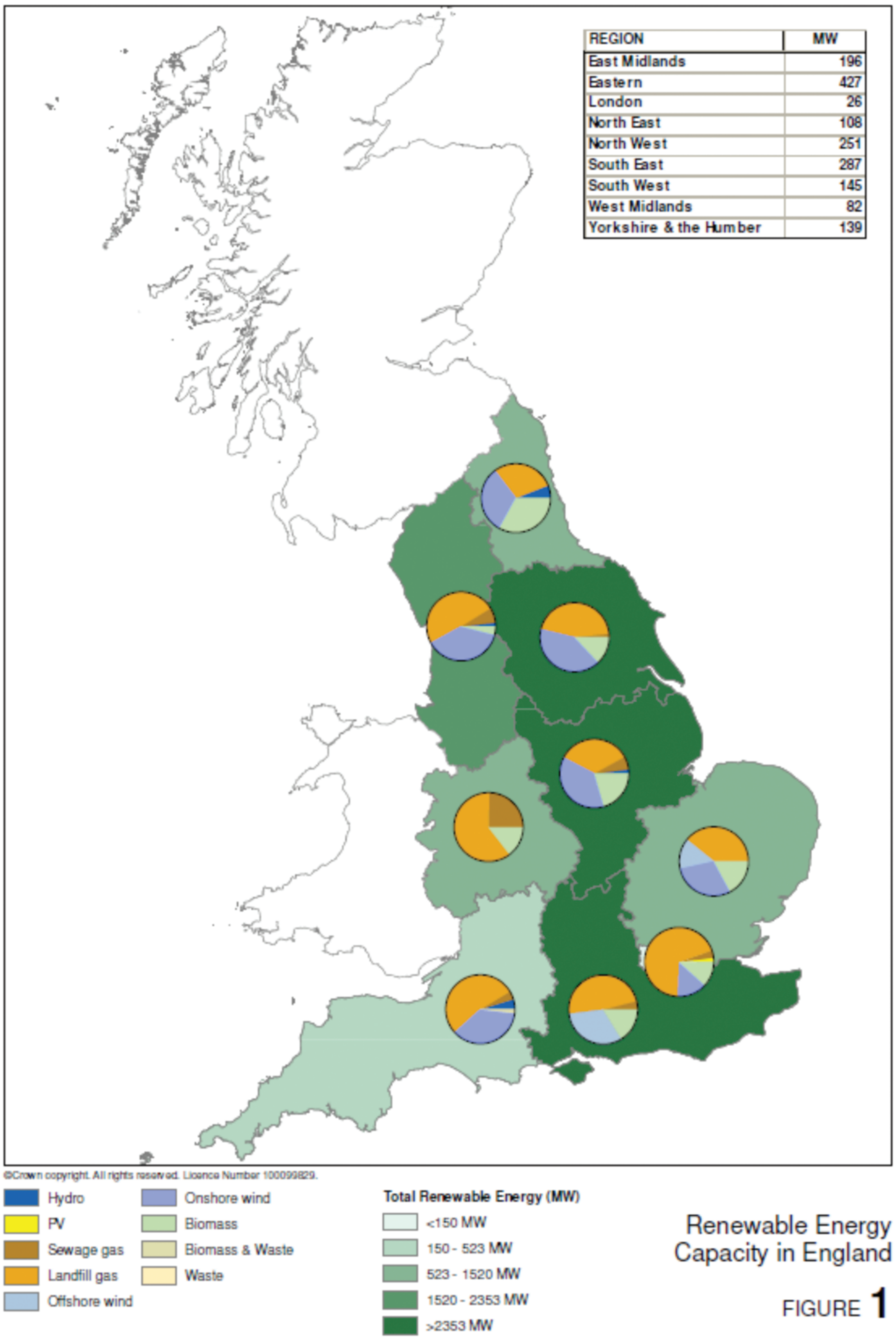
Figure 4.2 **Total installed generating capacity**



Notes.

1. Data taken from BIS Energy Statistics Publication (excludes biomass co-firing, photovoltaics and micro-wind generation) (December 2007). This includes offshore wind, although to date there have been limited offshore wind developments in the UK.

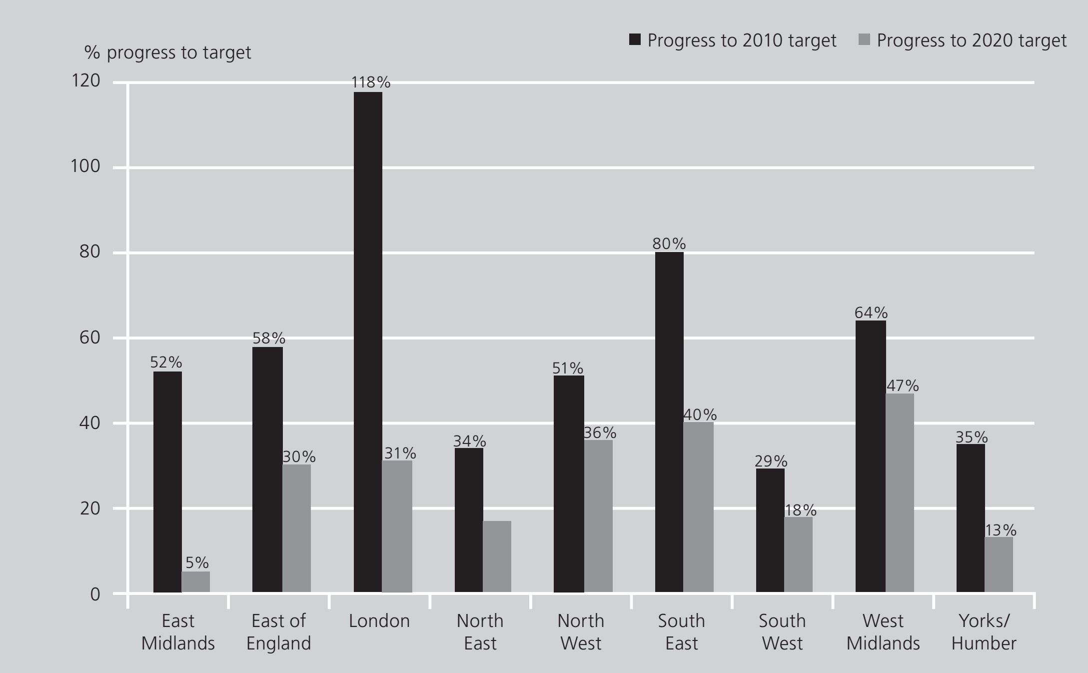
Figure 4.3 **Regional Installed Generating Capacity by Renewable Energy Type**



Source: Ofgem installed generating capacity 2008, excluding biomass co-firing with fossil fuels)

In terms of progress towards meeting published regional targets, London has already exceeded its target for 2010, although it should be noted that the target contained within the London plan (99MW) is considerably lower than that set out in the Mayor's energy strategy and quoted in its AMR (665GWh; 945GWh including heat). When compared to the London plan target, London has already installed 60% of its 2010 target. Outside London, the South East and West Midlands have delivered 80% and 64% of their 2010 targets respectively (Figure 4.4). The South West is making the slowest progress, having only delivered 29% of its 2010 target to date. The West Midlands and North West are making the greatest progress towards their 2020 targets, although none of the regions have reached more than 50% of their 2020 targets.

Figure 4.4 **Regional progress towards 2010 and 2020 targets**



Notes.

1. Data taken from BIS Energy Statistics Publication (excludes biomass co-firing, photovoltaics and micro-wind generation) (December 2007). This includes offshore wind, although to date there have been limited offshore wind developments in the UK.
2. Does not include extant planning permissions (i.e. those yet to be implemented), due to lack of available data
3. Please refer to Appendix A for more details of research methodology and target derivation

Table 4.5 sets out required additional capacity to meet 2020 regional renewable energy targets. Across the regions as a whole, a further 9013 megawatts installed generating capacity is required to meet existing RSS renewable energy targets.

Table 4.5 **Required additional capacity to meet 2020 targets**

Region	*Required additional capacity to meet 2020 target*
	MW
East Midlands	3495
East of England	1142
London	258
North East	742
North West	867
South East	496
South West	701
West Midlands	235
Yorkshire/Humber	1069
Total	**9013**

Notes
1. Please refer to Appendix A for more details of research methodology and target derivation

The current Government target is to generate 20% electricity from renewable energy sources by 2020. The draft UK RES proposes to increase this to between 30% and 35%. Table 4.6 indicates current regional energy consumption and the percentage of this supplied from renewable energy sources. London currently has the lowest proportion of its energy supplied from renewable sources (0.8%), although this is a reflection to some extent of higher general energy demand in the capital and the physical limitations on its renewable energy capacity. The East of England has the highest proportion of total energy consumption supplied from renewable energy sources at 6%. Nationally, 3.3% of total energy consumption in England is provided from renewable energy sources.

Table 4.6 **Current renewable energy consumption**

Region	*Current Energy Consumption*	
	GWh[1]	*% from renewable sources*
East of England	31681	6.0%
Yorkshire/Humber	29394	4.6%
North West	40112	4.0%
South East	45840	3.4%
East Midlands	25849	3.3%
North East	15190	2.8%
South West	29659	2.6%
West Midlands	30509	2.6%
London	47128	0.8%
Total	**295362**	**3.3%**

Notes
1. BIS Energy Statistics (2006), scaled up to 2007
2. Please refer to Appendix A for more details of research methodology and target derivation

4.4.1 Interview feedback on delivering renewable energy targets

Regional policy officers interviewed as part of this research highlighted several issues relating to the implementation and achievement of their renewable energy targets, summarised below (note that the views are not representative of all RAs):

- lack of available resources at regional and local level to undertake evidence base work to inform policy
- conflicting policy aspirations – for example issues over maintaining/ improving air quality in relation to small scale biomass installations
- there is a need to align different policies that have an impact on the delivery of onshore wind (for example noise) and establish how policy conflicts are dealt with in the context of renewable energy developments
- there is inconsistency in obtaining planning permission for wind developments (particularly single turbines) and the way in which regional planning policy priorities are applied by local authorities
- there is concern over the use of cumulative effects as anecdotal evidence against granting planning permission for further wind farm developments
- there is concern over the use of evidence such as the unknown and unevidenced impact on bird populations to refuse planning applications for wind farm developments
- there is a possible conflict between the requirements/ priorities of the Appropriate Assessment under the EU Habitats Directive and the potential impacts of renewable energy developments on natural habitats, flora and fauna
- there is a lack of sufficient local public benefits or means of securing these consistently to act as an incentive to implementing renewable energy developments and projects
- there is a lack of funding/ fiscal mechanisms and incentives under the RO to support small scale renewable energy developments
- the current cost of small scale renewable energy technology is often prohibitive to its implementation
- there is considerable concern over the availability of funding in the current economic climate
- there are issues relating to the establishment of supply chains in advance of or response to demand for biomass – particularly in terms of the cost involved to developers of installing biomass

- there is sometimes a lack of political will and leadership amongst members, particularly in the face of local opposition to largescale renewable energy developments

4.5 Monitoring

The ways in which regional assemblies (RA) monitor and report progress towards meeting their renewable energy targets varies significantly across England.

Core output indicator E3 requires regional planning bodies (RPB) to report the amount of renewable energy generation by installed capacity and type in their annual monitoring reports (AMR). Reporting against this target should take the following form and content:

- installed capacity should be reported for (a) renewable energy developments / installations granted planning permission and (b) completed renewable energy developments / installations

- only on-shore renewable energy developments / installations should be reported. This does not include any developments / installations permitted by a general development order

- installed capacity should be reported in megawatts and reported in line with the current BIS classifications

- where renewable energy technologies are aggregated in reporting, the aggregation should allow for comparison with the renewable energy statistics database supported by the Department for Business, Innovation and Skills (see www.restats.org.uk)

Information and methods used by RAs for monitoring purposes differ significantly, the greatest difference being those regions that rely on national statistics, and those who undertake their own monitoring. Review of 2007-08 AMRs revealed the following inconsistencies in relation to core output indicator E3:

- inconsistent reporting of installed capacity for installations granted planning permission and completed renewable energy installations; several regions have not reported on or disaggregated installations granted planning permission but not yet completed

- inconsistent use of MW and GWh

- installed capacity has not always been broken down according to BIS classifications.

- lack of comparison between aggregated renewable energy technologies used in reporting and comparison with renewable energy statistics

It is worth noting however that revised guidance on core output indicators was only published in July 2008, leaving little scope for RAs to respond to these changes in the current round of 2007-08 AMRs.

Information sources and methods used by regional assemblies to monitor progress are summarised below:

- RESTATS
- BIS energy trends data
- Ofgem ROC register
- energy consumption data
- government funding programmes (low carbon buildings and major PV demonstration programme)
- microgeneration certification scheme
- percentage of new publicly funded housing meeting at least level 3 of code for sustainable homes
- percentage of development meeting at least BREEAM 'very good' standard
- local authority questionnaires and audits
- recent studies undertaken in the regions
- conformity statements (for schemes over 3MW)
- number (%) of new developments using on site renewable energy sources and number and % of these developments generating 10% or more renewable energy on site
- renewable energy capacity in extant planning permissions
- installed good quality CHP capacity (MWE)
- www.SEE-Stats.org

Regional policy officers highlighted several issues relating to existing information sources and their ability to provide an accurate representation of installed generating capacity in the regions, summarised below:

- general paucity of data available
- delays in the publication of government statistics can mean that data used for monitoring purposes is already out of date

- it is difficult to monitor renewable energy installed as permitted development
- microgeneration and small scale installations may not qualify for registration under the renewables obligation
- some developers and organisations (e.g. London Fire Brigade) do not register their renewable energy installations under the RO, as there is no financial incentive to do so
- local authorities lack the expertise to calculate renewable energy capacity from planning applications
- local authorities do not have the means to monitor which planning applications have been implemented and the generating capacity of those installations
- there is sometimes a gap between what has been applied for in a planning application and what is subsequently installed by the developer on the ground
- the quality of data provided from Government and other organisations such as BIS could be improved – for example registers of Government funding programmes for renewable energy
- difficulties in systematically collecting and recording data from a variety of sources
- lack of resources and funding to allow regions to undertake their own monitoring in addition to national statistics
- anomalies in the application of load factors and associated assumptions

4.6 Further work

The majority of regions are currently at the scoping or evidence base stage of reviewing their RSSs. However, the nature and content of forthcoming work on renewable energy varies considerably across the regions, although several RAs are yet to define the specific scope of work in relation to renewable energy. Table 4.7 summarises planned evidence base work relating to renewable energy targets and policies.

Table 4.7 Forthcoming work

Region	Renewable energy types included in overall 2010 targets
East Midlands	Faber Maunsell is currently undertaking a review of targets for energy efficiency savings and new and renewable energy capacity in the East Midlands, findings from which are expected in March 2009.
East of England	Renewables East are taking forward work to inform sub-regional targets. LondonThe GLA are currently undertaking scoping work to determine further work required for full London plan review. Likely that an assessment of a wide range of renewable energy options will be undertaken, although scope will be limited by time and budget.
North East	Landscape studies are currently being conducted at a local authority level as part of an overall onshore wind review. No further work has been commissioned to review renewable energy policies or targets contained within the North East plan at this time.
North West	The original intention was to review the renewable energy targets as part of the partial review of the RSS. However, this has now been superseded by the development of the single regional strategy RS2010, which is currently undergoing a 12 week consultation on the principles and issues paper. Some evidence base scoping work is currently being undertaken until work commences on the renewable energy section of RS2010.
South East	Three commissions currently underway: • identification of opportunities for combined heat and power (CHP) and district heating/distributed heat supply in the South East of England • work building on the above to provide more detailed assessment of heat loads, identify potential sources of biomass and waste-related fuels, and use this to elaborate on scenarios • Thames Valley Energy are undertaking a review of the evidence base work which underpinned the renewable energy targets (regional and sub-regional) in RPG9 and the draft South East plan, to inform the review of the renewable energy policies and targets in the preparation of the single regional strategy
South West	Since the RSS has still not been approved by the Secretary of State, the region has been reluctant to review the 2020 target in order to determine whether it could be raised. Yearly surveys conducted to determine current installed capacity – the next survey is due in April 2009.
West Midlands	No forthcoming work at present.
Yorkshire and Humber	There are no current plans to review the existing renewable energy policies and targets contained within the Yorkshire and Humber plan. The regional assembly is currently working with Faber Maunsell to prepare a local authority renewable energy toolkit to help deliver carbon savings and decentralised energy.

4.7 Conclusions

Research reveals that the overarching message is one of variety across the regions. Key messages include:

- variation in the way that renewable energy targets are presented, both in terms of form and content
- variation in the treatment of offshore renewable energy contributions

- variation in the scope and date of evidence bases, with a need to revisit assessments and targets, particularly in relation to sub-regional targets and 2020 targets
- progress towards 2010 renewable energy targets range from 80% delivery in the South East to just 29% in the South West
- progress towards 2020 targets range from 47% delivery in the West Midlands to 5% in the East Midlands
- currently only 3.2% total electricity consumption in England is provided from renewable energy sources. A target of between 30% and 35% as proposed in the draft RES is therefore ambitious

Chapter 5
Regional summary

5.1 *East Midlands*

5.1.1 Targets and evidence base

The East Midlands plan was expected to be published in spring 2009. Table 5.1 summarises the East Midland's current renewable energy targets and progress towards meeting those targets.

Table 5.1 East Midlands renewable energy targets

Renewable Energy Target (MW)		*Total installed generating capacity*	*Progress towards 2010 target*	*Progress towards 2020 target*	*Required additional to 2020*
2010	*2020*	*MW*	*%*	*%*	*MW*
337	3671	176	52	5	1131

Sources: BIS Energy Statistics (2008); East Midlands Plan Proposed Changes (2008)

Renewable energy targets contained within the East Midlands plan are set out as an Appendix to policy and are quoted in MW, GWh and as a percentage of total electricity consumption. These targets do not include offshore renewable energy generation, targets for which are set out separately in the accompanying supporting text (equating to 500MW and 1142MW for 2010 and 2020 respectively). The plan does not currently include any targets for the generation of renewable heat, although the inclusion of such targets will be considered in the forthcoming RSS update.

The 2007 panel report from the draft East Midlands plan examination in public made the following observations in relation to the proposed regional targets:

- that the targets are extremely challenging
- concerns over the deliverability of the targets and
- evidence base used for setting the targets was considered to be weak, relying on scenarios and assumptions that were unlikely to come forward in the timescales stated, unless there was a major change in current planning practice

It was however recommended by the panel that the targets were retained in the RSS as an interim measure until more detailed work could be undertaken to develop 'realistic and deliverable' targets. Owing to the concerns expressed by the panel report, all targets set out in the adopted East Midlands plan are indicative only.

The targets provide a break down by renewable energy technology. In the short term up to 2010, onshore wind and energy from waste are expected to make the greatest contributions. In the longer term up to 2020, microgeneration from wind and PV becomes the most significant renewable energy source.

The East Midlands does not suggest any break down of the targets by sub-region, although it does provide an outline of the type of renewable energy technologies and their deployment potential in each sub-region. Existing evidence upon which to base sub-regional targets was considered too weak and further work with a view to setting sub-regional targets has since been identified as a priority.

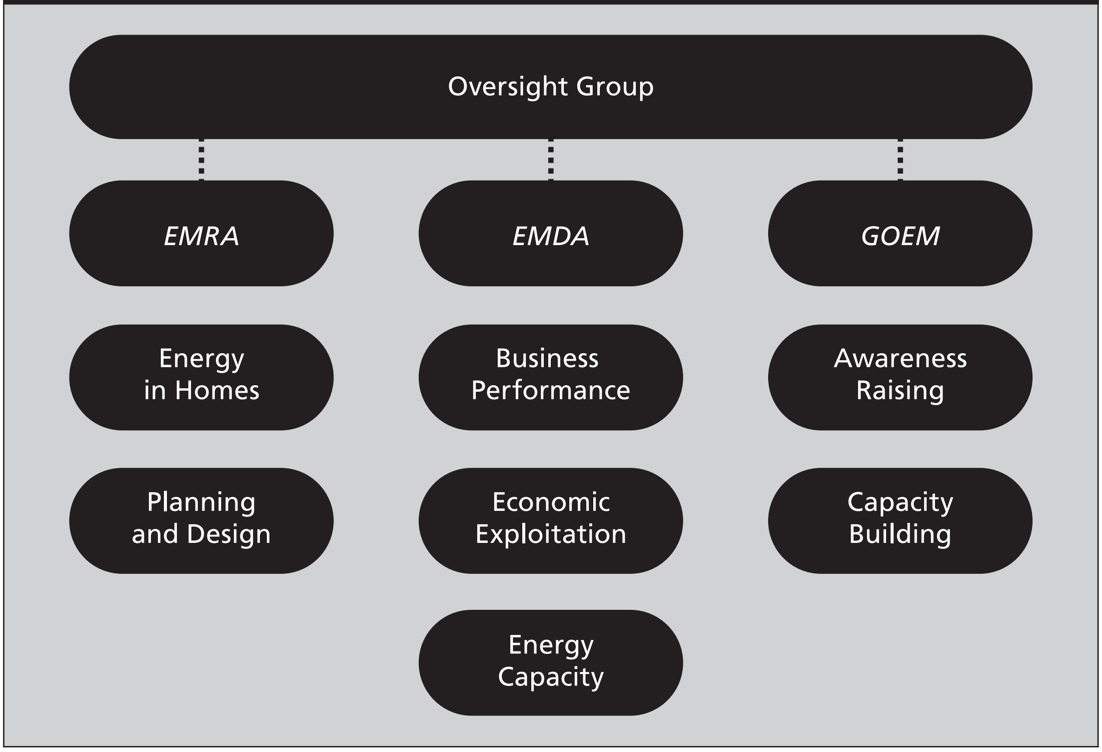
Key evidence base documents on which the targets contained within the East Midlands plan were based are the ***Regional Energy Strategy*** (2005) and two more recent studies – ***Determining Baseline Energy Consumption Data*** and ***Regional Targets and Scenarios for Renewable Energy,*** both completed in 2006. The regional targets and scenarios report considered five different regional scenarios, from business as usual to various means of achieving 20% renewable energy production by 2020 and the combined effect of energy efficiency measures. The indicative targets subsequently included in the RSS were based on a modified scenario 4d, which considered the effect of energy efficiency measures on the achievement of 20% renewable energy by 2020, using large scale renewables and microgeneration (excluding offshore wind and co-fired biomass). The targets contained within the East Midlands plan reflect – and in some cases exceed – the maximum targets suggested in the regional targets and scenarios assessment – the most notable being the adoption of a 2020 onshore wind target originally proposed for 2050, and a similarly ambitious microgeneration 2020 target which exceeds previous assessments and evidence and is expected to contribute to over 50% of the region's renewable energy target. A summary of the region's renewable energy evidence base is provided in Table 5.2.

Table 5.2 **East Midlands renewable energy evidence base documents**			
Document	*Date*	*Author*	*Client*
Regional Biomass Active Demand Mapping	2007	JHWalter	Natural England
Renewable Energy Strategy Framework for Action	2007	EMRA, EMDA, GOEM	EMRA, EMDA. GOEM
Regional Targets and Scenarios for Renewable Energy	2006	Best Foot Forward (Craig Simmons & Ignacio Gonzalez)	EMRA
Determining Energy Consumption Baseline Data	*2006*	*Best Foot Forward*	*EMRA*
Summary of Current Renewable Energy Capacity at County Level	*2006*	*Best Foot Forward*	*EMRA*
Renewable Energy Strategy	*2005*	*EMRA, EMDA, GOEM*	*EMRA*
Viewpoints on Sustainable Energy	2001	Land Use Consultants and IT Power Ltd	EMRA
Towards a Regional Energy Strategy	2003	Land Use Consultants, with National Energy Foundation and IT Power	EMRA
Wood Fuel Usage in the East Midlands Region	2004	ERIN Research Ltd	Forestry Commission and EMRA
East Midlands Renewable Energy Planning Study	1998	Unknown	Unknown
(Italics denotes key evidence base document)			

5.1.2 Key players

Up to this point, the East Midlands regional assembly have been principally responsible for driving forward the renewable energy agenda in the region, having commissioned the majority of existing and forthcoming evidence base work. In terms of future work and responsibilities, the regional energy etrategy identifies complementary roles for the East Midlands regional assembly, East Midlands Development Agency and Government Office for the East Midlands (Figure 5.1).

Figure 5.1 **Responsibilities in relation to renewable energy development in the East Midlands**



5.1.3 Progress towards targets

The East Midlands annual monitoring report 2007-08 provides information on the generation of electricity from renewable sources from 2003 to 2007, based on BIS energy trends data. In terms of progress towards meeting its renewable energy targets, the AMR reports that 847GWh was being generated from renewable energy sources (including hydro, wind/wave, landfill gas and other biofuels and excluding extant planning permissions ((planning permissions not yet implemented)) (Figure 5.2).

Figure 5.2 **East Midlands renewable energy AMR data (GWh)**

	Hydro	*Wind/Wave*	*Landfill Gas*	*Other Bio fuels*	*Total*
2003	5.5	1.3	223.1	202.7	432.6
2004	11.1	#	287.2	79.0	377.3
2005	14.7	17.2	305.3	307.7	644.9
2006	15.2	81.2	290.3	276.9	663.6
2007	14.2	132.3	312.1	388.4	847.0

Source: East Midlands Regional Plan Annual Monitoring Report (2009)

Installed generating capacity reported in the East Midlands AMR is the same as that reported by BIS energy statistics (2008). According to these figures, the East Midlands has delivered 36% of its 2010 renewable energy target to date.

Key findings from the AMR in relation to regional progress include:

- increased interest in wind development; the 2010 target of 122MW onshore wind is likely to be met, although the 2020 target remains challenging
- other renewable technologies are less well developed but policy support is expected to lead to further activity in these areas
- biomass installations are growing and the market is increasing
- the market for small scale generation is supported, although the main barrier continues to be cost
- small scale hydro projects are coming forward and
- it is difficult to monitor heat. The woodfuel biomass sector is increasing and projects are coming forward for district heating systems. There is also a growing market for ground source heat pumps

5.1.4 Monitoring

The East Midlands monitors progress against its renewable energy targets annually via a number of sources:

- BIS energy trends data (key data sources)
- recent studies undertaken in the region
- conformity statements (for schemes over 3MW)
- energy consumption data

These data sources are considered to be reasonably effective and reliable, although more detailed breakdown of data (for example at the local authority level) would be useful. The regional assembly intends to begin monitoring renewable energy planning applications as part of their next round of monitoring.

5.1.5 Further work

A partial review of the East Midlands plan – which will include consideration of renewable energy policies, is currently in its early stages. EMRA have commissioned Faber Maunsell to undertake a review of the existing renewable energy targets, the results of which are due at the end of March. As well as undertaking a technical assessment of renewable energy resources, the assessment is also considering how these can be implemented through planning by adopting a more spatial approach to the adoption of targets and considering a range of targets at different spatial scales (from individual buildings to wind farms) and the technologies that might be most appropriate at these scales.

5.2 East of England

5.2.1 Targets and evidence base

The East of England plan was published in May 2008. Table 4.3 summarises current renewable energy targets and progress towards meeting them.

Table 5.3 **East of England renewable energy targets**

Renewable Energy Target (MW)		*Total installed generating capacity*	*Progress towards 2010 target*	*Progress towards 2020 target*	*Required additional to 2020*
2010	*2020*	*MW*	*%*	*%*	*MW*
820	1620	478	58	30	1160

Sources: BIS Energy Statistics (2008), East of England Plan (2008)

East of England plan policy ENG2 sets out percentage targets for the generation of renewable energy as a proportion of total electricity consumption; estimates of installed capacity are provided in the supporting text. The targets set out in policy ENG2 do not include an offshore component. A contribution from offshore renewables is however identified in the supporting text, the contribution from which increases the renewable energy target for 2020 from 17% to 44% of total electricity generation. The regional targets do include a component of microgeneration, although the 2000 report on which they are based only identified this as a very small component of the 2010 target. The East of England plan does not include any policies for renewable heat, although it is anticipated that the forthcoming East of England plan review will consider the potential for renewable heat generation in the region.

The 2010 regional target contained within the draft East of England plan is derived from the study published in 2000 entitled ***Making Renewable Energy a Reality – Setting a Challenging Target for the Eastern Region***. This report assisted the East of England sustainable development round table and regional stakeholders to understand the issues around, and agree indicative targets for renewable energy capacity in the region. Although the 2000 study had proposed county targets, these were not formally adopted. The 2000 report set out potential contributions that each county might make to the achievement of the regional target through the exploitation of the various technologies. In reviewing the targets for inclusion in the draft RSS, it was decided that sub-regional or county figures should not be given; rather the emphasis should be that each part of the region should bring forward the maximum contribution.

The same consultants were commissioned in 2003 to review the 2010 target; re-present a 2010 target with off-shore wind excluded and to propose a target for 2020, set out in ***Regional Renewable Energy Targets for the East of***

England 2010 and 2020 (2004). The consultants used largely the same modelling methodology as before in doing this work, which was essentially a desk based exercise without stakeholder consultation. Modelling was based on a number of energy sector and general economic variables and did not take account of some of the practical restraints applying to renewable energy deployment across the region – especially relating to wind projects. The study did not update or define county or sub-regional level targets. A summary of the region's renewable energy evidence base is provided in Table 5.4.

Table 5.4 **East of England renewable energy evidence base documents**

Document	*Date*	*Author*	*Client*
Placing Renewables in the East of England	2008	Arup, White Consultants and the University	East of England regional assembly
Regional Renewable Energy Targets for the East of England 2010 and 2020	*2004*	*ESD, Global to Local Ltd, & Tony Hams Associates*	*Unknown*
Making Renewable Energy a Reality – Setting a Challenging Target for the Eastern Region	*2000*	*ESD & Global to Local Ltd*	*East of England Sustainable Development Round Table*
Eastern Region Renewables Energy Planning Study	1997	ETSU & Terence O'Rourke Plc	Unknown
(Italics denotes key evidence base document)			

The final East of England plan published in May 2008 contained a policy that requires EERA to commence an early focused review, to be completed by 2011. The review requires the plan to extend its coverage to 2031. In 2008, Arup and White Consultants were commissioned by the East of England regional assembly (EERA) to conduct a study to inform the review of the East of England plan to 2031, with regard to renewable energy generation.

Placing Renewables in the East of England focused on a selection of grid-connected onshore renewable energy technologies (wind, biomass and landfill gas), and any significant visual or landscape implications arising from the onshore grid connection of offshore wind installations (offshore wind is covered by a separate consents regime).The report presents three scenarios of renewable energy targets (theoretical maximum, expected, and business as usual), each presenting a different extent of renewable energy generation and includes an indicative break-down of the total installed capacity by county and technology.

5.2.2 Key players

To date, the East of England regional assembly (EERA) has driven much of the work on renewable energy in the region. The regional assembly and East of England Development Agency (EEDA) are however supported by Renewables East – the renewable energy agency for the East of England. The main role of Renewables East is to drive forward the agenda of a full range of low carbon energy solutions into the East of England economy, whilst ensuring the region exploits the best economic benefit and delivers jobs in an emerging and exciting global market. Renewables East works in three areas in particular – offshore renewable energy, bio energy and on site renewables.

In addition, the sustainable development round table was set up in 2006, as an independent body whose aims are to promote sustainable development in the East of England. It brings together people with relevant experience and expertise from across the region and across disciplines to explore issues, challenge current practice, raise awareness, change perceptions and act as a 'critical friend' to key regional bodies in the integration of economic, environmental and social policies. It will also strive to influence those who are responsible for delivering these policies.

5.2.3 Progress towards targets

At the time of writing, the East of England annual monitoring report for 2007-08 was not yet available. However, the Renewables East publication *The East of England Renewable Energy Statistics* (June 2008) reports that the region has 416MW of installed onshore renewable energy capacity, rising to 476MW with the inclusion of offshore wind (Figure 5.3). These figures are taken from a variety of sources, including Renewables East, DTI energy trends and Ofgem and are broadly similar to those reported in the BIS energy statistics (2008).

According to these statistics, the report concludes that the East of England is on course to meet its 2010 target. Our own analysis shows that the East of England has already delivered 66% of its onshore renewable energy target for 2010.

Figure 5.3 **2010 regional target by technology and progress to date**

	2010 target in Gw/h/yr+	*2010 target express in MW installed capacity +*	*Latest data, MW of installed of capacity**	*Latest data, in GY/h/yr*
Onshore wind	1700	647	120	273
Biomass	700	94	110	816
Landfill gas	600	76	182	1436
Others	6**	4	4	28
Total onshore	**3006**	**820**	**416**	**2553**
Offshore wind	1300	371	60	158
Total	**4306**	**1192**	**476**	**2711**

* Sources: Renewables East (wind), DTI Energy Trends Sept 07 (biomass and landfill gas) and OFGEM for other technologies

** Low figure – assumed as the PV contribution. Actual delivery is from sewage gas.

\+ Source: "Making renewable energy a reality – setting a challenging target for the East of England" 2000

Source: East of England Renewable Energy Statistics (2008)

As well as installed generating capacity, the *East of England Renewable Energy Statistics* (2008) report provides data by renewable energy technology type on extant planning applications and those in the planning system but not yet approved. Data is also provided at a disaggregated county level.

5.2.4 Monitoring

The East of England regional assembly use Renewables East to monitor the progress (MW and %) towards 2010 and 2020 targets. Renewables East produce a six monthly progress report (the latest being June 2009).

Key data sources include:

- DTI energy trends
- OFGEM
- monitoring undertaken by Renewables East.

5.2.5 Further work

The East of England regional assembly is carrying out their own survey work with local authorities to determine how they are implementing policy ENG1 in relation to on-site targets. Renewables East are also taking forward further work to inform sub-regional targets.

5.3 London

5.3.1 Targets and evidence base

Further Aaterations to the London plan – incorporating revised policies on renewable energy, where published in 2007. Table 5.5 summarises the current London renewable energy targets and progress towards those targets.

Table 5.5 **London renewable energy targets**

Renewable Energy Target (MW)		*Total installed generating capacity*	*Progress towards 2010 target*	*Progress towards 2020 target*	*Required additional to 2020*
2010	*2020*	*MW*	*%*	*%*	*MW*
99	375	1171	18	31	684

Sources: BIS Energy Statistics (2008), London Plan (2008)

Renewable energy polices contained in the London plan do not themselves set out any specific targets for renewable energy generation. Instead, targets for renewable energy generation are provided as an accompanying table to relevant supporting text, expressed in MW, MWh and as a percentage of total electricity consumption. The targets are broken down by renewable energy technology, but not by sub-region. In 2010, biomass fuelled CHP is anticipated to provide the greatest contribution towards the capital's targets, followed by energy from waste and wind. By 2020, energy from waste has become the single most important contribution, followed by biomass fuelled CHP and wind. Micro and small scale generation are also anticipated to contribute a significant proportion of the overall target. Understandably, the targets do not include any allowance for offshore renewables.

Most notable is the small proportion of total electricity consumption that is expected to be generated from renewable energy during the plan period – reaching just 3.2% by 2020. This is perhaps however a reflection of the much higher energy consumption level in London when compared to other regions, combined with the spatial constraints of an entirely urban policy area which inevitably limits opportunities for largescale renewable energy policies and increases dependence on building integrated renewables. It is worth noting however that the London plan has complemented its renewable energy targets with strong policy direction and emphasis on the development of heating and cooling networks, energy efficiency and the achievement of a 20% of carbon emissions in new developments from on site renewable energy generation.

The targets contained in the London plan are based on ***The Mayor's Energy Strategy*** (2004) and a previous assessment undertaken in 2001 – ***Renewable Energy Assessment and Target for London*** (2001), later added to by what the London plan terms 'further analysis by the GLA', which included work undertaken by the London Energy Partnership. Although the London plan states that its targets reflect those of the energy strategy, the targets contained within the London plan differ from those set out in the energy strategy in terms of total renewable energy capacity identified, technological split and renewable energy technologies included – particularly in relation to the treatment of waste as a source of renewable energy (incineration was excluded from the London plan targets). Whilst the London plan includes a target of 228GWh, the energy strategy sets a target of 665GWh electricity generation from renewable sources. The energy strategy also includes a target for the generation of 280GWh of heat by 2010. However, the London plan does not include a target for heat, as this was not a requirement specified in PPS22. It is intended that a target for heat will be included in the next update of the London plan. A full list of renewable energy evidence base documents is provided in Table 5.6.

Table 5.6 London renewable energy evidence base documents

Document	*Date*	*Author*	*Client*
Biomass for London: Wood Fuel Demand and Supply Chains	2008	BioRegional Development Group SE Wood Fuels and Creative Environment Networks	London Energy Partnership
London Wind & Biomass Study Summary Report: Feasibility of the Potential for Stand Alone Wind and Biomass Plants in London (and supporting reports)	2007	SEA/ RENUE	London Energy Partnership
Deployment of Photovoltaics on London's Roadside Noise Barriers	2007	SEA/ RENUE	London Energy Partnership
Evidence Base: Climate Change in the Further Alterations to the London Plan	2007	Arup	GLA
Scenario Testing for the Further Alterations to the London Plan	2006	Berkeley Hanover Consulting Ltd	GLA
Carbon Scenarios to 2026	2006	SEA/ RENUE	London Energy Partnership
London Community Heating Development Study	2005	Parsons Brinckerhoff Ltd in association with RAMBOLL	GLA
Green Light to Clean Power: Mayor's Energy Strategy	*2004*	*GLA*	*GLA*
Integrating Renewable Energy into new developments: toolkit for planners, developers and consultants	2004	London Energy Partnership and Faber Maunsell	GLA
Attitudes to renewable energy in London: public and stakeholder opinion and the scope for progress	2003	Brook Lyndhurst Ltd in association with MORI and Upstream for London Renewables	GLA
London Hydrogen Action Plan	2002	GLA	GLA
Development of a Renewable Energy Assessment and Targets	*2001*	*AEA Technology*	*GLA*
Exploiting Renewable Energy in London	2000	London Research Centre	Unknown

(Italics denotes key evidence base document)

Whilst London has undertaken a considerable amount of work in relation to renewable energy, there have been no comprehensive assessments of renewable energy resources in London since 2001, although further work was undertaken during 2006 in support of the further alterations to the London plan. The *Evidence Base for Climate Change Policies* which was produced in 2006 did not undertake any primary assessments of renewable energy potential across the capital as a whole, drawing instead on previous evidence base assessments. It did not address the issue of overall renewable energy targets in any great detail, its primary focus being on the feasibility of achieving a 20% reduction in carbon emissions from on site renewable energy generation. Scenario testing work undertaken for the further alterations to the London plan found that renewable energy development was unlikely to be affected by higher or lower population and employment scenarios.

There are no evidence base documents that appear to have undertaken a comprehensive review of renewable energy potential in London up to 2020. Instead, the energy strategy (2004) simply expects renewable energy capacity to simply to at least triple by 2020, to remain on the same timescale as the Government.

Despite the lack of a comprehensive renewable energy assessment since 2001, there have been several renewable energy specific assessments, the most notable being the London Biomass and Wind Study, the findings from which appear to be reflected in the emphasis placed by London plan policy on biomass and wind as key renewable energy sources.

5.3.2 Key players

The Greater London Authority – and, increasingly, the London Energy Partnership (LEP), have commissioned the majority of work in relation to renewable energy policy and development in London. The LEP was launched in 2004 to work with a range of partners across London to promote a sustainable energy future. The LEP works in close partnership with the Mayor of London, in response to the changing policy environment. The partnership works through a number of task and project groups, where current work covers fuel poverty, decentralised energy, biomass and the development of low carbon zones.

5.3.3 Progress towards targets

The 2009 London AMR reports that London is unlikely to meet its renewable energy target for 2010. However, the target quoted in the AMR (945GWh including heat) is based on the *Mayor's Energy Strategy* (2004), which is considerably higher than that set out in the London plan (99MW by 2010). Data reported in the AMR is taken from the London *Renewable Energy Capacity Study* (draft 2007), which states that there is currently 114MWh of installed renewable energy capacity electricity across London (Figure 5.4). This is broadly similar to that reported by BIS energy statistics (2008).

Although lower than the energy strategy 2010 target, current installed generating capacity already exceeds the target quoted in the London plan (99MW).

Figure 5.4 Energy produced in London per annum from renewable sources

	2001	*2007*	*2001*	*2007*	*2001*	*2007*	*2001*	*2007*
Technology	*Output Electricity (MWh)*		*Output Heat (MWh)*		*Capacity Installed (MWe)*		*Capacity Installed (MWt)*	
PV <50kWe	338	**3,086**				**4,101**		
PV >50kWe		**80**				**0.114**		
Solar heating			3,840	**4,305–14,985**				**10,683–37,465***
Biomass				**3,979**				0.2
Biodegradable fraction of MSW incineration	256,000	**302.610**			64			
Sewage Sludge Incineration	44,900	**47,071**			17.3			
Small/Micro Hydro	44							
Landfill Gas	64,000	**119,358**			18,182			
Sewage Gas	49,000	**21,102**	42,500	**30,600**		**6.78**		**14,571**
Wind <50kWe	0.2	**255**				**0.083**		
Wind >50kWe		**9,466**				**3.6**		
Commercial and Domestic Heat Pumps				**180**				**0.079**
Total excluding MSW** incineration	158,300	**200,418**	46,300	**39,063–49,744**		**50,397**		**25,533–52,314**
Total including MSW incineration	414,300	**503,207**	46,300	**39,063–49,744**		**114,397**		**25,533–52,314**

* London estimate (from national figures) for solar heating installed as an output of government funding schemes

** Municipal Solid Waste

Source: London Renewable Energy Capacity Study (Draft) SEA/RENUE April 2007

Source: London Plan Annual Monitoring Report 5 (2009)

In terms of potential barriers to achieving these targets, policy officers mentioned issues relating to maintaining air quality in relation to small scale biomass installations, the lack of funding/ fiscal mechanisms and incentives under the RO to support small scale renewable energy developments and the current cost of small scale technology.

5.3.4 Monitoring

Monitoring of progress towards renewable energy targets is undertaken annually by the GLA via a number of sources:

- questionnaire sent out to all local authorities
- Ofgem ROC register

- government funding programmes (e.g. low carbon buildings and major PV demonstration programme)
- microgeneration certification scheme

Officers have highlighted several issues relating to the monitoring of renewable energy installations – in particular to the paucity of data and tools available to local authorities to monitor renewable energy installations post planning permission (i.e. the implementation).

5.3.5 Further work

A full revision of the London plan has been commenced, with a view to publishing an entirely new plan by 2011. The scope of renewable energy work to be undertaken to inform this revision is still in its early stages of development. Any work undertaken is also expected to input into a revised renewable energy strategy. Work is expected to cover a range of renewable energy technologies, although the scope of assessment is likely to be limited by budget and time constraints (for planning purposes, work must be completed in the next 6-8 months).

5.4 North East

5.4.1 Targets and evidence base

5.4.2 RSS status and regional targets

The revised regional spatial strategy for the North East region was published in July 2008. Table 5.7 summaries the current North East renewable energy targets and progress towards those targets.

Table 5.7 **North East renewable energy targets**

Renewable Energy Target (MW)		*Total installed generating capacity*	*Progress towards 2010 target*	*Progress towards 2020 target*	*Required additional to 2020*
2010	*2020*	*MW*	*%*	*%*	*MW*
454	897	155	17	10	1678

Sources: BIS Energy Statistics (2008), North East Plan (2008)

Regional targets for the generation of renewable energy are set out in North East plan policy and expressed both as a percentage and MW of minimum installed capacity. Minimum sub-regional targets for 2010 are also set out in policy. The adopted targets do not contain an offshore component; whilst the region has a recognised offshore resource it is not possible at this stage however to estimate what this resource might amount to.

The North East plan does not contain any targets for the generation of renewable heat. The amount of renewable heat being produced at the present time is unclear and more work is needed to establish the base position for each source of renewable heat. However, this may be considered as an add-on once round 3 leasing has been confirmed.

The North East Regional Renewable Energy Strategy (RRES), first published in July 2003 and later reviewed in March and November 2005, was the most influential document to inform the regional renewable energy targets contained within the North East plan. The methodology behind each version largely consisted of three technical studies: ***The Development of a Regional GIS for the North East Renewable Energy Strategy***, ***North East of England Renewable Energy Strategy – Examination of Grid Connections***, and the ***Landscape Appraisal for Onshore Wind Development***, all published in 2003. A full list of renewable energy evidence base documents is provided in Table 5.8.

Table 5.8 **North East renewable energy evidence base documents**

Document	*Date*	*Author*	*Client*
A Study of Future Residual Waste Treatment Capacity and the Potential for Refuse Derived Fuel Production	2006 assembly	Entec UK Limited	North East regional
North East Regional Renewable Energy Strategy: Review	*2005*	*TNEI Services*	*North East regional assembly*
regional spatial strategy (RSS) for the North East – Technical Background Paper No. 7: Energy	2005	North East regional assembly	North East regional assembly
North East Regional Renewable Energy Strategy: Final Report	*2003*	*TNEI Services North East regional assembly*	*North East regional assembly*
The Development of a Regional GIS for the North East Renewable Energy Strategy	*2003*	*Northumbria University and Centre for Environmental and Spatial Analysis*	*North East Renewable Energy Group*
North East of England Renewable Energy Strategy – Examination of Grid Connections	*2003*	*Parsons Brinkerhoff Power*	*North East Renewable Energy Group*
Landscape Appraisal for Onshore Wind Development	*2003*	*University of Newcastle and Landscape Research Group*	*Government Office for North East*
A Biomass Action Plan for the North East of England	2003	TNEI Services	North East regional assembly
Towards a Waste Strategy for the North East of England	2003	Environmental Resources Management (ERM)	Unknown
Proposed Targets for the Development of Renewable Energy in the North-East to 2010	2000	Unknown	Unknown

(Italics denotes key evidence base document)

The draft RRES (2003) did not contain specific renewable energy targets for the region as a whole, or for sub-regions. It did however conclude that there are sufficient resources to generate 10% of the region's electricity consumption by 2010, and that achieving a 20% would be possible if strategic scale wind development took place within Kielder Forest. Assessments within later iterations of the regional energy strategy were based on information from the 2003 Draft RRES, local authorities, developers, government departments and other agencies. Information gaps within the RRES were filled and the detailed coverage of certain technologies was increased. The RRES of March 2005 focused largely upon electricity producing renewable technologies, because of their direct relevance to the Government's targets and emerging RSS targets. The November 2005 review also included coverage of biodiesel and heat from renewables.

The 2006 panel report from the draft North East plan examination in public highlighted issues relating to the regional targets:

- several participants commented on the fact that policy 40 requires Northumberland to provide the largest proportion of future renewable generation. It was suggested that the targets should be re-balanced to provide a more equitable distribution throughout the region. However, in our view the targets must reflect the opportunities for increased generation which are themselves a reflection of geography, settlement pattern and development potential. Hence sub-regional targets cannot be based on the proportion of existing consumption or any other proportional population based measurement

- policy 40 d) should include targets for sub-regional renewable energy generation in the year 2020 in order to reflect the aspiration set out in policy 40 b) and to set a challenging, but realistic, policy objective

5.4.3 Key players

To date, the North East regional assembly and North East Renewable Energy Group (NEREG) have commissioned the majority of work on renewable energy in the region. NEREG takes the regional lead for co-ordinating activity in developing renewable energy installations and industry in the North East. Its primary aim is to increase understanding, acceptance and to facilitate the delivery of renewables within the region by bringing together representatives from government agencies, local authorities, traditional and renewable energy industries, NGOs and environmental groups, universities, industry, developers, communities, and business and energy support and advice organisations.

5.4.4 Progress towards targets

The North East annual monitoring report 2007-08 provides information on renewable energy planning permissions and their potential installed generating capacity (MW). It does not distinguish between those schemes that have actually been installed and those that have not. As such, installed generating capacity is reported as a minimum, rather than an exact figure (Figure 5.5).

Figure 5.5 **Permissions by technology and sub-region in the North East**

	Wind		*Solar*		*Biomass*		*Ground source heat pump*	
	Number	*Potential capacity (MW)*	*Number*	*Potential capacity (MW)*	*Number*	*Potential capacity (MW)*	*Number*	*Potential capacity (MW)*
Northumberland	14 (0)	>0.32	1 (0)	Unknown	1 (0)	0.3	1 (0)	0.06
Tyne and Wear	9 (5)	>15.56	6 (4)	>0.03 (Unknown)	1 (0)	3	0	0
County Durham	29 (4)	>125,2265 (>45)	8 (1)	>0.1	0	0	2 (1)	Unknown
Tees Valley	4 (3)	>98.46	3 (0)	Unknown	2 (2)	>20	1 (1)	Unknown
North East England	**56 (12)**	**>239.57 (135)**	**18 (5)**	**>0.13**	**4 (2)**	**>23.3**	**4 (2)**	**>0.06**

Source: North East Annual Monitoring Report 2007/8

Data is provided by sub-region and renewable energy technology. The AMR notes that the largest number of schemes has been for wind energy, although there have been an increasing number of solar projects in recent years. Total potential renewable energy capacity as reported from planning permissions is >263MW. This is considerably higher than the figure of 155MW provided in the BIS Energy Statistics (2008), although this is likely to be a reflection of the number of planning permissions that have actually been installed since obtaining planning permission. According to the BIS statistics, the North East has delivered 17% of its 2010 renewable energy target to date.

5.4.5 Monitoring

As part of the annual monitoring process, the North East regional assembly asks local authorities to provide information on the number and potential generating capacity of renewable energy projects.

The 2007-08 AMR reports however that there is still a challenge in getting consistent and accurate information on the potential capacity of projects. It is therefore likely that many smaller schemes, in particular for solar power and ground source heat pumps, are going unrecorded as they fall outside the requirements of the statutory planning system.

5.4.6 Further work

Landscape studies are currently being conducted at a local authority level as part of an overall onshore wind review. No other work has currently been commissioned in reviewing renewable energy policies or targets contained within the North East plan. A number of other actions are currently in place to help encourage renewable energy development and target delivery, including:

- ensure that work on a landscape capacity study relating to onshore wind in north and south upland Durham is completed. This will ensure that all of the 'Ws' identified in the RSS have had capacity studies
- make progress in developing a policy to help to monitor the installation of combined heat and power (CHP) schemes and measure their capacity
- refresh the micro-renewables toolkit, and ensure the implementation of the toolkit can be monitored effectively
- review the information to be collected for the 2008-09 AMR and
- establish a consistent database of developments, which will contribute to targets being met in the future

5.5 North West

5.5.1 Targets and evidence base

The regional spatial strategy for the North West of England was adopted in September 2008. Table 5.9 summaries the current North West renewable energy targets and progress towards those targets.

Table 5.9 **North West renewable energy targets**

Renewable Energy Target (MW)		*Total installed generating capacity*	*Progress towards 2010 target*	*Progress towards 2020 target*	*Required additional to 2020*
2010	*2020*	*MW*	*%*	*%*	*MW*
937	1345	478	51	36	2363

Sources: BIS Energy Statistics (2008), North West Plan (2008)

Currently, North West plan renewable energy policy only expresses its renewable energy target in terms of a percentage of total electricity generation. Renewable energy capacity (including offshore renewables), technology specific break downs and sub-regional targets are only provided indicatively in supporting text and tables. In the short term, offshore wind, onshore wind and biomass are expected to make the greatest contribution. Looking forward to 2020, offshore wind will progressively increase and is expected to produce over half of the region's renewable energy. The evidence base provides a sub-regional split which is not reiterated within the RSS. The North West published a microgeneration strategy in 2006, thereby recognising its importance in increasing the contribution from renewable energy sources. Currently, the North West plan does not include any policies for the generation of renewable heat.

Targets contained within the North West plan have been informed by ***Advancing Sustainable Energy in the North West: Mapping the Way Forward to 2020*** (2004), ***Renewable Energy Targets for the North West*** (2006), and ***Renewable Energy in the North West: Investigating the Potential and Developing the Targets*** (2001). The report of 2006 set out three scenarios based on assumptions relating to regional electricity usage and disseminating technological targets based on predicted electricity usage. A summary of all evidence base documents is provided in Table 5.10

Table 5.10 **North West renewable energy evidence base documents**

Document	*Date*	*Author*	*Client*
renewable energy targets for the North West (Technical Briefing Note) – A Report to the North West regional assembly	*2006*	*Future Energy Solutions: AEA Technology*	*North West regional assembly*
Advancing Sustainable Energy in the North West: Mapping the way forward to 2020	*2004*	*Environmental Resource Management (ERM)*	*North West regional assembly*
From Power to Prosperity – Advancing Renewable Energy in the North West	2001	Environmental Resource Management (ERM)	North West Climate Group
Renewable Energy in the North West: Investigating the Potential and Developing the Targets	*2001*	*Environmental Resource Management (ERM)*	*Government Office for the North West*
(Italics denotes key evidence base document)			

The 2007 panel report, published after the draft North West plan public examination, identified a number of issues relating to the targets including:

- a region-wide assessment of landscape quality should be carried out to provide a more consistent approach across the region and to help produce a map of broad locations
- industry representatives felt that it was essential to set stretching targets otherwise progress would be very slow. Council representatives generally supported the targets but were concerned that insufficient schemes were coming forward on the ground to enable them to be met
- considerable reservations about the inclusion of energy from waste, and much discussion as to which types of energy from waste might be legitimate
- query over whether there was sufficient information to support installed capacity and sub-regional targets set out in accompanying tables

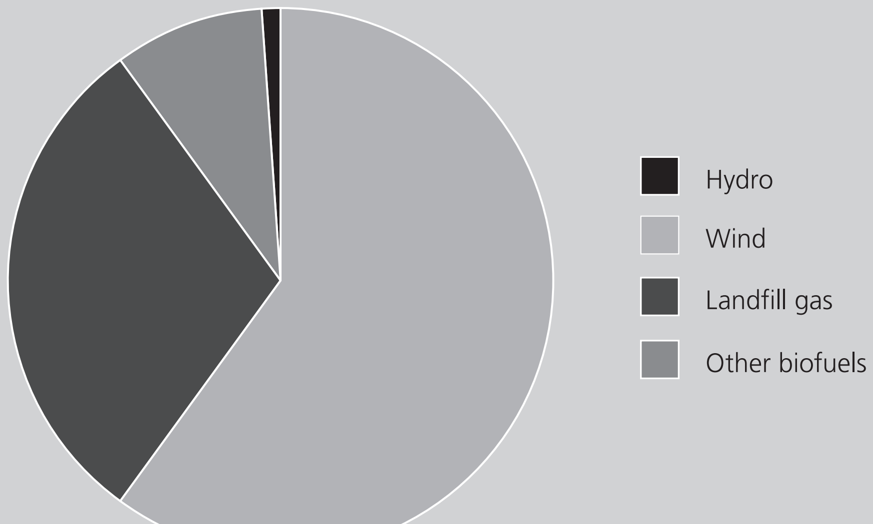
5.5.2 Key players

The North West regional assembly and Government Office for the North West have commissioned the majority of renewable energy evidence base research to date. The regional assembly has now been superseded by ‘4NW’, which is the Regional Leaders Forum for the northwest of England and new regional planning body for the North West. The region does not currently have a specific renewable energy agency or energy group.

5.5.3 Progress towards targets

The North West annual monitoring report 2007-08 reports that in 2007, the region’s renewable energy capacity was 477.7MW (including offshore wind). This represents a 34.2% increase on the previous year, the biggest contribution being from wind energy (Figure 5.6). The AMR reports that wind has now overtaken landfill gas as the region’s biggest source of installed renewable electricity capacity. Further detailed breakdown of installed generating capacity is provided in accompanying data tables, based on BIS energy trends.

Figure 5.6 **Renewable energy capacity in the North West, 2007**



Source: BERR, Energy Trends – September 2008

Currently, the North West has delivered 51% of its 2010 target. The AMR does not provide data relating to extant planning permissions. However, it is understood that the list of planning applications already in the pipeline is not sufficient to meet the 2010 target.

A particular delivery issue identified in the AMR is the reliance on banks, who have played a significant role in financing renewables projects to date. If banks stop lending due to the economic downturn, further projects may not go ahead, which will impact on regional performance. Other issues relate to the delivery of onshore and offshore wind, which are expected to make a significant contribution to the current regional targets. Siting of onshore wind farms is a particular issue, although a more streamlined planning process such as that envisaged by the Infrastructure Planning Commission (IPC) will assist in this respect. Significant shifts in policy relating to noise impacts, MOD land and landscape are also required in order to maximise contributions from onshore wind.

5.5.4 Monitoring

Primary data used by 4NW to monitor renewable energy progress against targets comes from BIS Energy Trends, which provides information on installations by location and technology type.

Although the current North West plan does not include targets for renewable heat, the AMR 2007-08 recommends that in the absence of national renewable heat targets, the region should adopt renewable heat targets for three technologies (residential solar water heating, wood heating and ground source heat pumps) expressed by the number of schemes and indicative output in GWh hours per annum (GWh/yr).

5.5.5 Further work

It was originally anticipated that the current renewable energy targets would be reviewed as part of the partial review of the existing RSS. However, this has now been superseded by work towards the single regional strategy – RS2010. Currently, evidence base gathering for renewable energy is at the scoping stage until work begins on the renewables section of RS2010.

5.6 South East

5.6.1 Targets and evidence base

Consultation on the proposed changes to the South East plan ended in October 2008. The Government Office for the South East is expected to publish the final South East plan in spring 2009. Table 5.11 summarises the proposed South East renewable energy targets and progress towards those targets.

Table 5.11 **South East renewable energy targets**

Renewable Energy Target (MW)		*Total installed generating capacity*	*Progress towards 2010 target*	*Progress towards 2020 target*	*Required additional to 2020*
2010	*2020*	*MW*	*%*	*%*	*MW*
420	830	334	80	30	1993

Sources: BIS Energy Statistics (2008); South East Plan Proposed Changes (2008)

South East plan targets for renewable energy generation are set out in policy and expressed as MW installed capacity and percentage of electricity generation. Indicative sub-regional targets up to 2016 are also set out in policy. The regional (but not the sub regional) targets include an offshore renewable element, which comprises 32% of the 2010 target. The targets do not include a specific breakdown by renewable energy technology, although indicative sub-regional land based and offshore potential up to 2016 is provided. Renewable energy resources identified with the greatest potential are onshore and offshore wind, biomass and solar. In the longer term (beyond 2016), solar, wave and tidal stream energy are identified as having increasing potential. A contribution from microgeneration has been included in the targets, although it is expected to comprise a very small proportion of overall and sub-regional targets in 2010. The South East plan does not include any targets for the generation of renewable heat.

The regional and indicative sub-regional targets proposed in the South East plan are the same as those set out in the proposed alterations to regional planning guidance document ***Harnessing the Elements***, which was published in 2003, prior to the publication of PPS22. These targets were based on research into renewable energy deployment in the South East carried out between 2001 and 2003. The majority of baseline research was undertaken by ETSU/ AEA Technology plc and Terence O'Rourke plc in 2001 in their ***Development of a Renewable Energy Assessment and Targets for the South East***. This was a strategic assessment of the potential for generating electricity from renewable energy sources in the Region, taking into account the potential economic, technical and environmental constraints to their exploitation. Informed by this assessment, the consultants attempted to reach a consensus view on possible targets for generating electricity from renewables by 2010 in the South East – and, to a lesser extent, 2016. This research was updated in 2002 in ***An Assessment of the South East's Renewable Energy Capacity and Potential to 2026*** (including consultation revisions) and targets developed in more detail for 2016, 2020 and 2026. These targets and the accompanying evidence subsequently provided the basis for publication of *Harnessing the Elements* – the South East's proposed changes to regional planning guidance relating to renewable energy and energy efficiency. A summary of renewable energy evidence base documents is provided in Table 5.12. No further evidence base work has been undertaken since 2003.

Table 5.12 **South East renewable energy evidence base documents**			
Document	*Date*	*Author*	*Client*
Harnessing the Elements Proposed Alterations to Regional Planning Guidance, South East – Energy Efficiency and Renewable Energy	*2003*	*SEERA*	*South East regional assembly*
Harnessing the Elements, Supporting Statement	2003	SEERA	South East regional assembly
South East Renewable Energy Targets – Consultation Revisions	*2003*	*AEA Technology*	*South East regional assembly*
An Assessment of the South East's Renewable Energy Capacity and Potential to 2026	*2002*	*AEA Technology and Savills*	*South East regional assembly*
Development of a Renewable Energy Assessment and Targets for the South East	*2001*	*ETSU/ AEA Technology plc and Terence O'Rourke plc*	*Government Office for the South East and Partnership*
South East England Renewable Energy Planning Study	1998	ETSU	DTI
Renewable Energy in the SEEBOARD Area	1995	ETSU	DTI
An Assessment of Renewable Energy in Southern Electric Region	1994	ETSU	DTI
(Italics denotes key evidence base document)			

5.6.2 Key players

To date, much of the recent evidence base work has been commissioned by the South East regional assembly (SEERA) and Government Office for the South East (GOSE). The GOSE and SEERA are supported in their renewable energy work by the South East of England Sustainable Energy Partnership (SESEP). The SESEP is led by the GOSE and comprises a partnership of regional and sub-regional organisations across the South East. Its mission is to develop and implement regional policy and targets for sustainable energy, to share best practice and support projects to meet the region's targets as a contribution to Energy white paper objectives. Other organisations involved in the partnership include The Forestry Commission, TV Energy, Creative Environmental Works, The Environment Centre, Energy Centre for Sustainable Communities, Milton Keynes Energy Agency and County Councils.

5.6.3 Progress towards targets

At the time of writing, the South East had yet to issue their 2009 AMR. Data provided by the South East Renewable Energy Statistics initiative (SEE-Stats) relating to installed renewable energy capacity (broken down by local authority area and technology type) indicates however that the region currently has

359MW installed generating capacity. The greatest contributions have come from landfill gas (136MW) and biomass (110MW). No data was provided in relation to extant planning permissions.

Total installed generating capacity reported by SEE-Stats is marginally higher than that set out in the BIS Energy Statistics (334MW), the difference being due to the ongoing monitoring undertaken by SEE-Stats.

The South East is making good progress towards achieving its 2010 target, having already delivered 80% of the required installed generating capacity to date. In terms of delivering the 2010 and 2020 targets, policy officers did however identify the following issues:

- inconsistency in obtaining planning permission for wind developments (particularly single turbines) and the way in which regional planning policy priorities are applied by local authorities

- issues relating to the establishment of supply chains in advance of or response to demand for biomass – particularly in terms of the cost involved to developers of installing biomass

5.7 *Monitoring*

The South East monitor progress against renewable energy targets on a rolling basis, using Thames Valley's South East Renewable Energy Statistics (). SEE-Stats is an initiative undertaken by Thames Valley Energy and sub-regional data partners on behalf of the South East of England Sustainable Energy Partnership. The initiative was set up in 2003 with the aim of monitoring progress towards regional and sub-regional targets, and to promote existing and prospective installations whilst publicising their technical data and various benefits to stakeholders and the people of the South East of England.

Data is provided from an amalgam of sources and is updated on a rolling basis. SEE-Stats is advantageous as it picks up smaller scale installations, although there are issues relating to systematically being able to maintain and update the database due to its reliance on a variety of data sources.

5.8 *Further work*

The South East has recently commissioned three pieces of research:

- identification of opportunities for combined heat and power (CHP) and district heating/distributed heat supply in the South East of England. Research will provide more detailed assessment of heat loads, identify potential sources of biomass and waste-related fuels, and use this to elaborate on scenarios

- Thames Valley Energy are undertaking a review of the evidence base work which underpinned the renewable energy targets (regional and sub-regional) in RPG9 and the draft South East plan, to inform the review of the renewable energy policies and targets in the preparation of the single regional strategy

- work is being undertaken in relation to local carbon fuels from waste and biomass

5.9 South West

5.9.1 Targets and evidence base

Consultation on the Secretary of State's proposed changes on the draft South West plan ended in October 2008. A final RSS is expected to be published in summer 2009. Table 5.13 summarises the current South West renewable energy targets and progress towards those targets.

Table 5.13 **South West renewable energy targets**

Renewable Energy Target (MW)		*Total installed generating capacity*	*Progress towards 2010 target*	*Progress towards 2020 target*	*Required additional to 2020*
2010	*2020*	*MW*	*%*	*%*	*MW*
509	850	149	29	18	1352

Sources: BIS Energy Statistics (2008), South West Plan Proposed Changes (2008)

Targets for renewable energy generation in the South West are set out in policy and expressed as MWe installed generating capacity. Targets for 2010 do not include offshore renewable energy generations – as concluded in the evidence based reports, the south west coast does not appear to be particularly attractive for the relatively near-shore wind farms that are likely to be built between now and 2010. The high concentration of designations on the coastline, large tidal range and limited areas of shallow water further offshore are expected to limit the identification of feasible wind farm sites in the short term. However, it is also recognised that the South West has one of the best wave and tidal resources within the UK. As a result, a contribution from offshore renewables has been included in the 2020 target and is expected to play a significant part in achieving the 20% renewable electricity target by 2020.

The targets outlined for 2010 were consulted upon and agreed within the counties and/or sub-regions as part of the ***Revision 2010*** Report (2004). Overall renewable energy targets for 2020 including heat and on-site generation were reviewed in the ***REvision 2020*** Report (2005). Prior to this, the ***Renewable Energy Assessment and Target for the South West*** (2004) report highlighted the resource potential without setting targets.

The targets in the RSS are broken down by sub-region and the adopted target range that supports the RSS has been approached cautiously by adopting targets at the lower end of the recommended installed capacity (i.e. 509-611MW (RSS), 563-665MW (from *REvision* 2010)). The targets do not provide a breakdown by technology, although an indicative technology mix by which the 2010 targets might be met is provided. Of this target, onshore wind, energy from waste and biomass from energy crops are the predominant resources implemented. The technology remains the same as it progresses towards the 2020 targets; however wave energy is recognised as quite a resourceful technology.

The South West is the only region to include targets for the generation of renewable heat. The renewable heat targets and the renewable electricity targets include a contribution from the building-integrated renewables installed as a result of the onsite generation requirement. The contribution however only relates to new build and refurbishment. The electricity and heat targets also include a notional additional contribution from the retro-fit of building-integrated technologies.

REvision 2020 provides targets based on a scenario based judgement. All scenarios assume that government will continue to provide political support to renewable energy and will put in place a target for 20% of UK electricity supplied from renewable sources by 2020, in line with the aspiration in the Energy white paper. It has been assumed for all scenarios that the renewables obligation is also extended to 20% by 2020. A summary of all renewable energy evidence base documents is provided in Table 5.14

Table 5.14 **South West renewable energy evidence base documents**

Document	*Date*	*Author*	*Client*
The Road to 2020	2008	Regen	SW and RegenSW and South West regional development agency
REvision 2020 – South West Renewable Electricity, Heat and On Site Generation Targets for 2020	*2005*	*Centre for Sustainable Energy*	*Government Office for South West and South West regional assembly*
REvision 2010 – Establishing County/Sub Regional Targets for Renewable Electricity Development to 2010	*2004*	*Centre for Sustainable Energy*	*Government Office South West and South West regional assembly*
Renewable Energy Assessment and Targets for the South West	*2004*	*Terence O'Rourke Plc*	*Government Office for South West*
(Italics denotes key evidence base document)			

The 2007 panel report for the draft South West plan identified the following groups of issues on renewable energy at the examination:

- it would be beneficial if monitoring covered both the installed capacity targets and the generation targets to give a more accurate picture of actual, rather than theoretical, performance and enable the veracity of the various underlying assumptions to be checked in readiness for future review beyond REvision2020

- given that permissions would need to be in place by early 2008 in order to ensure installation by 2010, it is clear that the regional target will inevitably be missed

5.9.2 Key players

The Government Office for the South West and South West regional assembly have commissioned all evidence base work relating to renewable energy to date. They have been supported by RegenSW – the sustainable energy agency for the South West. RegenSW were established to speed up the transition to a low carbon economy in the region by accelerating the uptake of the region's renewable energy resources, unlocking sustainable energy business opportunities and championing effective energy demand reduction initiatives. RegenSW provides independent advice to decision makers; acts as a sounding board for developers; supports demonstrator projects across a range of technologies at both micro and utility scale; and aims to stimulate an informed public debate about sustainable energy.

5.9.3 Progress towards targets

The 2008 AMR provides data on the total amount of electricity generated from renewables in 2007 in GWh and by broad technology type, based on data from the renewable energy statistics database and RegenSW. It also provides details of renewable electricity capacity installed by type and sub-region during 2008 (Figures 5.7 and 5.8). No data is provided on extant planning permissions. To date, landfill gas and other biofuels have made the biggest contribution to renewable energy generation. There was however a significant number of new wind installations in 2008.

Figure 5.7 **Amount of electricity generated from renewables in the South West (2007)**

(GWh) 2007	*Hydro*		*Wind*		*Landfill Gas*		*Other biofuels*		*Total*
	Amount	*%*	*Amount*	*%*	*Amount*	*%*	*Amount*	*%*	
South West	20.7	2.7%	99.3	13.0%	398	52.1%	246.5	32.2%	764.5
England	73	0.8%	1408.4	14.6%	3997.7	41.4%	4170.7	43.2%	9649.8

Source: South West Annual Monitoring Report 2008

Figure 5.8 **Renewable electricity capacity installed by type 2008 (GWh)**

	Number of projects	*Wind*	*Hydro*	*Landfill Gas*	*Sewage Gas*	*Advance treatment of waste*	*Combined heat and power*	*Solar PV*	*Total*
Cornwall and Isles of Scilly	100	43.34	1.73	11.48	0.40	0.14	0.00	0.21	**57.29**
Devon	126	3.20	6.77	15.51	0.99	2.70	0.00	0.32	**29.49**
Dorset	67	0.10	0.03	10.32	2.00	0.00	0.00	0.14	**12.58**
Gloucestershire	20	0.51	0.03	7.92	1.21	0.00	0.00	0.19	**9.84**
Somerset	42	0.51	0.03	7.92	1.21	0.00	0.00	0.10	**10.04**
West of England	14	6.01	0.00	5.45	5.75	0.23	0.01	0.04	**17.48**
Wiltshire	21	0.01	0.08	13.05	0.73	0.00	0.00	0.14	**14.00**
South West Total	**390**	**53.20**	**9.07**	**72.85**	**11.40**	**3.07**	**0.01**	**1.12**	**150.72**

The AMR reports that the South West is unlikely to meet its 2010 target for renewable energy generation – a likelihood borne out by the fact that the region has only delivered 29% of its 2010 target to date.

In their most recent document – *The Road to 2020,* RegenSW have indicated that generating 15% and 20% of all energy consumed in the South West from renewables is possible by 2020. However, this requires rapid changes in national policy and stronger support from decision makers at a local level.

There is also a strong case for a ‘regional deployment strategy’, that would ensure that the planning system creates an attractive environment for innovation and investment in renewable energy, as well as usefully addressing the issue of political ownership at district council level, where the majority of planning decisions on renewable energy are made.

The 2008 AMR also provides data on renewable heat installations by type and sub-region, the most predominant installations being biomass thermal and sewage gas combined heat and power (Figure 5.9).

Figure 5.9 **Renewable heat capacity installed by type 2008 (GWh)**

	Number of projects	*Biomass thermal*	*Heat pumps*	*Sewage gas combined heat and power*	*Solar thermal*	*Combined heat and power*	*Total*
Cornwall and Isles of Scilly	307	4.65	3.83	0.79	2.36	0.00	**11.63**
Devon	336	4.99	1.05	1.82	1.57	0.00	**9.43**
Dorset	93	0.57	0.21	2.12	0.20	0.00	**3.09**
Gloucestershire	43	1.87	1.13	0.00	0.02	0.00	**3.02**
Somerset	111	2.37	0.36	0.20	0.19	0.00	**3.12**
West of England	21	1.40	0.13	7.00	003	0.003	**8.55**
Wiltshire	22	0.27	0.14	0.37	0.05	0.00	**0.82**
South West Total	**933**	**16.11**	**6.83**	**12.29**	**4.43**	**0.003**	**39.67**

5.9.4 Monitoring

Monitoring of progress against renewable energy targets is undertaken on the basis of data provided by the renewable energy statistics database (relating to renewable energy generation) and RegenSW. RegenSW carry out research regarding the current/future installed generating capacity of renewable energy projects across the region. By contacting installers and extracting the relevant data which is later analysed in an annual survey (the next being in April 2009), RegenSW are able to provide the regional assembly/local authorities with up to date renewable statistics. However, RegenSW took this work upon themselves as a matter of interest before government requirements were set to a regional level. There is however an issue relating to national data requirements in relation to Core Output Indicators and those capable of being supplied by RegenSW without further financial support.

5.9.5 Further work

Since the RSS has still not been approved by the Secretary of State, the region has been reluctant to review the 2020 target in order to determine whether it could be raised. Yearly surveys are however undertaken to determine current installed capacity.

5.10 West Midlands

5.10.1 Targets and evidence base

The regional spatial strategy for the West Midlands (formerly known as regional planning guidance 11) was adopted in June 2004. At that time, a number of issues were identified for further work. These issues were subsequently divided into three blocks of work, with each one forming a partial revision to the RSS:

- phase 1 – the Black Country (*Now Complete*)

- phase 2 – including housing and employment (*Consultation ended December 2008*), and
- phase 3 – including environment issues

Preparatory work is currently underway for phase 3, which will include a revision of the region's renewable energy policies and targets. Table 5.15 summaries the current West Midlands renewable energy targets and progress towards those targets.

Table 5.15 **West Midlands renewable energy targets**

Renewable Energy Target (MW)		*Total installed generating capacity*	*Progress towards 2010 target*	*Progress towards 2020 target*	*Required additional to 2020*
2010	*2020*	*MW*	*%*	*%*	*MW*
1250*	1700*	182	64	47	1387

Notes: * aspirational figure taken from West Midlands Regional Energy Strategy

Sources: BIS Energy Statistics (2008), West Midlands Regional Spatial Strategy (2008)

Targets for the generation of renewable energy in the West Midlands are not set out in RSS policy. Rather, the supporting text states that *"the Region should aim to contribute as far as possible towards the achievement of the national energy target – 10% of electricity produced from renewable energy by 2010, with an aspiration to double renewables' share of electricity between 2010 and 2020"*.

The ***West Midlands Regional Energy Strategy*** (2004) – which post dates the RSS, sets out aspirational targets for renewable electricity, heat and biofuels to 2010 and 2020. The Energy Strategy notes that renewable energy potential in the West Midlands is limited – stating that *"with mass-burn Energy from Waste no longer included in the renewable fuel mix in the region, and no access to marine renewable resources, a target for electricity of 10% of regional consumption to come from renewables by 2010 is inappropriate for the West Midlands".* The Energy Strategy therefore proposes renewable energy generation targets equivalent to 5% and 10% of electricity consumption by 2010 and 2020 respectively. The Energy Strategy also contains targets for the generation of renewable heat.

The principal assessment of renewables resource of the West Midlands – ***Renewable Energy Prospects for the West Midlands***, was undertaken by Halcrow in 2001, which provided the backbones to the current regional renewable energy targets. The study identified the limitation of the region's current energy supply from renewables as well as technical, economical and commercial constraints in developing these resources further, particularly in relation to meeting UK/EU targets.

The study built on previous resource assessments such as those carried out for Shropshire [1998a] and the Manweb distribution area [ETSU, 1994a], but represents the first analysis of the renewable energy resource on a regional level.

The majority of the available resource suggested in this study was derived from energy from waste in the form of mass burn incineration, which is no longer counted as renewable. Excluding this, the total 2001 capacity was only approximately 1% of consumption.

Although the Halcrow Report considered targets for specific sub-regions and identified the technological resource, realistic deliverable resource and current generation for specific technologies, its findings are now quite dated. For example, the deliverable resource highlights the importance of onshore wind but does not highlight the growth in landfill gas or biomass from energy crops.

Since the publication of the renewable energy strategy, Advantage West Midlands have produced several other reports. However, none of these reports have been fed into regional policy and both are viewed as opportunities for the private sector. A summary of renewable evidence base documents and research undertaken to date is provided in Table 5.16.

Table 5.16 **West Midlands renewable energy evidence base documents**

Document	*Date*	*Author*	*Client*
Heat and Decentralised Energy Feasibility Study	2009	Unknown	Advantage West Midlands
Wind Resource Study for the West Midlands Region	2009 Midlands	Unknown	Advantage West
West Midlands Regional Energy Strategy	*2004*	*West Midlands Regional Observatory*	*West Midlands regional assembly*
Renewable Energy Prospects for the West Midlands	*2001*	*Halcrow*	*Government Office for West Midlands*

(Italics denotes key evidence base document)

5.10.2 Key players

Previously, the regional assembly and Government Office for the West Midlands have undertaken some limited work in relation to renewable energy deployment across the region. Advantage West Midlands (the regional development agency) have recently undertaken several pieces of research in connection to the implementation of the regional economic strategy – *Connecting Success* – billed as the UK's first low carbon regional economic strategy.

The region does not currently have a specific renewable energy agency or energy group, although there is a regional environment partnership that will hold the lead responsibility for the environment on behalf of the regional assembly. The partnership is expected to integrate environmental sustainability across all assembly strategies, plans and initiatives and contribute to the implementation of sustainable development in the region. This will include advising on the development and delivery of the quality of the environment aspects of the regional spatial strategy, including energy.

5.10.3 Progress towards targets

The 2008 AMR reports a 'modest increase' in renewable energy generating capacity over 2008, which is reported to be 182MW. No further break down by sub-region or renewable energy technology is provided.

Whilst the AMR concludes that *"it is now clear that even the reduced target for the Region will not be achieved, given the current rate of progress"*, our analysis indicates that the West Midlands has already delivered 64% of its 2010 target, as set out in the Regional Energy Strategy.

5.10.4 Monitoring

In the absence of more accurate regional data, monitoring of progress against renewable energy targets in the region is undertaken on the basis of national statistics provided by BIS.

The West Midlands Regional Observatory currently undertakes renewable energy monitoring for the regional energy strategy and have identified the need for monitoring of renewable energy on a more regular basis.

5.10.5 Further work

There is no forthcoming work in relation to renewable energy at present. Renewable energy will however be reviewed as part of the phase 3 revision of the RSS, which will need to address concerns about the lack of significant progress towards national and regional targets. A requirement that a percentage of the energy to be used in new developments is provided from renewable energy sources has been incorporated in the preferred option for the phase 2 revision.

5.11 Yorkshire and Humber

The Yorkshire and Humber plan was published in 2008. Table 5.17 summarises the proposed Yorkshire and Humber renewable energy targets and progress towards those targets.

Table 5.17 **Yorkshire and Humber renewable energy targets**

Renewable Energy Target (MW)		*Total installed generating capacity*	*Progress towards 2010 target*	*Progress towards 2020 target*	*Required additional to 2020*
2010	*2020*	*MW*	*%*	*%*	*MW*
468	1232	163	35	13	1182

Sources: BIS Energy Statistics (2008), Yorkshire and Humber Plan (2008)

The Yorkshire and Humber plan sets out clear policies for the generation of renewable energy, expressed as MW installed capacity and broken down into sub-regional targets for 2010 and 2021. An indicative breakdown by local authority area is also provided. The YHRA is considering a 2015 target as part of the next RSS review. The regional targets do include an offshore component, which accounts for 34% of the total target for both 2010 and 2020. The targets also include consideration of microgeneration (PV) – although estimations set out in the accompanying evidence base documents anticipate that it will only comprise a minute proportion of the overall target in 2010, and less than 10% by 2020. The plan does not include any targets for the generation of renewable heat.

The renewable energy targets set out in the Yorkshire and Humber plan were largely derived from the ***Regional Renewable Energy Assessment and Targets Study*** (2002) and the ***Planning for Renewable Energy Targets in the Yorkshire and Humber*** (2004). The renewable energy capacity identified in each of these studies was broadly similar; market and technological developments during the intervening period were however acknowledged to have resulted in a refinement of original recommendations. These were generally only minor in scale, the main difference being the slightly different balance of technologies that would contribute to the achievement of the proposed targets. The 2004 Assessment also considered the implications and opportunities arising from sub-regional targets, and developed targets for LPAs for 2010 and 2021. The 2021 targets were however acknowledged to represent 'potential' rather than 'firm targets'. The 2004 Assessment suggested that the majority of renewable energy would come from wind turbines and biomass for co-firing in power stations up to 2010. Beyond 2010 it is anticipated that other technologies such as photovoltaics would become increasingly significant.

The *North Yorkshire Renewable Energy Assessment and Targets Study* (2004) was the first local RE study in the region. More recently, work has been undertaken by Arup (2007) to assess the region's progress towards meeting the RSS targets for 2010 and 2021. This study concluded that the region was unlikely to meet its 2010 target. The plan's target for 2021 is however considered to be more achievable. A summary of renewable evidence base documents is provided in Table 5.18.

Table 5.18 Yorkshire and Humber renewable energy evidence base documents

Document	*Date*	*Author*	*Client*
The Status of Biofuels in the Yorkshire and Humber	2008	AEA Energy and Environment	Yorkshire and Humber Assembly
Low Carbon Energy Capacity Review	2007	Arup	Yorkshire Futures and Environment Agency
Yorkshire and Humber Vision for Biomass	2007	AEA Energy and Environment	Yorkshire and Humber Regional Energy Forum
Regional Energy Infrastructure Strategy	2007	regional assembly, Government Office, Yorkshire Forward	regional assembly, Government Office, Yorkshire Forward
Delivering Sustainable Energy in North Yorkshire	2005	NEF & Landuse Consultants	North Yorkshire authorities
Energy and the Regional Spatial Strategy	2005	Enviros	Yorkshire and Humber Assembly
Planning for Renewable Energy Targets in Yorkshire and Humber	*2004*	*AEA Technology*	*Government Office for Yorkshire and Humber*
Development of a Renewable Energy Assessment and Targets for the Yorkshire and Humber (including Annexes)	*2002*	*AEA Technology*	*Government Office for Yorkshire and Humber and Yorkshire and Humber Assembly*
Energy Forum Foundation Study	2001	Unknown	Unknown
Lancashire and Yorkshire Renewable Energy Planning Study	1998	Unknown	Unknown

(Italics denotes key evidence base document)

5.11.1 Key players

Evidence base research in Yorkshire and Humber has been commissioned by a variety of regional bodies. There are several regional agencies and groups involved in renewable energy planning, research and development in the region;

Led by the Government Office for Yorkshire and Humber, the Yorkshire Regional Energy Forum (REF) seeks to ensure that a strategic and integrated approach to energy is adopted and implemented across the region.

Yorkshire Futures is the regional intelligence network for Yorkshire and Humber, providing information and intelligence about the region, to improve decision making and planning for the future.

Future Energy Yorkshire has been established to secure the economic opportunities arising from new and renewable energy technologies and projects across the Yorkshire and Humber region and to deliver greenhouse gas emissions reductions to meet regional targets.

5.11.2 Progress towards targets

The Yorkshire and Humber 2009 AMR provides details of installed renewable energy by type and local authority, as recorded in the local authority 2008 audit (Figures 5.10 and 5.11). Excluding offshore wind, the AMR reports that Yorkshire and Humber have installed 300MW of their target, with a further 123-139MW currently recorded in extant planning permissions. Several local authorities did not contribute to the audit.

Figure 5.10 **Renewable Energy Capacity – Megawatts Installed by Type, 2007/8**

	Biomass	*Onshore Wind*	*Water/Solar Energy*	*Geothermal Energy*	*Total*
Barnsley	0	0	0	0	0
Doncaster	0	0	0	0	0
Rotherham	0	1.7	0	0	1.7
South Yorkshire	**0**	**1.7**	**0**	**0**	**1.7**
Calderdale	0	9.2	0	0	9.2
Leeds	12.37	0	0	0	12.37
Wakefield	0	0	0	0	0
West Yorkshire	**12.37**	**9.2**	**0**	**0**	**21.57**
Craven	0	0	0	0	0
North Yorks Moors	0	0	0	0	0
Ryedale	0	0	0	0	0
Scarborough	0	0	0	0	0
Selby	0	0	0	0	0
City of York	0	0	0	0	0
Yorkshire Dales	0	0	0	0	0
North Yorkshire	**0**	**0**	**0**	**0**	**2**
EROYC	0	34.3	0	0	34.3
NE Lincolnshire	25	0	0	0	25
Nth Lincolnshire	0	30	2.4	0	32.4
Humber	**25**	**64.3**	**2.4**	**0**	**91.7**
Y&H	**37.37**	**75.2**	**2.4**	**0**	**116.97**

Source: Local Authority 2008

Notes: Sheffield, Bradford, Kirklees, Harrogate, Hambleton, Richmondshire and Hull, were unable to monitor this information for AMR 2008.

Scarborough notes that it has 2 facilities, but does not specify what type of renewable energy, nor the megawatt capacity.

Figure 5.11 **Megawatts of Renewable Energy Installed by Type**

	Bio fuels & Biomass	*Onshore Wind*	*Water/Solar Energy*	*Geothermal Energy*
2005	83.45	9.2	0.09	0
2006	0	13.8 – 36.5	0	0.6
2007	25	64.3	2.4	0
2008	37.37	75.2	2.4	0

Source: Local Authority 2005, 2006, 2007, 2008

Based on the findings of the local authority audit, the AMR reports that the region has already delivered 71% of its 2010 target (excluding the offshore component), which it is on course to delivering. The figures contained in the AMR are however considerably higher than those set out in the BIS Energy Statistics, which estimate that there is 163MW installed renewable energy capacity in Yorkshire and Humber, equating to 35% of the region's 2010 target.

In terms of the delivery of the region's renewable energy targets, policy officers have identified the following issues:

- availability of resources at the regional and local level – renewable energy is low down on the list of local authorities' evidence requirements given continual pressure for housing evidence, viability work, infrastructure work and limited capacity. The RA is considering how to address this, although it too also suffers from limited resources
- lack of member acceptance for targets and renewable energy in general
- lack of sufficient local public benefits or means of securing these consistently to act as an incentive to implementation
- appropriate assessment requirements
- unknown and unevidenced impact on bird populations in relation to wind farm development
- use of cumulative effects as anecdotal evidence against further wind farm delivery

5.11.3 Monitoring

The regional assembly collects information relating to renewable energy development on an annual basis. As well as monitoring progress against renewable energy targets as part of the AMR, the RA also work with Yorkshire Futures, Natural England and Future Energy Yorkshire to monitor progress.

Sources of information used to monitor progress include:

- installed grid-connected renewable energy capacity (generally good quality)
- number (%) of new developments using on site renewable energy sources and number and % of these developments generating 10% or more renewable energy on site (considered difficult to collect)
- renewable energy capacity in extant planning permissions (MW) (considered difficult to collect)
- installed good quality CHP capacity (MWE)
- percentage of new publicly funded housing meeting at least level 3 of code for sustainable homes
- percentage of new Yorkshire Forward funded development meeting at least BREEAM ‘very good’ standard

5.11.4 Further Work

There are no current plans to review existing renewable energy policies and targets contained within the Yorkshire and Humber plan, as existing polices are considered to be in line with national guidance. The regional assembly is however currently working with Faber Maunsell to prepare a local authority renewable energy toolkit to help deliver carbon savings and decentralised energy.

Appendix A Regional Overview and Methodology

Table A1 provides an overview of:

- regional renewable energy targets for 2010 and 2020
- current electrical installed generating capacity from renewable resources
- progress towards targets set (against regional targets and regional electricity consumption with reference to the draft UK RES)
- current energy consumption
- percentage of electricity consumption from renewable resources and
- additional installed renewable energy capacity required to meet existing regional 2020 targets

An accompanying explanation of methodological assumptions is provided in section A1.1.

A1.1 Methodology

A1.1.1 2010 and 2020 targets

Renewable energy targets for 2010 and 2020 were extracted from the relevant regional spatial strategies. In order to analyse progress towards these targets, absolute figures (not percentages) required. For both 2010 and 2020 targets, all regions except for the West Midlands included a figure for MW installed generating capacity, either in the RSS itself or the accompanying evidence base from which the targets are drawn. In the absence of absolute targets for the West Midlands, an aspirational GWh figure was taken from the *West Midlands Regional Energy Strategy (2004)*.

A1.1.2 Offshore wind generation

Treatment of offshore wind varied across the regions. Where possible, contributions from offshore wind were discarded from analysis. In the absence of a specific offshore contribution for the South East 2020 target, the offshore component was based on the 2016 target breakdown.

Table A1 **Regional overview of renewable energy targets and progress towards targets**

Region	*Target 2010*	*Target 2020*	*Total Installed Generating Capacity*[1]		*Progress Towards 2010 Targets*	*Progress Towards 2020 Targets*	*Percentage Progress Towards 10% Regional Electricity Consumption*	*Percentage Progress Towards 20% Regional Electricity Consumption*	*Percentage Progress Towards 32% Regional Electricity Consumption*	*Current energy Consumption*[4]		*Required Additional Capacity to Meet 2020 Target*
	MW	*MW*	*MW*	*GWh*	*%*	*%*	*%*	*%*	*%*	*GWh*	*% Renewable Sources*	*MW*
East Midlands	337	3671	176	847	52%	5%	33%	16%	10%	25849	3.3%	3495
East of England	820	1620	478	1903	58%	30%	60%	30%	19%	31681	6.0%	1142
London	99	375	117	392	118%	31%	8%	4%	3%	47128	0.8%	258
North East	454	8972	155	425	34%	17%	28%	14%	9%	15190	2.8%	742
North West	937	1345	478	1608	51%	36%	40%	20%	13%	40112	4.0%	867
South East	420	830	334	1550	80%	40%	34%	17%	11%	45840	3.4%	496
South West	509	850	149	765	29%	18%	26%	13%	8%	29659	2.6%	701
West Midlands	1250GWh[3]	1700GWh[3]	182	801	64%	47%	26%	13%	8%	3050	92.6%	2355
Yorkshire/Humber	468	1232	163	1360	35%	13%	46%	23%	14%	29394	4.6%	1069
Total	**4372**	**11565**	**2232**	**9651**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**295362**	**3.3%**	**9013**

Notes:
1. BERR energy statistics publication (excludes biomass co-firing, photovoltaics, micro-wind generation and extant planning permissions) (December 2007)
2. Taken from evidence base (North East renewable energy strategy (2003))
3. Aspirational figure taken from West Midlands regional energy strategy (2004)
4. BERR energy statistics, 2006, scaled up to 2007
5. Additional capacity (1700GWh-801GWh) has been converted to MW based on OFGEM Register Technology Split (Please refer to Table A2)

A1.1.3 Total installed generating capacity

Data was taken from the Department for Business, Innovation and Skill's (BIS) energy statistics publications, the most recent of which was published in September 2008 and represents the installed capacity of sites generating electricity from renewable sources up to December 2007. It should be noted that this data does not account for co-firing biomass, solar photovoltaics, and micro wind generation. These statistics run in parallel to the RESTATS figures (www.restats.org.uk), which the regional assemblies are expected draw comparisons with as part of their annual monitoring reports, as suggested in DCLG's *Regional Spatial Strategy and Local Development Framework – Core Output Indicators – Update 2/2008*.

Total installed generating capacity quoted in Table A1 also does not include extant planning permissions, due to the paucity of available data.

A1.1.4 Progress towards targets

Total installed generating capacity data was measured against regional targets for 2010 and 2020.

A1.1.5 Current energy consumption

Consumption (demand) is recorded by suppliers, collated by BIS and published in the annual energy statistics bulletins. Figures are reported in GWh. The figures shown in Table A1 are recorded sales of electricity and are collected from all grid-connected electricity meters in the different regions.

The latest data available is from 2006. Although assumptions from the national grid expect a 1.1% per annum over the period from 2005-06 to 2012-13 (National Grid (2006) *GB Seven Year Statement* http://www.nationalgrid.com/uk/sys_06/print.asp?chap=2), this assumption was applied to our dataset for one year in order to provide a level playing field with the BIS renewable energy figures (December 2007).

A1.1.6 Progress towards regional electricity consumption

Although regional progress can be measured by comparing installed generating capacity against regional targets, it can sometimes appear misleading when targets are not set against a percentage baseline in each region. The current UK target is to generate 10% and 20% of total electricity consumption from renewable sources by 2010 and 2020 respectively. The draft UK RES proposes to increase the 2020 target to between 30% and 35%. Installed generating capacity was therefore also measured against regional electricity consumption to gauge progress against UK energy consumption targets at both a regional and national level using BIS energy data and DECC consumption data.

A1.1.7 Required additional capacity

Additional installed renewable energy capacity required to meet existing regional 2020 targets was calculated. In order to calculate required additional capacity, a renewable technology split and associated load factors were applied. In terms of determining the technology split, a national rather than regional split was applied, based on the most recent OFGEM Register (May 2008). The load factors for each technology were taken from a number of sources, which are generally considered to be fairly consistent across the UK.

Table A2 **Current installed generating capacity technology split (OFGEM, 2008)**

Technology	*Contribution by Technology (%)*
Hydro	4.5%
Micro-Generation	0.3%
Sewage Gas	3.6%
Landfill Gas	36.3%
Offshore Wind	7.1%
Onshore Wind	35.9%
Biomass	12.3%

Table A3 **Load factors and reference**

Technology	*Load Factor*	*Reference*
Hydro	0.6	North East Regional Renewable Energy Strategy (2005), P39
Micro-Generation	0.1	REvision 2020 - South West Renewable Electricity, Heat And On Site
		Generation Targets For 2020 (2005), P59
Sewage Gas	0.85	North East Regional Renewable Energy Strategy (2005), P39
Landfill Gas	0.95	REvision 2020 - South West Renewable Electricity, Heat And On Site Generation Targets For 2020 (2005), P59
Offshore Wind	0.3	Placing Renewables in the East of England (2008), P10
Onshore Wind	0.26	Placing Renewables in the East of England (2008), P10
Biomass	0.85	Placing Renewables in the East of England (2008), P10

Table A4 **Regional electricity output estimates for North East 2010 target, worked example by technology**

Technology	*Installed Capacity (MW)*	*Load Factor*		*Regional Total*	*% Contribution by Technology*
Hydro	20.4	0.6		107.4	4.5%
Micro-Generation	1.4	0.1		1.2	0.3%
Sewage Gas	16.3	0.85	Multiplied	121.7	3.6%
Landfill Gas	164.8	0.95	by hours	1371.5	36.3%
Offshore Wind	32.2	0.3	per year	84.7	7.1%
Onshore Wind	163.0	0.26	(8760)	371.2	35.9%
Biomass	55.8	0.85		415.8	12.3%
Regional Total	**454**	**N/A**		**2473.5**	**100.0%**

Appendix B
East Midlands

B1.1 RSS renewable energy policies

B1.1.1 Introduction

The East Midlands regional spatial strategy was reviewed in 2006, and consultation on proposed changes ended in October 2008. The Secretary of State is expected to publish the regional plan in early 2009. A further partial review of the RSS is currently in its early stages. The review will address planning issues up to 2031, including a consideration of how more power can be generated from renewable sources. Further work on the region's renewable energy policies and targets was highlighted by the Inspector in his Panel Report on the draft RSS as an area requiring considerable further work.

B1.1.2 Primary renewable energy policies

(Red text indicates revisions made by proposed changes)

Chapter 3: Topic based priorities

Regional priorities for energy

3.3.64: The Government has reviewed the delivery of national energy policy and has recognised that the two major long term challenges are tackling climate change and delivering secure, clean energy at an affordable price (The Energy Challenge, 2006). The 2002 Energy white paper includes a goal of putting the UK onto a path to cut UK CO_2 emissions by some 60% by 2050, with real progress by 2020. The UK also has a binding target under the Kyoto Protocol to reduce emissions of six greenhouse gases by 12.5% from 1990 levels in the period 2008-2012. The Government has an additional goal of a reduction of 20% in emissions of CO_2 from 1990 levels by 2010 and has signalled a policy and legislative move towards zero carbon development, with strong support for incorporating renewable energy technologies at the building and development scale. The Government is committed to ensuring that low carbon energy generation, including renewable technologies, makes an increasing contribution to UK energy supplies. It has set a target of 10% of UK electricity from renewable sources by 2010 and 20% by 2020.

3.3.65: Regional policies on energy are underpinned by the following 'energy hierarchy':

- to reduce the need for energy
- to use energy more efficiently

- to use renewable energy
- any continuing use of fossil fuels to be clean and efficient for heating and co- generation

3.3.66: Regional plan policy has been informed by the regional energy strategy (available at http://www.emra.gov.uk) and two recent studies undertaken by the regional planning body: *Determining Baseline Energy Consumption Data* and *Regional Targets and Scenarios for Renewable Energy* (both June 2006 and available at http://www.emra.gov.uk). Together, these studies present a comprehensive assessment of the patterns of energy consumption and CO_2 emissions across the East Midlands and highlight the need for:

- planning policies to reduce the need for energy at the regional level
- a significant increase in combined heat and power (CHP) capacity
- minimum regional targets for renewable energy generation for 2010 and 2020, emphasising the role of micro-generation and
- planning policies to enable a significant increase in renewable energy microgeneration, and to achieve the Government's ambition of zero carbon development and regeneration

Regional priorities for energy reduction and efficiency

3.3.67: The Home Energy Conservation Act 1995 and related guidance requires that local authorities with housing responsibilities should prepare energy efficient improvement measures aimed at reducing domestic energy consumption by 30% over 10-15 years. In addition the Government's 2002 Energy white paper states that domestic households are expected to save 5 million tonnes of carbon a year by 2010 and a further 4-6 million tonnes by 2020.

3.3.68: The regional energy consumption baseline study has indicated that electricity consumption is actually increasing within the East Midlands. Annual domestic electricity sales are rising by around 1% per customer and industrial and commercial sales by 8% per consumer. These figures are in excess of the projections resulting from earlier regional studies. Regional CO_2 emissions for 2004 were 32 million tonnes and are increasing as both transport and energy consumption continue to grow. To contribute to a 60% reduction in carbon emissions by 2050, (as identified in the Energy white paper) would currently require a reduction in electricity consumption of around 1.5% per year each year in the East Midlands.

3.3.69: The planning system can contribute to reducing energy demand through measures to improve the location of development, site layout and building design and as recognised in Section 1.4, the Planning and Climate Change PPS (PPS1 supplement) expects development plan documents (DPDs) to include policies which promote and encourage a proportion of the energy supply of new development to be secured from decentralised and renewable or low-carbon sources. The East Midlands will have significant growth in development over the regional plan period and new development will need to secure the highest viable resource and energy efficiency in order to ensure that the region can also make its contribution to the national carbon emissions reduction targets and longer term goals. To achieve this, substantial areas of new development need to be located where there is good accessibility by means other than the private car and where energy can be gained from decentralised energy supply systems, or where there is clear potential for this to be realised. These systems will include renewable or low carbon sources. In drawing up their local development frameworks, local planning authorities should take account of the provisions of the Planning and Climate Change PPS and where policies need to be developed to respond to more local issues these should be included in DPDs. In doing this local planning authorities should also take account of any best practice deriving from innovative design including examples developed in eco-towns.

3.3.70: Heat producing renewable energy technologies at the building scale, such as ground source heat pumps, wood heat and solar air or water heating can provide a lower carbon approach to meeting heating requirements that would be reflected in reduced consumption of electricity and lower carbon emissions. Small scale renewable electricity generation at the building scale, such as photovoltaic cells and micro wind turbines can contribute to a reduced energy demand from the grid. Development scale district heating systems can also provide a path to carbon neutral development. These technologies can also help to reduce the carbon emissions in the refurbishment and redevelopment of existing buildings.

POLICY 38: Regional priorities for energy reduction and efficiency

Local authorities, energy generators and other relevant public bodies should:

- promote a reduction of energy usage in line with the 'energy hierarchy' and
- develop policies and proposals to secure a reduction in the need for energy through the location of development, site layout and building design

3.3.71: The Government has introduced a number of initiatives including the renewables obligation and the climate change levy to encourage low carbon generation. The Government has also signalled a need to move towards a more distributed energy generation network which will require facilitation through the planning process. Renewable energy technologies and combined heat and power (CHP) will be crucial in delivery of a distributed network. Current planning policy guidance on renewable energy is set out in PPS22.

3.3.72: Parts of the East Midlands, notably the Trent Valley, have clear locational advantages for major energy installations through easy access to the grid, cooling water and fossil fuel supplies. Some former power station and colliery sites may be suitable for re-use for new forms of power generation such as clean coal technology. There is also considerable potential for co-firing (using mixes of fossil fuels and bio-energy). This is currently contributing some 270 MWe (in excess of the 2010 target for biomass). Co-firing currently relies on imported biomass, and with renewable obligation certificates due to end in 2016, it is unlikely to continue without additional support. However there are opportunities for local farmers to develop local sources of co-firing biomass for smaller schemes and for new cleaner burning technologies in existing power stations.

3.3.73: Domestic and industrial combined heat and power (CHP) schemes can increase efficiency in the use and supply of energy. The Government has set a target of at least 10,000MWe of CHP by 2010. In 2004, there were 237MWe of CHP electricity generation capacity in the East Midlands, a reduction in capacity over the last four years, reflecting poor market conditions. Regional targets propose to increase this figure to a minimum of 511 MWe by 2010 and 1120 MWe by 2020. Suitable locations for large-scale CHP developments are likely to be urban areas or associated with new development which avoid negative effects on the landscape or built environment.

3.3.74: At present renewable energy sources make a minor contribution to the region's capacity (approximately 2%) and the East Midlands lags behind the other English regions. The regional targets and scenarios for renewable energy report indicates that a 20% renewable energy mix by 2020 can only be achieved by adopting energy efficiency improvements and challenging micro-generation targets as well as a mix of large scale grid connected renewable energy. Revised indicative targets are summarised in Appendix 5 and exclude energy derived from incineration of municipal and commercial waste, offshore wind and large scale co-firing of biomass. Coal mine methane also has a potential future role to play in the sustainable energy mix within the region though currently there is uncertainty about the technology related to this resource and it is not eligible for renewable obligations certificates. Other low carbon technologies, such as tidal or wave generation may become viable towards the end of the plan period, but there is too little information to make an assessment now.

3.3.75: Although the regional targets are ambitious, they are considered to be achievable and should be treated as a minimum. To achieve the targets, however, there will need to be a complete change in attitude in current planning practice. Local planning authorities need to accept that far more energy generation schemes using innovative renewable technologies need to be accepted if renewable energy targets are to be achieved. Furthermore it should not be inferred that once the targets have been met, efforts should not continue to deliver additional renewable schemes. However the Government's targets on energy efficiency and renewable generation will both need to be met if carbon reduction objectives are to be achieved. The regional planning body has a duty to review all policies in its annual monitoring report and to adjust policies and targets accordingly. The regional targets will therefore need to be kept under continuous review.

3.3.76: Much of the region could be suitable for the location of wind turbines subject to a number of criteria, including visual impact and the cumulative effect of a number of turbines and their actual size. Local planning authorities should not adopt policies that would in effect impose a blanket ban on on-shore wind energy projects. Instead they should establish the criteria which guide and inform wind energy projects in order to achieve high quality, well planned developments. Policy 39 sets out the considerations that need to be addressed when drawing up local policies.

3.3.77: The scale of the need to provide for more opportunities for renewable energy generation also indicates the pressing need for micro-generation schemes to be implemented as widely as possible. Local development documents should therefore encourage such schemes taking into account the advice in PPS22, the Companion Guide to PPS22 and the supplement to PPS1.

3.3.78: The technologies that are appropriate in each Sub-area will vary according to local resources and constraints. Microgeneration can be applied anywhere, either grid linked or with battery back-up. The opportunities for non-electricity generating renewables should not be underestimated. Ground source heat pumps and solar water heating as well as biomass space heating can contribute to a reduction in demand for electricity, coal, oil or gas that will deliver carbon savings across the region. Other technologies may be more appropriate at specific locations. Sub-area based guidance is outlined below:

Eastern sub-area

There are significant opportunities for biomass of all types, including large scale biomass power plants, using crops or animal waste. There are also opportunities for small scale disposal of municipal compostable waste at the farm scale. There are some sites available for large wind developments and more for smaller scale wind development at farm/settlement level. There is very small hydro resource. The more dispersed pattern of development offers opportunities for community scale micro-grids for electricity and heating. Any infrastructure required to develop offshore developments will also need to be accommodated within the eastern sub-area.

Northern sub-area

There is a heritage of coal mining in the sub-area and as a result significant opportunities for coal mine methane. There are some opportunities for wind development at different scales. Regeneration initiatives may allow opportunities for carbon neutral development using medium scale renewable generation, for example CHP or wind. There are some opportunities for wood or coppice as biomass, but fewer for other forms of biomass.

Peak sub-area

The sub-area is mainly within or close to the Peak District National Park and large scale renewable generation will always be difficult to accommodate as a result. However there are many opportunities for small scale hydro and some opportunities for small wind generation. The Peak District National Park Authority has produced supplementary guidance to encourage appropriate renewable energy installations.

Southern sub-area

The Growth Area designations in the Southern sub-area offer the best opportunities for new carbon neutral developments. There are also significant opportunities for biomass in what will remain a generally rural area. There are also some opportunities for wind development at a variety of scales.

Three Cities sub-area

The scale of development in the Three Cities sub-area offers opportunities for local distribution networks for electricity and heat using CHP. Microgeneration also has the biggest potential here. Large scale wind generation is limited, but there are opportunities for smaller scale at business park level, contributing to carbon neutral developments. There may be opportunities for generating energy from waste through a variety of different technologies.

3.3.79: Offshore wind lies beyond normal planning jurisdiction but the onshore infrastructure required to bring the electricity ashore is likely to require planning permission. The Government has identified three 'national strategic areas' for offshore wind power. One of these lies in the Wash off the Lincolnshire coast where much of the area is protected by national and international designations. This has important implications for the design and location of on-shore infrastructure. local development frameworks covering the on-shore area will need to include appropriate policies aimed at protecting key environmental assets and the integrity of designated sites, based on relevant information, for example, relating to bird movement patterns. Such policies should concentrate on mitigating potentially adverse effects and encouraging co-operative planning of infrastructure, for example 'cable sharing'. Further advice on these issues is contained in the Companion Guide to PPS22.

3.3.80: While offshore renewable generation projects are not covered by RSS policies, PPS22 requires that an indication of the output that might be expected to be achieved from offshore renewables should be included though these are not included in regional totals. The relevant targets are 1315GWh/y for 2010, 3000GWh/y for 2020 and 3483GWh/y by 2026.

POLICY 39: Regional priorities for low carbon energy generation

Local authorities, energy generators and other relevant public bodies should promote:

- the development of combined heat and power (CHP) and district heating infrastructure necessary to achieve the regional target of 511 MWe by 2010 and 1120 MWe by 2020 and
- the development of a distributed energy network using local low carbon and renewable resources

In order to help meet national targets low carbon energy proposals in locations where environmental, economic and social impacts can be addressed satisfactorily should be supported. As a result, local planning authorities should:

- safeguard sites for access to significant reserves of coal mine methane
- identify suitable sites for CHP plants well related to existing or proposed development and encourage their provision in large scale schemes
- consider safeguarding former power station and colliery sites for low carbon energy generation
- support the development of distributed local energy generation networks and
- develop policies and proposals to achieve the indicative regional targets for renewable energy set out in Appendix 5

In establishing criteria for onshore wind energy, local planning authorities should give particular consideration to:

- landscape and visual impact, informed by local landscape character assessments;
- the effect on the natural and cultural environment (including biodiversity, the integrity of designated nature conservation sites of international importance, and historic assets and their settings)
- the effect on the built environment (including noise intrusion)
- the number and size of turbines proposed
- the cumulative impact of wind generation projects, including ‘intervisibility’
- the contribution of wind generation projects to the regional renewables target and
- the contribution of wind generation projects to national and international environmental objectives on climate change

POLICY 39: *continued*

In establishing criteria for new facilities required for other forms of renewable energy, local planning authorities should give particular consideration to:

- the proximity to the renewable energy resource
- the relationship with the existing natural and built environment
- the availability of existing surplus industrial land in close proximity to the transport network and
- the benefits of grid and non grid connected 'microgeneration'

Appendix 5: Renewable energy policy targets (RSS Policy 39)

Renewable energy Technology	*Current Capacity (2006) (GWh/y)*	*Current Capacity MWe*	*Target for 2010 GWhj/y*	*Target for 2010 MWe*	*Target for 2020 GWh/y*	*Target for 2020 Mwe*	*Indicative Target for 2026 GWh/y*	*Indicative Target for 2026 MWe*
Onshore Wind	142	54[1]	319	122	460	175	460	175
Biomass Wet agricultural waste	0	0	41.7	5.1	42	5	77	10
Biomass Poulty Litter	0	0	118	15	210	27	210	27
Biomass Energy Crop	38	5	344	46	1,012	136	1,114	150
Hydro	14	3	39	9	62	14	73	16
Micro-generation Wind	0 (negligible)	0 (negligible)	9	10[2]	1,832	2,091	1,832	2,091
Micro-generation PV	0 (negligible)	0	52	59[3]	1,018	1,162	1,018	1,162
Landfill gas[4]	438	53	438	52.5	438	53	358	43
Anaerobic Digestion	11	1	137.3	18.4	64	8	72	9
Total[5] (%)	**2%**		**6.4%**		**23%**		**24%**	

Note that all targets are indicative

1 Includes 2 wind farms to construction, but not yet commissioned

2 Micro wind corresponds to 2000 installations of 5kw turbines

3 PV corresponds to approximately 2kw PV on half of the new properties to 2010

4 Landfill gas is not a natural renewable resource but it is eligible for renewable obligations certificates. Note that landfill gas contribution will begin to tail after 2020 due to reduced organic waste going to landfill

5 In addition to the Regional onshore targets offshore generation targets are 1,351GWh/y for 2010; 3,000GWh/y for 2020; and 3,483GWh/y by 2026.

B1.1.3 Secondary renewable energy policies

Chapter 1: Core strategy

POLICY 1: Regional core objectives

To reduce the causes of climate change by minimising emissions of CO_2 in order to meet the national target through:

- maximising 'resource efficiency' and the level of renewable energy generation
- promoting best use of existing infrastructure
- promoting sustainable design and construction and
- ensuring that new development, particularly major traffic generating issues, is located so as to reduce the need to travel, especially by private car

POLICY 2: Promoting better design

Care should be taken to encourage designs and layouts that reduce CO_2 emissions and provide resilience to future climate change, including through:

- design led approaches which take account of local natural and historic character
- minimising energy use, reducing the heat impact of urban areas, using sensitive lighting, improving water efficiency, providing for sustainable drainage (SUDS) and management of flood water, reducing waste and pollution, securing energy from decentralised and renewable or low carbon energy technologies, incorporating sustainably sourced and recycled materials wherever possible, and considering building orientation at the start of the design process
- ensuring that all urban extensions that require an environmental impact assessment achieve the highest viable levels of building sustainability
- architectural design which is functional, yet which respects the beneficial aspects of local natural and built character
- making the most efficient use of land
- locating and designing access from new development to local facilities on foot, by cycle or by public transport
- highway and parking design that improves both safety and the quality of public space

POLICY 2: Promoting better design *continued*

- design which helps to reduce crime and the fear of crime, supports community safety, promotes vitality, maintains amenity and privacy, and benefits the quality of life of local people and
- taking account of the need to develop carbon sinks and 'green infrastructure' networks and provide for access to open space and the enhancement of biodiversity and landscape quality

Regional priorities for waste reduction and waste management

3.3.51: The region's human and economic activities generate waste that must be managed in accordance with the principles of sustainable development. The European Union Framework Directive on Waste, the revised National Waste Strategy and PPS10 all promote a comprehensive hierarchical approach to waste management:

- waste reduction
- re-use
- recycling and composting
- energy recovery
- disposal

3.3.52: Whilst some elements of the hierarchy are outside the scope of the planning system, others have significant planning implications. The overall regional context for waste policy is set by the regional waste strategy , which is based on:

- working towards zero growth in waste at the regional level by 2016
- reducing the amount of waste sent to landfill in accordance with the EU Landfill Directive
- exceeding Government targets for recycling and composting, with the objective to bring all parts of the region up to the levels of current best practice and
- taking a flexible approach to other forms of waste recovery, on the basis that technology in this area is developing very quickly and is difficult to predict over a 20 year period

B1.2 Renewable energy evidence base documents

Document	*Date*	*Author*	*Client*
Regional Biomass Active Demand Mapping	2007	JHWalter	Natural England
Renewable Energy Strategy Framework for Action	2007	EMRA, EMDA, GOEM	EMRA, EMDA. GOEM
Regional Targets and Scenarios for Renewable Energy	2006	Best Foot Forward (Craig Simmons & Ignacio Gonzalez)	EMRA
Determining Energy Consumption Baseline Data	*2006*	*Best Foot Forward*	*EMRA*
Summary of Current Renewable Energy Capacity at County Level	*2006*	*Best Foot Forward*	*EMRA*
Renewable Energy Strategy	*2005*	*EMRA, EMDA, GOEM*	*EMRA*
Viewpoints on Sustainable Energy	2001	Land Use Consultants and IT Power Ltd	EMRA
Towards a Regional Energy Strategy	2003	Land Use Consultants, with National Energy Foundation and IT Power	EMRA
Wood Fuel Usage in the East Midlands Region	2004	ERIN Research Ltd	Forestry Commission and EMRA
East Midlands Renewable Energy Planning Study	1998		
(Italics denotes key evidence base document)			

B1.2.1 East Midlands Renewable Planning Study, 1998

The *East Midlands Renewable Energy Planning Study* was published in 1998, but was based on work done in 1995-96. The *Viewpoints* (2001) report supersedes it and the data contained within it.

B1.2.2 Viewpoints on Sustainable Energy in the East Midlands, 2001

Overview

In 2000, a study was commissioned into current energy projects and future prospects in the East Midlands, which culminated in this viewpoints report. This study supersedes the *East Midlands Renewable Planning Study*. For each type of renewable energy considered in the earlier study, the *Viewpoints Report* sets out how its findings differ/ have been updated in light of new research.

The main objective of the viewpoints report was to provide information on existing sustainable energy projects and exemplars, and to explore the opportunities for furthering the development of sustainable energy solutions throughout the East Midlands. This involved the definition of targets at the regional and sub-regional level for the implementation of renewable energy and CHP technologies, and for potential energy efficiency savings. It also included the drafting of recommendations designed to act as catalysts for action – to prompt key stakeholders into advancing progress towards achievement of the targets.

The report also seeks to draw out the sustainability issues associated with energy development in order to show that there are important social, economic and futurity, as well as environmental concerns at stake. The study was not restricted to an analysis of electricity generation alone; it also sought to consider the potential for the development of non-grid small scale renewables, as well as thermal sources of energy - where these could form a substitute for electricity consumption. The potential for the displacement of fossil fuel use through the development of 'bio-fuels' or 'fuel cells' for transportation use was not however included within the scope of this study.

The study comprised six main elements:

- review of the national and regional policy and institutional context
- calculation of the energy supply and demand profile of the East Midlands
- survey of local authorities in the region to obtain information on existing renewable energy schemes and the perceived barriers and opportunities associated with pursuing sustainable energy solutions
- detailed resource assessments and definition of targets for energy efficiency, CHP and renewable energy
- stakeholder participation workshops
- identification of general and specific actions required to meet the targets

The study was different to undertaken in other regions at the time as it considered energy efficiency and CHP as well as renewables. The study also aligned their approach with the 'energy hierarchy': reducing the need for energy; using energy more efficiently; using renewable energy; and making clean and efficient use of fossil fuels.

Methodology

For each renewable energy type, the study considered:

- the nature of the technology available to harness the resource
- existing activity in the region
- the technically feasible resource (the amount of power available if all of the resource were to be developed)

- the accessible resource (taking account of physical, planning and other constraints)
- the strengths, opportunities and barriers associated with realising the resource are highlighted
- indicative targets

The study also involved a significant amount of consultation with relevant parties.

The assessment considered the following types of renewable energy:

- offshore wind
- onshore wind (largescale)
- marine: wave/ tidal
- biomass
  - wet agricultural wastes
  - poultry litter
  - energy crops and forestry residues
- hydropower
- solar
  - photovoltaics
  - active solar
  - passive solar
- municipal and industrial waste (incineration and gasification)
- landfill gas
- anaerobic digestion

Potential renewable energy resources are estimated at the county level in terms of technical and accessible resources, although this is disaggregated to local authority level for some technologies.

Recommendations/ targets

The assessment proposed the following regional targets:

Renewable energy targets

Renewable energy technology type	*Existing schemes*		*Target for 2003*		*Target 2010*	
	Capacity (MWe)	*Electricity (GWh/y)*	*Capacity (MWe)*	*Electricity (GWh/y)*	*Capacity (MWe)*	*Electricity (GWh/y)*
Wind: Offshore	0	0	0	0	125	330
Wind: Onshore	0.05	0.045	12	31	122	319
Marine: Wave/Tidal	0	0	0	0	0	0
Biomass: Web Agric. Wastes	0	0	0.4	3.2	5.1	42
Biomass: Poultry Litter	0	0	10	79	15	118
Biomass: Energy Crops	0.1	0.1	6	45	46	343
Solar* – Phovaltaics	0.08	0.06	0.9	0.9	15.9	14
Municipal and Industrial Waste	7	55	7	55	55	432
Landfill Gas	27.2	232	52.5	438	52.5	438
Anaerobic Digestion	7.2	57	10.1	80	18.4	137
Total including MIW	**44.1**	**355.7**	**102.7**	**748.9**	**465.5**	**2,212**
Total excluding MIW	***37.1***	***300.7***	***95.7***	***693.9***	***410.5***	***1,780***

* Passive and Active Solar do not count towards the Government's targets for the percentage of electricity derived from renewables and have therefore not been included in this table. They are however important in reducing the energy demand from other sources.

** These figures do not account for the thermal energy output that could be utilised within CHP schemes, as these are taken into account in the CHP section.

Recommended CHP target for 2010

	Existing CHP 2000 (MWe)	*Target 2010 (MWe)*
East Midlands Total	17	25.6

Technical renewable resource potential by local authority area

Local Authority	*Onshore wind[1]*	*Biomass – Wet agricultural wastes[2]*	*Biomass – Forestry residues[3]*	*Hydro-spheres[4]*	*Landfill gas*
Amber Valley District	●●	●●●	●●	●●	–
Ashfield District	●●●	●●	●●●	●	●
Bassetlaw District	●●	●●	●●●	●	●●●
Blaby District	●	●●	●	●	●●
Bolsover District	●●●	●●	●●	●	●●
Boston District	●●	–	–	●	●
Broxtowe District	●	●	●	●	●
Charnwood District	●●	●●	●●●	●●●	●●●
Chesterfield District	–	●	●	●	●●
City of Derby	●	●	●	●●	–

Technical renewable resource potential by local authority area *contd*

Local Authority	*Onshore wind*[1]	*Biomass – Wet agricultural wastes*[2]	*Biomass – Forestry residues*[3]	*Hydro-spheres*[4]	*Landfill gas*
City of Leicester	–	•	•	•	–
City of Nottingham	•	–	•	•	–
Corby District	••	•	••	•	•
Daventry District	•••	••	••	••	•
Derbyshire Dales District*	•••	•••	•••	•••	••
East Lindsey District*	•••	••	•••	•	•••
East Northamptonshire District	••	••	•••	•••	•
Erewash District	••	••	•	•••	–
Gedling District	••	•	•••	••	••
Harborough District	•••	•••	••	•	•
High Peak District*	•••	•••	•••	••	–
Hinckley and Bosworth District	••	•••	••	•	•
Kettering District	••	••	••	•	••
Lincoln District	•	•	••	•	–
Mansfield District	•	•	••	•	–
Melton District	•••	•••	••	•	•
Newark and Sherwood District	••	•••	•••	•••	••
North East Derbyshire District*	••	•••	••	•	•
North Kesteven District	••	•	••	•	•••
North West Leicestershire District	••	•••	••	•••	•
Northampton District	–	•	•	••	•
Oadby and Wigston District	•	•	–	–	–
Rushcliffe District	••	••	••	•••	••
Rutland	•••	•	••	•	•
South Derbyshire District	••	•••	••	•••	••
South Holland District	••	–	•	•	–
South Kesteven District	•••	•	•••	•	•
South Northamptonshire District	•••	••	•••	•	•
Wellingborough District	••	•	••	•••	•
West Lindsey District*	•••	••	•••	••	•

Key: – Little or no potential resource
• Low potential resource
•• Medium potential resource
••• High potential resource

Notes:

1 Onshore wind: ranked by amount of land with wind speeds over 6.5 m/s

2 Wet Agricultural Wastes: ranked by number of pits and cattle

3 Forestry Residues: ranked by area of existing woodland

4 Hydropower: ranked by number of potential sites

5 Landfill Gas: ranked by number of potential sites

* The Peak District National Park or the Lincolnshire Wolds AONB lie within Districts. Planning constraints will therefore have a signficant impact on the total accessible resource in these areas

In terms of achieving the targets, the report makes several recommendations on how to deliver the proposed targets. It considers key issues such as how to use the targets, energy efficiency and CHP and overcoming technological barriers. The study also considers the impact of the targets and renewable energy deployment on the region's CO_2 emissions. The Viewpoint report appendices provide further quantitative data and details of methodology for each renewable energy technology. They also set out findings from consultation events.

B1.2.3 Towards a Renewable Energy Strategy, 2003

This consultation document precedes and informs the *Regional Energy Strategy* (2004). Amongst other things, it takes forward the baseline work of the Viewpoints 2001 report to propose renewable energy targets for the region. Targets proposed in the Viewpoints study are used as a starting point, although in some cases they were altered following further consultation and research. Only one target was revised downwards (microgeneration).

Renewable Energy Technology	*Capacity 2010 (MW)*	*Electricity (GWh/yr)*	*Relationship with Viewpoints target*
Offshore wind & marine technology	400	1056	Increased
Onshore wind	122	319	Stayed the same
Biomass, energy crops & forestry residues	46	344	Stayed the same
Biomass, poultry litter	15	118.3	Stayed the same
Biomass, wet agricultural waste	5.14	1.7	Stayed the same
Small scale hydropower	10.6	39.1	Stayed the same
Landfill gas	52.5	438	Stayed the same
Anaerobic digestion (sewage sludge & municipal waste)	18.4	137.3	Stayed the same
New technologies*	29.9		

* Includes domestic micro CHP, & remote fuel cells; commercial/ industrial scale micro-turbines & fuel cells; and largescale fuel cells

B1.2.4 Wood Fuel Usage in the East Midlands Region, 2004

This report was commissioned jointly by the EMRA and Forestry Commission. It considers factors contributing to and influencing the potential for using wood fuel for biomass as a source of renewable energy. These include supply infrastructure, availability of resources, information and education, equipment, installers and ESCos, financial considerations, potential areas for growth and existing activity in the counties.

B1.2.5 Regional Energy Strategy, 2004

The *Regional Energy Strategy* (RES) provides the framework for all decisions on the generation, supply and use of energy across the region and makes connections between energy and other key policy areas, in particular spatial planning, waste and transport, but also food and farming and housing.

The strategy sets out policies on:

- reducing the need for energy
- using energy more efficiently
- using energy from renewable sources
- making clean and efficient use of fossil fuels

Interestingly, the strategy itself does not contain any targets for renewable energy.

B1.2.6 Determining Baseline Energy Consumption Data, 2006

This report calculates baseline regional energy use and carbon emissions for the East Midlands. Specific objectives of the study were to:

- determine baseline energy usage in the East Midlands broken down to district level and split between business (industrial and commercial, here abbreviated to I and C) and domestic
- identify associated carbon dioxide emissions
- suggest a methodology for monitoring energy usage in future years

Energy consumption data was obtained from the DTI (Local Authority NUTS Level 4, 2003 data). Energy sources considered included gas, electricity, oil, coal, MSF and renewables and waste. Consumption data was then processed to estimate C02 emissions. Several methodological limitations for converting energy consumption data into C02 emissions are acknowledged from the outset. Factors influencing C02 per capita emissions are also acknowledged, such as age and condition of housing stock, occupancy and consumption behaviour.

B1.2.7 Regional Targets and Scenarios for Renewable Energy, 2006

Overview

This report provides updated renewable energy targets for the East Midlands, building on previous targets set out in *Viewpoints on Sustainable Energy in the East Midlands 2001*.

Specific objectives were to:

- review current 2010 targets as given in the 2001 document *Viewpoints on Sustainable Energy in the East Midlands* (hereafter referred to as Viewpoints)
- comment on progress to date, technology changes and any improved data

- update the 2010 targets to 2020 and, if possible, to 2050
- use updated targets and commentary to inform a series of future scenarios

Methodology

For each renewable resource, the following are discussed:

- the technically feasible resource. This figure represents the power available if all of the resource were to be developed
- accessible resource. This figure takes into account practical constraints such as those imposed by planning designations
- the strengths, opportunities and barriers associated with realising the resource
- performance against 2003 and 2010 *Viewpoints 2001* targets; adjustments to 2010 targets are made where necessary
- indicative targets for 2020 and, where this is possible to estimate, 2050

As with the original *Viewpoints 2001*, the indicative targets are based on judgements about the relative impact of current, and anticipated, technological, legislative and economic factors, which led to some significant revisions.

For the purpose of conducting scenarios, the report seeks to establish for each renewable technology a 'business as usual' baseline which projects forward historical and predicted trends to 2050.

Renewables considered were:

- offshore wind
- onshore wind (largescale)
- biomass
  - wet agricultural wastes
  - poultry litter
  - energy crops
- hydropower
- microgeneration
  - solar photovoltaics

  - small wind turbines
- municipal and industrial waste (incineration and gasification)
- landfill gas
- anaerobic digestion
- other renewable resources
  - CHP

A number of technical and baseline studies underpin the assessment of several of the renewable energy types considered e.g. *Wood Fuel Usage in the East Midlands* (2004, ERIN Research Ltd),

The report also considers energy efficiency and attempts to quantify potential savings in consumption by 2010 (total estimate being 2,000GWh). Energy efficiency targets used in the report's scenarios are those carried forward from the *Viewpoints 2001* report.

Recommendations/ targets

The revision of the renewables targets was used to inform a set of East Midlands energy scenarios:

1. What percentage of the electricity generation would be met from renewables under a 'business as usual' (BAU) projection using the updated trends and targets identified in the earlier section of this report. This is analysed with, and without, offshore wind.

2. What, if any, additional measures over and above the BAU projections would be needed to meet the Government's aspirational target of 20% renewable electricity by 2020 using large scale renewables only (excluding offshore wind).

3. What, if any, additional measures would be needed to meet the Government's aspirational target of 20% renewable electricity by 2020 using microgeneration to supplement large scale renewables (excluding offshore wind).

4. What energy efficiency savings could be introduced between now and 2020? What effect would this have on the regional renewable energy targets?

5. What measures would be required to meet 60% CO_2 reductions by 2050?

Scenarios 1-3 are based on energy consumption projections up to 2050.

Suggested Targets (scenario 4, with modifications):

Renewable Energy Technology Type	*Target (GWh/yr)*		
	2010	*2020*	*2050*
Offshore wind	330*	3000	5900
Onshore wind	319*	240	460
Biomass – wet agricultural wastes	41.7*	41.7	254
Biomass – poultry litter	118.3*	209.9	
Biomass – energy crops	343*	1,012	1,626.3
Hydropower	39 (10.6MWe*)	61.4	27.9MWe
Microgeneration	1.72*	146	2,850
Municipal and industrial waste	118	118	
Landfill gas	438	117	
Anaerobic digestion	64.1	100	
(* = Viewpoints 2001 target)			

A summary of county level renewable energy capacity and targets (2006) was also provided separately.

B1.2.8 Regional Energy Strategy, Framework for Action, 2007

Framework for Action comprises Part 2 of the *Regional Energy Strategy*. It gathers together the strategic work carried out in the past within the policies that the regional energy strategy presented, and builds a framework of priorities that has been adopted by the East Midlands Regional Assembly (EMRA), the East Midlands Development Agency (EMDA), and the Government Office for the East Midlands (GOEM).

This framework makes direct provision for the next stage of the regional energy strategy, forming specific action plans with assigned responsibilities, resources and targets to address the identified priorities.

The Framework for Action comprises the following three strands:

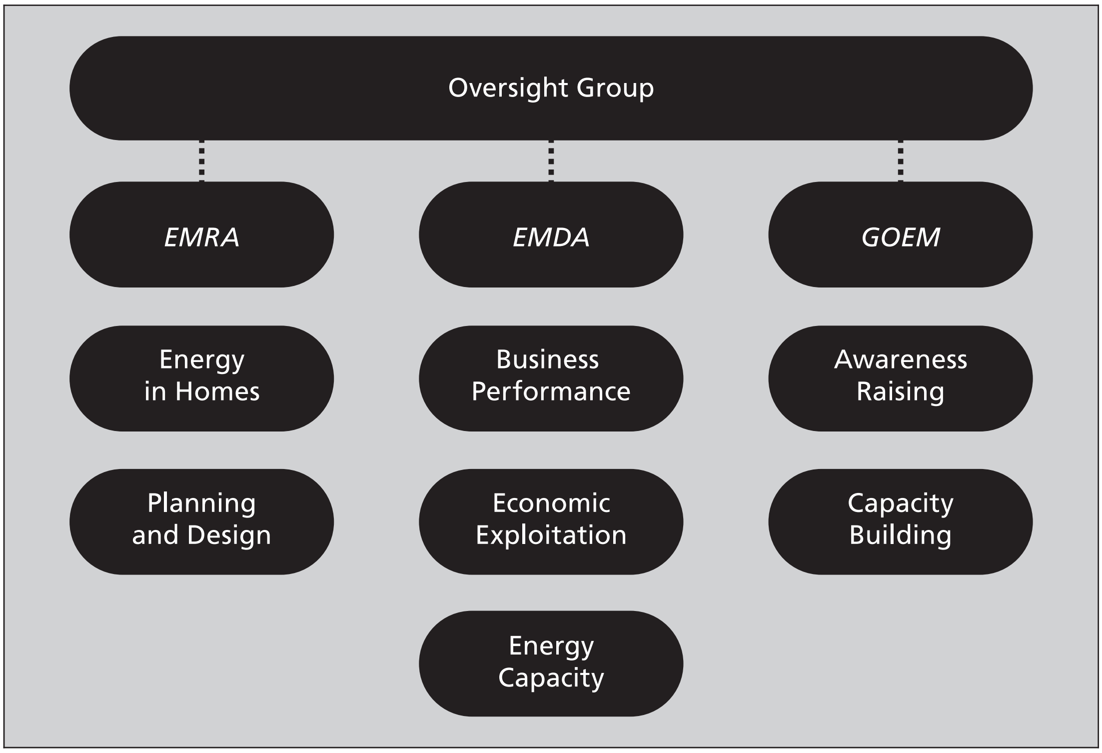
1. *Energy for Communities:* where EMRA will take a lead on those priorities that more directly involve individuals, households and communities, including the general environment.

2. *Energy for Enterprise:* where EMDA will take a lead on those priorities that more directly affect the region's economy, including business productivity and skills and the opportunities that a low carbon economy presents.

3. *Communicating the Energy Challenge:* where GOEM will take a lead on coordinating a communications strategy for the region, including the provision of capacity building and raising awareness that will inform the other two work strands.

Underpinning these three strands will be a monitoring and evaluation function that will scrutinise progress and make recommendations for future actions. Without monitoring it is difficult to ensure that the region is progressing toward our goals.

A Framework for Action sets out seven priority areas within the three work strands, each with a key regional lead agency. Implicitly, each priority has a group of key and wider stakeholders that must be brought together to deliver the framework's priorities. The lead organisation (EMRA, EMDA or GOEM), in taking responsibility for a priority, will identify and work with these specific and relevant key stakeholders to develop a detailed programme of actions, milestones and outcomes as targets. They will identify and help to acquire the required resources; and they will manage and ensure the provision of data and other information to allow for monitoring and review.



B1.2.9 Regional biomass active demand mapping

JHWalters were appointed by Natural England to identify current and future demand for biomass. Specific objectives of the project were:

- identify current public and private sector end users
- identify future public and private sector end users
- identify current supply and demand issues
- produce an information contact database

The report concluded that there is a growing market for biomass. However, links between production and consumption are still weak.

B1.3 Monitoring activity

The East Midlands monitors progress against its renewable energy targets annually via a number of sources:

- BIS energy trends data
- recent studies undertaken in the region
- conformity statements (for schemes over 3MW)
- LPA
- energy consumption data

These data sources are considered to be reasonably effective and reliable. However, the following improvements to current monitoring mechanisms would be useful:

- a more detailed breakdown of data (for example at the local authority level)
- a more effective means of capturing small scale development such as PV
- a mechanism by which implementation of planning permissions could be monitored

The regional assembly does not currently monitor planning applications, as the systems have not been considered to be very robust. However, they are considering the possibility of including questions regarding energy installations in the next monitoring process.

B1.4 Further work

The Secretary of State's *Proposed Changes to the Regional Plan*, issued in 2008, upheld the need for early review of the East Midland's renewable energy targets. Their panel report also identified a need to undertake assessment to ascertain the capacity of the sub-regions to accommodate the different technologies and how each area can contribute to achieving the regional target.

A partial review of the East Midlands plan – which will include consideration of renewable energy policies, is currently in its early stages. As part of this review, EMRA have commissioned Faber Maunsell to undertake a review of the existing renewable energy targets, the results of which are due in March. This will include landscape character assessments, and work to establish the suitability and environmental capacity of the sub-areas to accommodate the different technologies

The study will:

- assess the energy consumption in each housing market area (HMA), given the expected growth and the effect of national policy to reduce energy demand. The consumption assessment should include a breakdown of demand by sectoral area (domestic, industrial and commercial etc), where possible. This assessment will form the basis for deciding an upper and lower range for any targets, including those for energy efficiency, renewable heat, renewable electricity at a variety of scales and other low carbon technologies

- update current levels of renewable and low carbon technology and express as installed capacity (in MW), energy generated (in GWh/yr) and carbon savings (in tonnes)

- produce an overall target range for each HMA, with a more detailed break down by technology and sector. The target should also define an upper and lower range given the effectiveness of delivery against national policy. Targets should be expressed as installed capacity (in MW), generated or consumed energy (GWh/year) and carbon emissions/savings (in tonnes). The methodology should also make clear how any double counting of savings is avoided. The range of targets should then be aggregated to give a regional target, with upper and lower ranges specified

- recommend which technologies and scales of development may be best suited to each HMA, based on constraints including those due to landscape, grid connection, and so on

- suggest a challenging, but deliverable, range of targets for energy efficiency savings

- include a target range for electricity generated from each of large scale renewables, community renewables and microgeneration

- include a renewable heat target range for large, community and micro-generation scale and suggest ways to effectively monitor these targets via data that is easily accessed at regional level

- draw out some general evidence relating to cumulative impact and landscape. Make recommendations in relation to the issue of cumulative impact of certain technologies to allow some guidance to be given on this issue to decision makers in local planning authorities

- identify a target range for other low carbon technologies (including CHP) and provide an analysis of future technologies that may come on stream during the plan period. Within this we would expect to see an assessment of the expected delivery of energy from the various energy from waste projects that are coming forward through the waste planning process, but we would not expect a target as any energy from waste delivery is defined through waste planning

- the study should if possible identify key areas where it may be possible to make very significant cuts in carbon emissions and identify approaches to delivering on very deep cuts in these low carbon action areas

Appendix C
East of England

C1.1 RSS renewable energy policies

C1.1.1 Introduction

The final East of England plan published in May 2008 contained a policy that requires EERA to commence an early focused review to be completed by 2011. The review requires the plan to extend its coverage to 2031. EERA is currently working with regional partners and stakeholders to:

- monitor and implement the East of England plan 2001 - 2021
- provide advice as to whether local development plan documents are in general conformity with the East of England plan 2001 - 2021
- comment on regionally significant planning applications
- commission and lead a number of planning related studies to inform the East of England plan review to 2031 evidence base
- prepare a review of East of England plan covering the period 2011 to 2031

C1.1.2 Primary renewable energy policies

POLICY ENG1: Carbon Dioxide Emissions and Energy Performance

Working with regional partners, EERA should consider the performance of the spatial strategy on mitigating and adapting to climate change through its monitoring framework and develop clear yardsticks against which future trends can be measured, which should inform the review of the RSS and the preparation of Local Development Documents.

To meet regional and national targets for reducing climate change emissions, new development should be located and designed to optimise its carbon performance. Local authorities should:

- encourage the supply of energy from decentralised, renewable and low carbon energy sources and through Development Plan Documents set ambitious but viable proportions of the energy supply of new development to be secured from such sources and the development thresholds to which such targets would apply. In the interim, before targets are set in Development Plan Documents, new development of more than 10 dwellings or **1000m^2 of non-residential floorspace should secure at least 10% of their energy from decentralised and renewable or low-carbon sources, unless this is not feasible or viable**; and
- promote innovation through incentivisation, master planning and development briefs which, particularly in key centres for development and change, seek to maximise opportunities for developments to achieve, and where possible exceed national targets for the consumption of energy. To help realise higher levels of ambition local authorities should encourage energy service companies (ESCOs) and similar energy saving initiatives.

9.1: The UK Government, as a signatory to the Climate Convention, is actively seeking to achieve its commitments under the Kyoto Protocol to reduce its greenhouse gas emissions by 12.5% below 1990 levels by 2012. It set higher carbon reduction targets in the Climate Change Programme, 2000, and aims to reduce domestic emissions by 20% by 2010. The Climate Change Programme, 2006 sets out the Government's current policies and priorities for action. In November 2007 it published its Climate Change Bill which aims to reduce carbon dioxide emissions through domestic and international action to 26-32% below 1990 levels by 2020 and to at least 60% by 2050. This target will be reviewed, based on a report from the independent committee on climate change.

9.2: The 2007 housing green paper establishes targets for all new homes to emit 25% less carbon from 2010, 44% less from 2013 and to be carbon zero from 2016. The 2008 Budget set out the Government's intention for all new non domestic buildings to be carbon zero from 2019. The supplement to PPS1, *Planning and Climate Change*, December 2007, makes clear that tackling climate change is a key Government priority for the planning system. It sets out how planning should shape places which produce lower emissions and are resilient and appropriate for the climate change now accepted as inevitable.

9.3: For the East of England, the combination of vulnerability to the effects of climate change and the level of development with its potential contribution to emissions means that addressing climate change is particularly urgent and challenging. The concentration of research expertise on climate change within the region and the work being done by partners including the Sustainable Development Round Table, Climate Change Partnership, Regional Cities East and other cities, means there is an opportunity for the East of England to be a leader in reconciling development with reduced emissions. This will also support the aspiration within the East of England to use the developing markets for micro-renewables, biofuel production and other technologies as an economic driver, building on the expertise and capacity in the region.

9.4: Complementing national objectives, local authorities should ensure that development in the region contributes towards medium and long term emissions targets through planning policies. These policies should promote approaches to the location and design of development which encourage the incorporation of suitable technologies and reduce energy consumption and carbon emissions. They should seek ways to incentivise further reductions in carbon emissions both on-site and by agreement elsewhere within their areas e.g. reductions in carbon output from existing buildings by retrofitting improvements in energy efficiency and fixing carbon through green infrastructure.

POLICY ENG2: Renewable Energy Targets

The development of new facilities for renewable power generation should be supported, with the aim that by 2010 10% of the region’s energy and by 2020 17% of the region’s energy should to come from renewable sources. These targets exclude energy from offshore wind, and are subject to meeting European and international obligations to protect wildlife, including migratory birds, and to revision and development through the review of this RSS.

9.5: Substantial efforts to switch to energy produced from renewable and low carbon sources will be required to put the region on a less carbon-intensive path. The Climate Change Programme contains targets requiring suppliers to increase the provision of electricity from renewable sources to 10% and to at least double combined heat and power capacity by 2010. It looks to a doubling of the 2010 renewables’ share of electricity by 2020. The renewables obligation obliges suppliers to source a rising percentage of electricity from renewable sources. The 2006 Energy Review *The Energy Challenge* strengthens the need to plan for a higher share of renewable energy and to ensure security of supply.

9.6: The targets in ENG 2 derive from studies commissioned by the East of England Sustainable Development Round Table. *Making renewable energy a reality – setting a challenging target for the East of England* identified the sources of renewable energy likely to offer the greatest potential, including offshore wind, and concluded that 14% of the region's electricity could be produced from these sources by 2010. This work was reviewed through *Regional renewable energy targets for the East of England 2010 and 2020* which established a 2010 target for on-shore renewable generation and a target for 2020 of 44% of the region's electricity to be produced from renewable sources, or 17% excluding offshore wind.

Based on then estimates of energy consumption these targets equate to the following targets for installed capacity:

- at least 1192 megawatts by 2010 (820 MW excluding offshore wind) and
- at least 4250 megawatts by 2020 (1620 MW excluding offshore wind)

9.7: For the purpose of this policy means of generating renewable energy include photovoltaic energy, solar-powered and geothermal water heating, wind, energy crops and biomass (such as wood from existing woodlands, sawmill co-products, and organic waste products that might otherwise be destined for landfill) and energy from agricultural, plant and animal, domestic and industrial waste. It includes energy generated as a product of anaerobic digestion and energy gained on site and/or from a decentralised supply, including power from combined heat and power (but excluding renewable heat).

9.8: The development of energy sources and technologies such as biomass and biofuels could bring significant economic benefits but issues of location and scale will require careful consideration. The regional assembly proposes to develop fuller regional guidance for renewable energy as part of the review of RSS, including sub-regional targets based on an assessment of potential, together with locational criteria. The review should take account of national policy and initiatives on energy, including the Energy white paper 2007 and the national *Woodfuel Strategy and Implementation Plan*, 2005 and should consider all forms of renewable energy generation, including renewable heat and energy from waste.

C1.1.3 Secondary renewable energy policies

POLICY GYL1: Great Yarmouth and Lowestoft Key Centres for Development and Change

The strategy for Great Yarmouth and Lowestoft is to promote the comprehensive regeneration of the two towns, capitalising on their strengths and protecting and enhancing their environmental assets. Local Development Documents and other strategies should pursue this strategy by:

- Promoting radical change in the economy building on the area's established sectors and diversifying into new and emerging sectors including:
  - the renewable energy cluster, building on offshore engineering skills;
  - a more diverse tourism cluster, based on the resort and leisure role of the towns, the proposal for a casino at Great Yarmouth and proximity to the Broads;
  - environmental technologies and the wider environmental economy furthered by establishing a research and teaching centre supported by further and higher educational institutions and others; and
  - port and related activities strengthening links with the rest of Europe.
- Encouraging an urban renaissance by identifying priority areas and projects for brownfield redevelopment to achieve economic, physical and social regeneration in inner urban areas and taking advantage of key waterfront sites. Priority will be given to regeneration projects that can assist in dealing with concentrations of deprivation.
- Delivering at least 11,800 additional dwellings in line with the Policy H1 to support a healthy housing market, assist the regeneration of brownfield sites and meet local affordable housing needs.
- Promoting improvements on key transport corridors into the area and between the towns, together with measures to relieve congestion, improve access to regeneration areas, and enable a significant increase in public transport, walking and cycling.

POLICY NR1: Norwich key centre for development and change

13.70: Existing and emerging economic clusters/sectors to be supported and promoted include media and creative industries, finance and insurance, ICT, energy (including renewable energy), advanced engineering (including high performance motor sport), environmental economy, plant biotechnology, education and tourism.

C1.2 Renewable energy evidence base documents

Document	*Date*	*Author*	*Client*
Placing Renewables in the East of England	2008	Arup, White Consultants and the University	East of England Regional Assembly
Regional Renewable Energy Targets for the East of England 2010 and 2020	*2004*	*ESD, Global to Local Ltd, & Tony Hams Associates*	*Unknown*
Making Renewable Energy a Reality – Setting a Challenging Target for the Eastern Region	*2000*	*ESD & Global to Local Ltd Sustainable Development Round Table*	*East of England*
Eastern Region Renewables Energy Planning Study	1997	ETSU & Terence O'Rourke Plc	Unknown
(Italics denotes key evidence base document)			

C1.2.1 Making Renewable Energy a Reality – Setting a Challenging Target for the Eastern Region, 2000

Overview

A regional assessment of the potential for renewable energy production in the East of England was published in 2000. Produced by ESD Ltd, Tony Hams and Global to Local Ltd and entitled *Making Renewable Energy a Reality – Setting a Challenging Target for the Eastern Region*, it proposed a 2010 target. This was adopted by EERA as part of the October 2001 Sustainable Development Framework for the East of England. Widespread stakeholder consultation was undertaken as part of the work.

The original 2010 target has been incorporated into the draft East of England plan, (now with offshore wind separately identified), and a 2020 target has been added. The latter was produced in 2004 by the same consultants (see: *Regional Renewable Energy Targets for the East of England 2010 and 2020*), using the methodology of the 2000 study, but without stakeholder consultation.

The 2004 work was essentially a desk based exercise and did not benefit from any stakeholder consultation. Moreover it did not refer to or update the indicative county targets produced in 2000 or define new targets broken down to county or any other sub regional level. It is therefore desirable, in testing the 2020 targets, to review the constraints which have become apparent since 2000 in a systematic way, and see whether a realistic set of sub-regional targets can be usefully devised and achieve stakeholder support. Therefore, this report has not been considered further.

Methodology

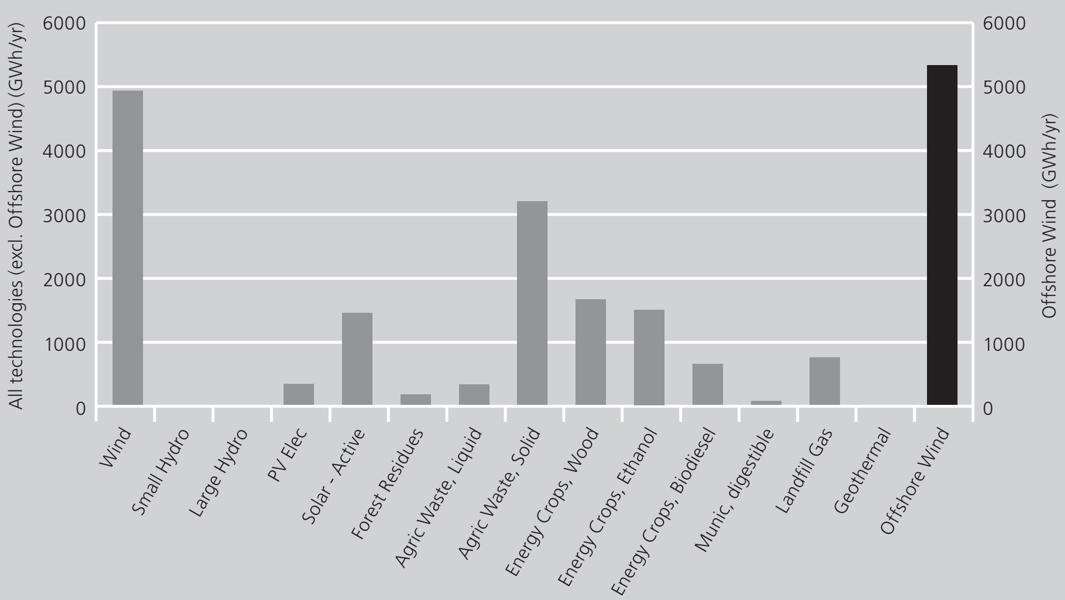
The starting point for resource data was the material contained in the existing ETSU renewable energy planning study for the eastern region. This was reassessed to allow for changes in technology, renewable energy policy, the land use planning system and the financial regime associated with renewables. The results furnished the "raw" data for the second stage of the analysis, which used the SAFIRE computer modelling methodology to elaborate the likely market penetration of each renewable technology under the agreed scenario regimes.

In addition to providing a renewable energy target based on local energy demand profiles and the most commercially appropriate technologies, the scenario modelling forecast the implications of renewable energy deployment for local employment, local added value (essentially how money is retained in the local economy), the capital costs of the developments and the environmental impact of the technologies (in terms of the CO_2 impact of deployment). These figures were produced for the region and for each of its six counties.

Recommendations/targets

The result of the whole process was an agreed renewable energy target for the eastern region. The scenario results include both electricity and the heat arising from the renewable energy generation process - reflecting a strong desire throughout the consultation process that all available energy should be used. The use of both electricity and heat maximises the potential that can be obtained from renewable energy. However, detailed figures for the RET are for electricity only. The technical potential for the production of renewable energy in the eastern region is shown below. If this potential were realised it would equate to a regional target of 40%.

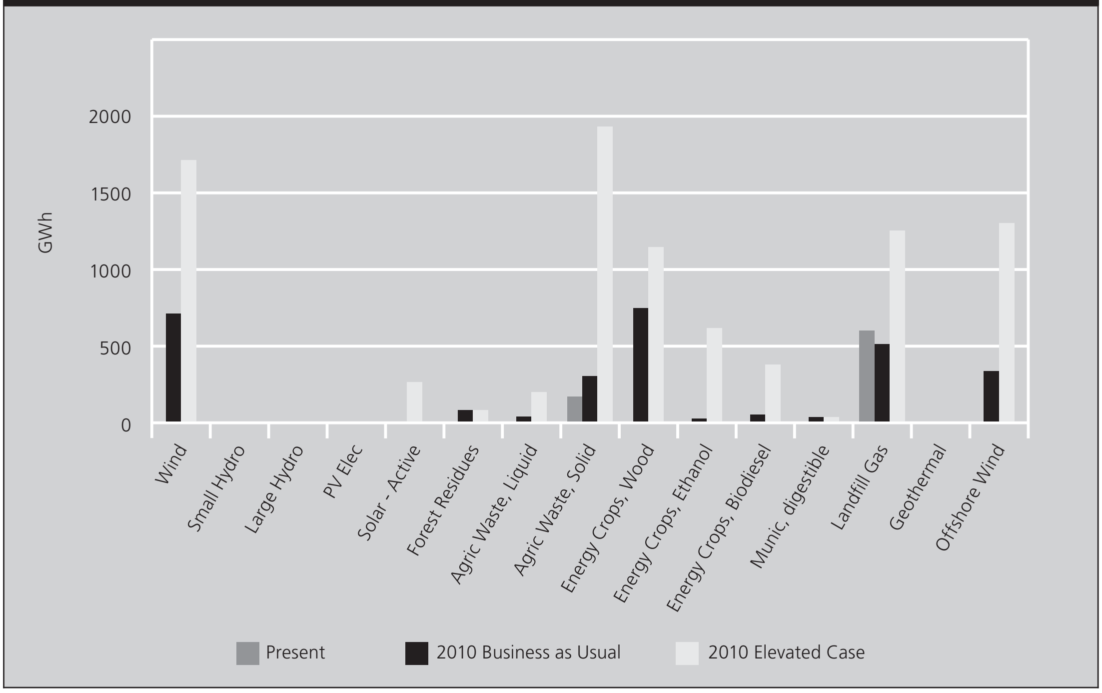
The technical potential for energy from renewable energy sources in the eastern region



In the light of our data analysis, computer modelling, planning research, and consensus building processes, we recommend the following RET for the region and for each of its six counties:

- to produce 14% of the region's electricity from renewable sources by 2010 as a first step towards achieving a more significant percentage in the medium term
- to produce 1,300 GWh/yr of electricity from offshore wind by 2010
- to produce 1,700 GWh/yr of electricity from onshore wind by 2010
- to produce 700 GWh/yr of electricity from biomass by 2010

The possible development of renewable energy in the East of England, The two scenarios are shown along with the current deployment



Energy derived from municipal solid waste has been excluded from the recommended renewable energy target in view of the opinion expressed by stakeholders that it is not a renewable source of energy. However, the modelling exercise undertaken as part of the study identified the potential energy that could be recovered in this way. That figure for the ECS is 1250GWh.

C1.2.2 Regional Renewable Energy Targets for the East of England 2010 and 2020, 2004

This study built on the work of the 2000 report *Making Renewable Energy a Reality* as an accompanying technical report. Targets were derived from an "elevated case scenario", this assumed generally positive external factors, as opposed to a less optimistic "business as usual" scenario which produced lower targets. The earlier study was the product of widespread consultation; this study was not.

C1.2.3 Placing Renewables in the East of England, 2008

Overview

Arup, White Consultants and the University of Northumbria were commissioned by the East of England Regional Assembly (EERA) to undertake a study that would inform the further review of the East of England plan, with regard to renewable energy generation. The work focussed on a selection of grid-connected onshore renewable energy technologies – wind, biomass and landfill gas – which at the time of the report amounted to about 92% of all renewable energy electricity production in the East of England.

Offshore technologies were not covered by this study.

This study is based on existing information, and the consultants' professional views. It synthesises data from a range of sources in order to draw comparisons between what is currently generated in the region and what might be possible, in a range of policy contexts, in the period to 2020. It did not involve empirical research.

Methodology

Understanding the theoretical potential for different RE technologies are discussed below. The report presents three scenarios of renewable energy targets (theoretical maximum, expected, and business as usual), each presenting a different extent of renewable energy generation and includes an indicative break-down of the total installed capacity by county and technology.

The theoretical potential for onshore wind (which included broad areas of greatest potential) used GIS constraints mapping setting out strategic scale and site specific constraints applicable to the determination of individual planning applications. Small developments (less than seven turbines) were not considered and they would most likely be dispersed and identified on an ad hoc basis.

The theoretical potential for dedicated biomass was derived through the UK Biomass strategy and technical specialists in the East of England. Several agencies had undertaken research to consider the future effects of climate change on the growth of crops. This research was also taken into consideration in identifying the likely potential for biomass in the East of England.

The theoretical potential for energy from waste was sought through telephone interviews, future potential for landfill gas, waste arising from forecasts by EERA/GO-East and several other documents including:

- Review of the Regional Waste Plan (http://www.gos.gov.uk/goeast/environment_and_rural/waste/waste_management_strategy/)
- Foundation Study (http://www.cseng.org.uk/_db/_documents/RE_Biomass_Foundation_Report_2005.pdf) and
- Scoping Study for a Woodfuel Strategy in the East of England.

Recommendations/targets

Following an assessment of the three scenarios (discussed in Chapter 6 of the report) Scenario 2 – 'expected', was considered the most suitable target for the East of England for 2002. It does not include the additional contributions from technologies such as photovoltaics, solar water heating and geothermal water heating.

A 10% target for 2010 and a 20% target for 202 were recommended. A way-mark figures of 16% given that the region should be more than a mid-point towards the overall target to ensure that sufficient levels of appropriate renewable development get underway sufficiently early to enable the region to meet its full target in 2020.

Target renewable electricity generation in the East of England (2020)

Resource	*Installed capacity Energy generated*	*TARGET electricity*	*Scenario 2*
wind (unconstrained / variably constrained)	installed capacity (MW) GWh	910 2071	909.4 2071.3
wind (constrained areas)	installed capacity (MW) GWh	155 350	155.0 353.0
energy crops	installed capacity (MW) GWh	125 928	124.6 927.8
imported biomass	installed capacity (MW) GWh	80 596	80.0 595.7
landfill gas	installed capacity (MW) GWh	175 1375	174.1 1372.7
agricultural wastes	installed capacity (MW) GWh	115 846	113.7 846.3
managed woodland	installed capacity (MW) GWh	13 100	12.7 100.1
AD of waste	installed capacity (MW) GWh	12 65	11.6 65.0
sewage gas	installed capacity (MW) GWh	5 35	4.7 35.1
sewage sludge	installed capacity (MW) GWh	10 75	10.0 74.5
Total	**installed capacity (MW)** **GWh**	**1,600** **6,441**	**1,595.9** **6,441.5**

Way-mark target renewable electricity generation in the East of England (2015)

Resource	*Installed capacity* *Energy generated*	*2015 WAYMARK Electricity* *(80% of 2020 target)*
wind (unconstrained / variably constrained)	installed capacity (MW) GWh	728 1659
wind (constrained areas)	installed capacity (MW) GWh	124 280
energy crops	installed capacity (MW) GWh	100 742
imported biomass	installed capacity (MW) GWh	64 477
landfill gas	installed capacity (MW) GWh	140 1100
agricultural wastes	installed capacity (MW) GWh	92 677
managed woodland	installed capacity (MW) GWh	10 80
AD of waste	installed capacity (MW) GWh	10 52
sewage gas	installed capacity (MW) GWh	4 28
sewage sludge	installed capacity (MW) GWh	8 60
Total	**installed capacity (MW)** **GWh**	**1,280** **5,153**

C1.3 Monitoring activity

The East of England regional assembly use Renewables East to monitor the progress (in MW and %) towards 2010 and 2020 targets. Renewables East produce a six monthly progress report (the latest being June 2009).

In order to monitor wind and wave, Renewables East resort to monitoring the press (trade journals), contacting the BWEA, contacting developers, and liaising with local authorities regarding any applications. For waste, Renewables East refers to section 36 applications and waste proposals within local authorities, landfill gas resources are monitored through a government source. Any further applications in any renewable category are double-checked against local authority records.

Microgeneration is not currently recorded as part of the monitoring, although it is usually seen as a demand reduction contribution rather than a significant resource towards the targets.

Next year, Renewables East expect to use a similar approach to RegenSW who produce an annual survey of all installers and developers (including microgeneration and heat) in order to provide a more accurate monitoring process.

Issues encountered as part of the monitoring process include:

- delays in the publication or use of government data may mean that statistics are not up to date

- unseen anomalies relating to load factors for different forms of renewable technology. An extreme example of this occurred whilst a 1.8MW turbine was forced to turn off as the rotor blades were spraying icicles into nearby resident's properties. Several months down the line the turbines remain stationary. However, the generation from this turbine will be recorded as all year round

C1.4 Further work

The East of England regional assembly are carrying out their own survey work with local authorities to determine how they are fairing with the East of England on-site targets (ENG1) similar to the Merton Rule. This requires the use of 10% renewable energy onsite to reduce annual carbon dioxide (CO_2) emissions in the built environment.

Renewables East are taking forward further commissioned work for renewables in the hope that they can arrive at sub-regional targets. The most up to date work includes *Placing Renewables in the East of England*.

Appendix D London

D1.1 RSS renewable energy policies

D1.1.1 Introduction

The further alterations to the London plan, which were adopted in 2007, included revised policies on renewable energy. The Mayor has recently embarked on a full revision of the London plan, with a view to its formal publication in winter 2011. In the meantime, a revised SPG on sustainable design and construction and renewable energy is expected in 2009.

D1.1.2 Primary renewable energy policies

POLICY 4A.3: Sustainable design and construction

The Mayor will, and boroughs should, ensure future developments meet the highest standards of sustainable design and construction and reflect this principle in DPD policies. These will include measures to:

- make most effective use of land and existing buildings
- reduce carbon dioxide and other emissions that contribute to climate change
- design new buildings for flexible use throughout their lifetime
- avoid internal overheating and excessive heat generation
- make most effective and sustainable use of water, aggregates and other resources
- minimise energy use, including by passive solar design, natural ventilation, and vegetation on buildings
- supply energy efficiently and incorporate decentralised energy systems (Policy 4A.6), and use renewable energy where feasible (Policy 4A.7)
- minimise light lost to the sky, particularly from street lights
- procure materials sustainably using local suppliers wherever possible

POLICY 4A.3: Sustainable design and construction – *continued*

- ensure designs make the most of natural systems both within and around the building
- reduce air and water pollution
- manage flood risk, including through sustainable drainage systems (SUDS) and flood resilient design for infrastructure and property
- ensure developments are comfortable and secure for users
- conserve and enhance the natural environment, particularly in relation to biodiversity, and enable easy access to open spaces
- avoid creation of adverse local climatic conditions
- promote sustainable waste behaviour in new and existing developments, including support for local integrated recycling schemes, CHP and CCHP schemes and other treatment options
- encourage major developments to incorporate living roofs and walls where feasible (Policy 4A.11)
- reduce adverse noise impacts

The Mayor will and the boroughs should require all applications for major developments to include a statement on the potential implications of the development on sustainable design and construction principles. This statement should address demolition, construction and long-term management. Boroughs should ensure that the same sustainability principles are used to assess other planning applications. The Mayor will and boroughs should ensure that developments minimise the use of new aggregates and do not use insulating and other materials containing substances which contribute to climate change through ozone depletion.

Developers should use best practice and appropriate mitigation measures to reduce the environmental impact of demolition and construction.

POLICY 4A.4: Energy assessment

The Mayor will, and boroughs should, support the Mayor's energy strategy and its objectives of improving energy efficiency and increasing the proportion of energy used generated from renewable sources. The Mayor will, and boroughs should, require an assessment of the energy demand and carbon dioxide emissions from proposed major developments, which should demonstrate the expected energy and carbon dioxide emission savings from the energy efficiency and renewable energy measures incorporated in the development, including the feasibility of CHP/CCHP and community heating systems. The assessment should include:

- calculation of baseline energy demand and carbon dioxide emissions
- proposals for the reduction of energy demand and carbon dioxide emissions from heating, cooling and electrical power (Policy 4A.6)
- proposals for meeting residual energy demands through sustainable energy measures (Policies 4A.7 and 4A.8)
- calculation of the remaining energy demand and carbon dioxide emissions

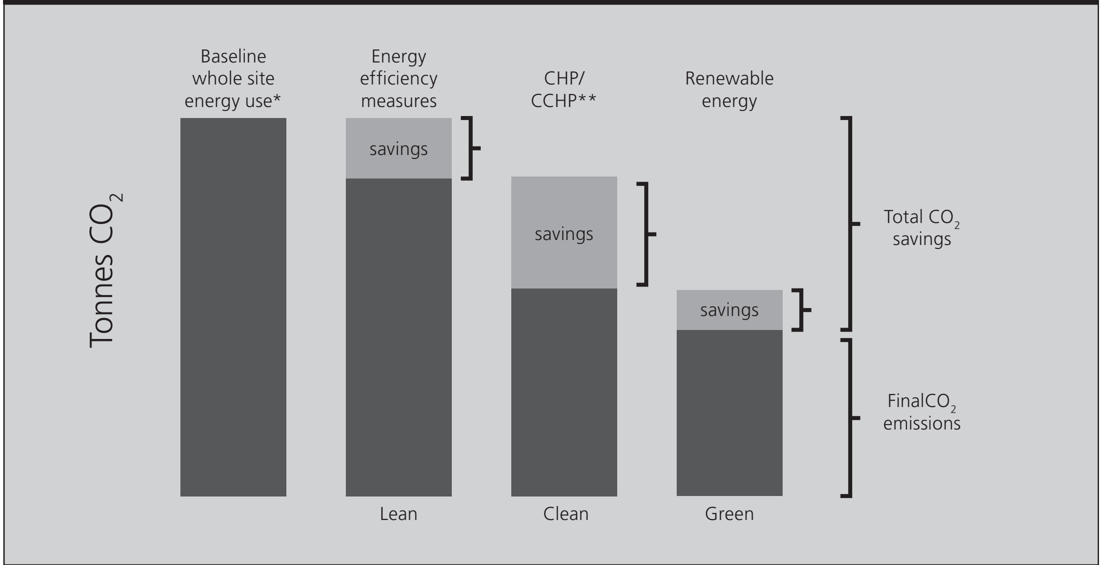
This assessment should form part of the sustainable design and construction statement (Policy 4A.3).

The Mayor will explore with the government and boroughs the means of extending assessments to include all greenhouse gases.

All development should contribute to improving the integration of land use and transport policy and reducing the need to travel, especially by car (see Policy 3C.1). Such issues will not be part of the energy assessment.

4.19 The energy strategy sets out the following principles: using less energy, supplying energy efficiently and using renewable energy. Part L of the current Building Regulations will be used as the minimum benchmark and the starting point for the assessment. The Mayor's *Energy Strategy* and the guidelines set out in the *Sustainable Design and Construction* SPG require consideration of a development's whole energy use when calculating the carbon dioxide emissions baseline for the assessment.

Figure 4A.1 **Calculation of energy/carbon dioxide savings**



POLICY 4A.5: Heating and cooling networks

Boroughs should ensure that all DPDs identify and safeguard existing heating and cooling networks and maximise the opportunities for providing new networks that are supplied by decentralised energy. Boroughs should ensure that all new development is designed to connect to the heating and cooling network. The Mayor will and boroughs should work in partnership to identify and to establish network opportunities, to ensure the delivery of these networks and to maximise the potential for existing developments to connect to them.

4.20 The London Energy Partnership's (LEP) Carbon Scenarios report demonstrates that a combined heat and power (CHP) led approach is the most cost-effective mechanism for delivering carbon dioxide reductions in London. Boroughs can set the planning framework for this by prioritising decentralised energy in all area-based DPDs. This will provide a systematic way of identifying the opportunities across London for different types of decentralised energy systems, whilst still retaining the principles of additionally and physical connection. It will create a framework for energy to be considered early in the development process, taking some of the burden away from the developer, particularly smaller developers. Some boroughs have already undertaken technical and financial work to underpin the decision to progress district-wide schemes.

4.21 There are a number of studies already available to help boroughs in developing this policy approach:

- Mayor of London: *The London Community Heating Development Study* (May 2005) provides indications of heat densities, and the main opportunities for community heating

- LEP: *'Making ESCos work' Guidance and advice on setting up and delivering ESCos* (February 2007)

- LEP/London Renewables: *Towards zero carbon; supportive information for boroughs*

4.22 This area wide approach should provide more market certainty for energy services companies (ESCo) as it should remove some of the risk of developments not being designed to connect to decentralised energy. The scale of opportunity for delivery may also increase competition between ESCos and encourage the creation of small and medium size ESCos to deal with the different scales of development.

POLICY 4A.6: Decentralised energy: heating, cooling and power

The Mayor will and boroughs should in their DPDs require all developments to demonstrate that their heating, cooling and power systems have been selected to minimise carbon dioxide emissions. The need for active cooling systems should be reduced as far as possible through passive design including ventilation, appropriate use of thermal mass, external summer shading and vegetation on and adjacent to developments. The heating and cooling infrastructure should be designed to allow the use of decentralised energy (including renewable generation) and for it to be maximised in the future. Developments should evaluate combined cooling, heat, and power (CCHP) and combined heat and power (CHP) systems and where a new CCHP/CHP system is installed as part of a new development, examine opportunities to extend the scheme beyond the site boundary to adjacent areas.

The Mayor will expect all major developments to demonstrate that the proposed heating and cooling systems have been selected in accordance with the following order of preference:

- connection to existing CCHP/CHP distribution networks
- site-wide CCHP/CHP powered by renewable energy
- gas-fired CCHP/CHP or hydrogen fuel cells, both accompanied by renewables
- communal heating and cooling fuelled by renewable sources of energy
- gas fired communal heating and cooling

4.23 Decentralised energy generation is a series of local systems generating heat and power, at or near the point of use, connected to local distribution networks. Where possible, the opportunity to link a new development to an existing CCHP/CHP system may be the most resource efficient option, allowing more effective use to be made of heat, power and cooling. If it is not possible to link to an existing system, the provision of CCHP/CHP needs to be considered on a site-wide basis that connects different uses and/or groups of buildings. If a site-wide approach is not possible, CHP/CCHP should still be investigated. This should include renewables where it is technically feasible. Electrical heating and cooling systems cause significant carbon dioxide emissions and the Mayor wishes to discourage these.

4.24 Decentralised energy schemes make more efficient use of primary energy than large-scale generation via the national grid. CCHP and CHP will need to be sized to minimise carbon dioxide emissions. They can be suitable for all scales of development. They can incorporate the use of renewable sources of energy. Their design should minimise impacts on air quality (see the Mayor's *Air Quality Strategy*). The establishment of fuel cells using renewable and low carbon dioxide hydrogen is the goal, but the role of other technologies is recognised in the transition to a hydrogen economy. It is important that the design of infrastructure associated with fuel cells does not preclude links being made to additional uses. Investment in heat and power distribution infrastructure should be considered in all developments. Provision of localised energy systems can also offer an opportunity to involve and benefit local residents through community schemes. Where a district CHP/CCHP scheme provides only a proportion of a development's power, and/or heating and/or cooling demand, the scheme should address the remainder utilising renewable energy technologies where feasible. The required renewable energy contribution should be established in line with policies 4A.4 and 4A.7.

POLICY 4A.7: Renewable energy

The Mayor will, and boroughs should, in their DPDs adopt a presumption that developments will achieve a reduction in carbon dioxide emissions of 20% from on site renewable energy generation (which can include sources of decentralised renewable energy) unless it can be demonstrated that such provision is not feasible. This will support the Mayor's *Climate Change Mitigation and Energy Strategy* and its objectives of increasing the proportion of energy used generated from renewable sources by:

- requiring the inclusion of renewable energy technology and design, including: biomass fuelled heating, cooling and electricity generating plant, biomass heating, renewable energy from waste (Policy 4A.21) photovoltaics, solar water heating, wind, hydrogen fuel cells, and ground coupled heating and cooling in new developments wherever feasible
- facilitating and encouraging the use of all forms of renewable energy where appropriate, and giving consideration to the impact of new development on existing renewable energy schemes

Boroughs in their DPDs should identify broad areas where the development of specific renewable energy technologies is appropriate. These should encourage the fullest realisation of the potential for renewable energy having regard to the environmental and transport policies of the London plan. These should include:

- identifying sites for zero carbon development
- identifying suitable locations for wind turbines in developments
- encouraging at least one large wind power scheme in London
- encouraging applications for new street appliances (such as bus shelters, bus stops, parking ticket machines and road signs) to incorporate off-grid solar power and other renewable energy sources where feasible

4.25 London should become more energy efficient. This applies to both new development and the existing built form. Energy efficient measures and renewable energy technology should not be precluded in areas of heritage, but should be designed sensitively.

4.26 Analysis has shown very significant increases in energy savings in developments referred to the Mayor. Annex D of the *Sustainable Design and Construction* SPG explains the criteria to be used in applying this policy.

4.27 The *London Renewable Energy Toolkit* has been developed to assist in assessing the feasibility and viability of renewable technologies. Developments not initially incorporating solar technologies should, where practicable, be of a suitable design and orientation to support them later. Applications proposing prestige cladding should incorporate photovoltaics wherever feasible.

4.28 The London Energy Partnership is developing a low carbon design toolkit to provide support on all aspects of sustainable energy, including energy efficiency. This can be applied to the assessment of micro-generation for small developments as well as major ones.

4.29 The Mayor's energy strategy contains targets in relation to the installation of types of renewable energy schemes to increase London's generation of power and heat from renewable energy schemes up to 2020; these are set out in table 4A.1. On the assumption that electricity consumption in London for 2010 and 2020 is 40,631 GWh and 42,709 GWh, (extrapolation from baseline in the London Energy and Carbon Dioxide Emissions Inventory, 2003) these targets will produce approximately 0.6% and 3.2% of London's electricity for 2010 and 2020 respectively. Further work on assessing the renewable energy potential in London, including the potential for retrofitting development with renewables, will be undertaken to review these targets. These will be included in the Mayor's *Climate Change Mitigation and Energy Strategy* and in further reviews of the London plan. In support of these London wide targets the energy strategy includes policies requesting boroughs to set consistent targets, for the generation of renewable energy in their areas, to install at least one zero carbon development and to identify energy action areas. The principle of energy action areas is that they set higher standards for new build and retrofit and showcase best practice for integrating sustainable energy. The Mayor strongly encourages boroughs and developers to work in partnership to establish these areas.

Table 4A.1 Targets for installed electricity capacity generated from renewables

	2010			2020		
	Number	*Total Installed Capacity (MW)*	*Total Output (MWh)*	*Number*	*Total Installed Capacity (MW)*	*Total Output (MWh)*
Offshore Wind Farms	–	–	–	–	–	–
On-shore Wind Farms	–	–	–	–	–	–
Single Large Wind Turbines	6	15	26,280	18	45	78,840
Snakk Stand-Alone Turbines	50	10	13,140	150	30	39,420
Building Mounted Micro-Wind Turbines	2,000	5	3,066	6,000	15	9,198
Biomass Fuelled CHP / Electricity	8	24	126,144	24	72	378,432
Hydro Power	–	–	–	–	–	–
Solar PV (domestic) (MWp)	7,000	15	10,500	21,000	45	31,500
Solar PV (commercial) (MWp)	25-	12	8,400	750	36	25,200
Tidal Energy	–	–	–	–	–	–
Wave Energy	–	–	–	–	–	–
Anaerobic Digestion[a]	4	1.2	9,460	25	7.5	67,050
Sewage Gas[a]	2	10	31,124	6	30	93,372
Gasification / Pyrolysis[b]	1	6.8[c]	42,048[c]	11	94.6[c]	662,957[c]
Total	**9,321**	**99**	**228,114**	**27,984**	**375.1**	**1,385,969**

a Energy from waste (biological processes)

b Energy from waste (thermal processes)

c Renewable component of capacity and output is represented. A 68% biodegradeable Municipal Solid Waste content is assumed.

Note: The applicability of off-shore wind farms, onshore wind farms, biomass co-firing, anaerobic digestion of far biogas, hydro power, tidal and wave energy, and landfill gas in London will be investigated for future reviews of the plan.

Source: ETSU, AEA Technology, Renewable Energy Assessment and Target for London. GLA/GOL, 2001. The Mayor's Energy Strategy, GLA, 2004 (and further analysis by GLA)

4.30 Where land is needed for the provision of renewable energy technologies, such as anaerobic digesters and biomass plants, as part of appropriate developments, boroughs should encourage this provision through their inclusion in development briefs and area development frameworks. The Mayor's forthcoming *Renewable Energy* SPG will set out broad guidelines to define locations where stand-alone renewable energy schemes would be appropriate and set criteria both for the assessment of such schemes and for their application to individual technologies. The Mayor will encourage the use of a full range of renewable energy technologies, which should be incorporated wherever site conditions make them feasible. Off-site renewable contributions to developments are acceptable only where they are directly connected and supplied by private wire arrangement. Further information regarding these circumstances will be contained in the forthcoming renewable energy SPG. The London Energy Partnership has completed a study of the potential both for biomass, and for non building-integrated wind power in London, which identifies several specific locations at which wind turbines may be feasible. The recommendations of the study are being taken forward by the London Climate Change Agency and in the development of the Mayor's renewable energy SPG.

POLICY 4A.8: Hydrogen economy

The Mayor will work with the London Hydrogen Partnership, the London Climate Change Agency, boroughs and others to support and encourage the more widespread use of hydrogen as an alternative to fossil fuels by:

- planning hydrogen supply and distribution infrastructures
- supporting and developing renewable sources of hydrogen
- maximising the uptake of hydrogen and fuel cell vehicles (see Chapter 3C)
- maximising the adoption of fuel cell combined heat and power in developments

4.31 The Mayor supports the development of energy infrastructure based on hydrogen as a principal energy carrier and will encourage boroughs to identify capacity for this infrastructure. Delivering a low carbon dioxide, hydrogen economy requires the hydrogen to be produced from non-fossil primary energy sources, with fuel cells expected to be the principal energy conversion technology. This offers a means to achieve improved air quality, reduce greenhouse gas emissions and improve energy security while generating water as a by-product. Pathways to the more widespread use of hydrogen involve supporting interim technologies, which enable infrastructure and associated skills development.

D1.1.3 Secondary renewable energy policies

The Mayor's Objectives

Objective 6: To make London an exemplary world city in mitigating and adapting to climate change and a more attractive, well-designed and green city

The key policy directions for achieving this objective are:

- address issues of mitigation of and adaptation to climate change and ensure that the environmental impact of a growing London does not contribute to global warming

- promote a range of actions to achieve the wider environmental sustainability of London, including setting challenging targets for energy use (including appropriate renewables), the reduction and treatment of waste, the reduction of noise pollution, the improvement of air quality and the promotion of biodiversity

- manage flood risk and water resource issues at an early stage, especially in the Thames Gateway region
- provide the spatial framework to achieve better use of resources and improvements to the environment in support of the Mayor's environmental strategies
- analyse the potential threat from summer hotspots and identify heat sensitive land uses
- encourage and support the development of green industries
- make the fullest and most sustainable use of resources including land, water, energy and construction materials
- protect and enhance the quality of the townscape, through historic conservation and enhancing the public realm, open spaces and waterways, and create new resources, recognising their increased importance in a compact city

Chapter 4A: Climate Change and London's Metabolism: mitigation of and adaptation to climate change and using and managing natural resources

4.1 London is already feeling the effects of climate change. It is particularly vulnerable to flooding, subsidence, overheating and to water supply shortfalls. Climate change will increase the probability and severity of these events through rising sea levels, heavier winter rainfall, higher tidal surges, hotter summers and less summer rainfall. The exceptionally high concentration of people and assets at risk means that any extreme event will have major consequences. The impacts of climate change will be detrimental to the quality of life of all and particularly to the health and social and economic welfare of vulnerable people. Collaboration is needed at international and national levels as well as within London itself.

4.2 The Mayor will use all of his powers, resources and influence to work with other agencies to raise awareness and promote behavioural change in support of mitigation and adaptation. Under the Greater London Authority Act 2007, the Mayor has a new statutory duty to contribute towards the mitigation of, or adaptation to, climate change in the UK. The Mayor will produce statutory strategies for climate change mitigation and energy and for adaptation to climate change in London.

4.3 The Mayor supports an integrated, multi-agency approach, which promotes retrofitting existing buildings. Currently, these contribute about 73% of carbon dioxide emissions. Precedence should be given to retrofitting over demolition wherever practical. The Mayor will support measures through the Building Regulations and other regulation and funding mechanisms to improve the performance of London's existing building stock and to make fuller use of technologies such as CCHP (Combined Cooling Heat and Power). He will work with energy supply companies to promote more effective and sustainable use of energy, including communal energy systems. The Mayor has established the London Climate Change Agency to provide practical advice and take radical measures to tackle climate change.

4.5 The Mayor and boroughs need to have regard to the costs and feasibility of measures to tackle climate change within developments. They also need to have regard to the potential cumulative costs of failure to respond to the need for mitigation and adaptation. Dealing with climate change is an integral and essential part of the development process and not a set of “add-ons”; developers should see it as part of their core responsibilities. Preventative and adaptive measures will generate long-term savings, for example of energy, water and other resources. Building occupiers will also increasingly expect developments to incorporate such measures. There is a need to drive down costs of the relevant technologies and the Mayor will support incentives and measures to do so, such as stimulating the supply chains for new technologies.

4.6 To become an exemplary, sustainable world city, London must use natural resources more efficiently, increase its re-use of resources and reduce levels of waste and environmental degradation. As London grows, these objectives will become even more important. The shift towards a compact city will contribute towards these objectives. It will enable the efficient use of resources such as land and energy. It will also enable the delivery of the proximity objective – which states that waste should be disposed of in one of the nearest appropriate installations. More intensive development will require strategies to minimise noise and air pollution.

POLICY 4A.1: Tackling climate change

The Mayor will, and boroughs should, in their DPDs require developments to make the fullest contribution to the mitigation of and adaptation to climate change and to minimise emissions of carbon dioxide. The following hierarchy will be used to assess applications:

- using less energy, in particular by adopting sustainable design and construction measures (Policy 4A.3)
- supplying energy efficiently, in particular by prioritising decentralised energy generation (Policy 4A.6), and
- using renewable energy (Policy 4A.7)

Integration of adaptation measures with mitigation to tackle climate change will be sought through the approach set out in Policy 4A.9. These contributions should most effectively reflect the context of each development – for example, its nature, size, location, accessibility and operation. The Mayor will and boroughs should ensure that development is located, designed and built for the climate that it will experience over its intended lifetime.

The Mayor will work with all relevant bodies, including the government, Environment Agency, London Regional Resilience Forum, neighbouring regions, boroughs, water and energy authorities and companies, and other appropriate organisations to achieve an holistic approach to climate change, to plan strategic adaptation measures such as flood risk management, to promote changes in behaviour, particularly to address the problems of the most vulnerable, and to improve the operation of existing buildings, infrastructure, services and facilities. He will support the strengthening of regulatory mechanisms, such as building control, to achieve this. He will encourage co-ordination of spatial planning and emergency planning to deal with weather related incidents.

The Mayor will work with other agencies to promote measures to increase the cost-effectiveness of, and incentives to use, technologies and applications that support mitigation of and adaptation to climate change.

4.9 Policies 4A.2 – 4A.16 include targets that developments should meet in terms of the assessment of and contribution to tackling climate change. The targets should be applied to developments in an integrated fashion so that the fullest and most appropriate contributions can be identified in the context of each particular proposal. There will be a presumption that the targets will be met in full except where developers can demonstrate that in the particular circumstances of a proposal there are compelling reasons for the relaxation of the targets. In all cases, the most important contribution will be to the achievement of reductions in carbon dioxide emissions. The Mayor will work with the boroughs and developers to create mechanisms that ensure that each development can make the fullest and most appropriate contribution to mitigating climate change in its particular context. He will offer training and expert advice in the assessment of potential impacts of developments and in determining appropriate packages of measures. He will participate in efforts to redress the effects of environmental inequality such as the impacts of higher summer temperatures on the elderly and the problems of fuel poverty.

POLICY 4A.2: Mitigating climate change

The Mayor will work towards the long-term reduction of carbon dioxide emissions by 60 per cent by 2050. The Mayor will and boroughs and other agencies should seek to achieve the following minimum reduction targets for London against a 1990 base; these will be monitored and kept under review:

- 15% by 2010
- 20% by 2015
- 25% by 2020
- 30% by 2025

4.10 Reduction of carbon dioxide and other greenhouse gas emissions from new developments will be achieved in particular by policy 4A.7. 4.11 The minimum carbon dioxide (CO_2) reduction targets in this plan are feasible with the full commitment and collaboration of all stakeholders, including the government. They will be kept under review so that factors such as technological and behavioural change can be reflected. The Mayor believes that all development should contribute fully towards their achievement. As a common methodology for the definition of regional trajectories becomes available, it will be applied to the targets in the plan. The Mayor will work with partnerships by committing to work with London Energy Partnership (LEP), London Climate Change Agency, London Hydrogen Partnership and local authorities.

4.12 The Mayor has set minimum carbon dioxide emissions reduction targets that are below the levels set out in his energy strategy for two reasons. First, government has accepted that its own targets for reductions will not be achieved and this will significantly impact on London's targets. Second, the scale of London's future population and business growth will generate more demand. However, in achieving the conservative targets set out in this plan, the rate of per capita reduction in emissions will be high, reflecting the relatively sustainable nature of growth in London.

4.13 The Mayor supports the recommendation of the Royal Commission on Environmental Pollution that *"the government should now adopt a strategy that puts the UK on a path to reducing carbon dioxide emissions by some 60 per cent from current levels by 2050"*. The targets in this plan are designed to achieve this level through progressive and cumulative change.

4.14 In February 2007 the Mayor produced his *Climate Change Action Plan* (CCAP) to deliver decisive action in London. On the basis of the latest climate science, the CCAP set a target of a 60% reduction in carbon dioxide emissions by 2025, but recognised that achieving this would be dependent on additional action by central government. Without that action, the CCAP recognised that it would be possible to achieve a 30% reduction though action in London alone.

4.15 The forthcoming decades will see a reduced dependence on fossil hydrocarbon fuels and greater reliance on renewable sources. Plant and equipment should be designed to accommodate changes in fuels and technology.

POLICY 4A.21: Waste strategic policy and targets

In order to meet the national policy aim that regional and other planning bodies should provide a framework in which communities take more responsibility for their own waste and enable sufficient and timely provision of waste management facilities to meet the needs of their communities, the Mayor will work in partnership with the boroughs, the Environment

Agency, statutory waste disposal authorities and operators to:

- ensure that facilities with sufficient capacity to manage 75 per cent (15.8 million tonnes) of waste arising within London are provided by 2010, rising to 80 per cent (19.2 million tonnes) by 2015 and 85 per cent (20.6 million tonnes) by 2020
- minimise the level of waste generated, in accordance with Chapter 4B of the Mayor's *Municipal Waste Management Strategy*, and by following the principles in the *Sustainable Design and Construction* SPG
- increase re-use and recycling and composting of waste, and reduce landfill disposal
- minimise the amount of energy used, and transport impacts from, the collection, treatment and disposal of waste in line with the Mayor's target of reducing carbon dioxide emissions
- promote generation of renewable energy and renewable hydrogen from waste
- exceed recycling or composting levels in municipal waste of:
  - 35 per cent by 2010
  - 45 per cent by 2015
- achieve recycling or composting levels in commercial and industrial waste of 70 per cent by 2020
- achieve recycling and re-use levels in construction, excavation and demolition waste of 95 per cent by 2020

POLICY 4A.21 Waste strategic policy and targets *continued*

The minimum quantities represented by these targets are, for municipal waste, 1.7 million tonnes in 2010 and 2.3 million tonnes in 2015. This would leave some 3.1 million tonnes in 2010 and 2.9 million tonnes in 2015 to be dealt with by other means, with a declining reliance on landfill and an increasing use of new and emerging technologies. Boroughs should ensure that land resources are available to implement the Mayor's municipal waste management strategy, waste strategy 2007, the landfill directive and other EU directives on waste. The Mayor will monitor key waste indicators in the London plan annual monitoring report and in monitoring reports for the Mayor's municipal waste management strategy.

Where waste cannot be recycled, the Mayor will encourage the production of energy from waste using new and emerging technologies, especially where the products of waste treatment could be used as fuels (e.g. biofuels and hydrogen). Having regard to the existing incineration capacity in London and with a view to encouraging an increase in waste minimisation, recycling, composting and the development of new and emerging advanced conversion technologies for waste, the Mayor will consider these waste management methods in preference to any increase in conventional incineration capacity. Each case however will be treated on its individual merits. The aim is that current incinerator capacity will, over the lifetime of this plan, become orientated towards non-recyclable residual waste.

The Mayor will also consider, in preference to incineration, technologies that have the potential to produce renewable hydrogen from waste.

D1.2 Renewable energy evidence base documents

Document	*Date*	*Author*	*Client*
Biomass for London: Wood Fuel Demand and Supply Chains	2008	BioRegional Development Group SE Wood Fuels and Creative Environment Networks	London Energy Partnership
London Wind & Biomass Study Summary Report: Feasibility of the Potential for Stand Alone Wind and Biomass Plants in London (and supporting reports)	2007	SEA/ RENUE	London Energy Partnership
Deployment of Photovoltaics on London's Roadside Noise Barriers	2007	SEA/ RENUE Partnership	London Energy
Evidence Base: Climate Change in the Further Alterations to the London Plan	2007	Arup	GLA
Scenario Testing for the Further Alterations to the London Plan	2006	Berkeley Hanover Consulting Ltd	GLA
Carbon Scenarios to 2026	2006	SEA/ RENUE	London Energy Partnership
London Community Heating Development Study	2005	Parsons Brinckerhoff Ltd in association with RAMBOLL	GLA
Green Light to Clean Power: Mayor's Energy Strategy	*2004*	*GLA*	*GLA*
Integrating Renewable Energy into new developments: toolkit for planners, developers and consultants	2004	London Energy Partnership and Faber Maunsell	GLA
Attitudes to renewable energy in London: public and stakeholder opinion and the scope for progress	2003	Brook Lyndhurst Ltd in association with MORI and Upstream for London Renewables	GLA
London Hydrogen Action Plan	2002	GLA	GLA
Development of a Renewable Energy Assessment and Targets	*2001*	*AEA Technology*	*GLA*
Exploiting Renewable Energy in London	2000	London Research Centre	
(Italics denotes key evidence base document)			

D1.2.1 Development of Renewable Energy Assessment and Targets, 2001

Overview

This report presents the findings of a study to develop an assessment and targets for renewable energy across London. It has involved a review of technical opportunities and existing policy backgrounds against a backdrop of stakeholder consultation. It builds upon the earlier foundation provided by the London Research Centre report, *Exploiting Renewable Energy in London* (2000).

The primary objective of the study is the establishment of consensus-led targets for the development of renewable energy in London, taking into account:

- available resources, broken down by category (e.g. solar, wind, etc.)
- current and future costs of the technologies
- identification of opportunities, including the potential for heat from renewable energy
- limitations imposed by planning and other policies which seek to safeguard landscape and wildlife interests
- limitations imposed by the current, or planned, capacity of the electricity distribution network to accommodate new sources of electricity generation
- the roles and contributions of the different stakeholder groups in implementation

Methodology

The assessment involved three main areas of activity:

- analysis of renewable energy resources
- an analysis and review of the planning, Local Agenda 21 and other policy backgrounds relevant to RE
- stakeholder consultation processes leading to an initial understanding of the viability of RE deployment at the scales, and with the natures, implied by the technical analysis

The study assesses the following renewable energy technologies:

- solar
  – photovoltaics
  – passive solar heating
  – passive solar design
- Waste to energy technologies
  – thermal treatment of municipal solid waste and commercial waste
  – energy from aerobic digestion of municipal solid waste

  - energy from incineration or aerobic digestion of sewage sludge
  - combustion of wood for energy
  - landfill gas
- Wind energy
  - commercial scale turbines
  - smaller grid connected turbines
  - off grid applications
- small scale hydro
- other technologies (tidal, ground source heat pumps, fuel cells)

Recommendations/ targets

Proposed targets for renewable energy, 2010

Renewable Energy Type/Size	*Existing Situation*			*Prospective Total by 2010*		
	Schemes	Output		Schemes	Output	
		Elec (MWh)	Heat (MWh)		Elec (MWh)	Heat (MWh)
Domestic PV (1.5-3 kW_p)	≈50	150	-	10,000	11,250	-
Commercial PV (50 kW_p)	?	188	-	100	3,750	-
Motorway PV (160 kW_p/km)	0	0	-	10	1,200	-
Domestic-scale Solar Water Heating (1.2 MWh/yr)	>2,700	-	3,240	25,000	-	30,000
Solar Water Heating for Swimming Pools (6 MWh/yr)	100	-	600	2,000	-	12,000
Solar Water Heating (14 MWh/yr) for commercial/industrial	?	-	?	50	-	700
PSDesign in Domestic dwellings (1-2 MWh/yr	?	?		3,500	7,000	
PSDesign in Commercial Buildings (3-9 $kWh/m^2/yr$)	?	?		200,000m^2	1,800	
Single Large Wind Turbine (1.5 MW)	0	0	-	6	18,600	-
Single Small Wind Turbines (2 kW)	5	0.2	-	500	2,100	-
"Off-Grid" Wind Turbines	?	?	-	Up to 1,000	750	-
Small or Micro-Scale Hydro Power	1	44	-	3	5,100	-
Anaerobic Digestion Plants part-fuelled by Municipal waste fractions	0	0	0	4	12,000	14,500
Incineration Plants for Sewage Sludge[9]	2	44,900	?	2	50,000	?
Anaerobic Digestion Plants fuelled by Sewage Gas[9]	5	49,000	42,500	7	75,000	75,000
CHP Plants fuelled by arboricultural / civic amenity wood wastes (0.3-3 MWe)	0	0	0	8	30,000	150,000
CHP Plants fuelled by forestry wastes arising in & around London (3 MWe)	0	0	0	0	0	0
Landfill Gas Schemes	1	64,000	0	1	64,000	0
Addition for Biodegradable Fraction of Municipal Waste Incineration[10]	2	(256,000)	-	3	(391,000)	?
TOTAL (excluding Waste Incineration)	**14 + Solar**	**158,300**	**46,300**	**≈42,000**	**≈274,000**	**≈282,000**
TOTAL (including Waste Incineration	**16 + Solar**	**414,300**	**46,300**	**≈42,000**	**≈665,000**	**≈282,000**

Prospective energy from waste, 2010						
Renewable Energy Type/Size	*Existing Situation*			*Prospective Total by 2010*		
	Schemes	*Output*		*Schemes*	*Output*	
		Elec (MWh)	*Heat (MWh)*		*Elec (MWh)*	*Heat (MWh)*
Large CHP / Electricity Plants for Municipal or Industrial Solid Waste incineration	2	427,000	0	3	652,000	?
Small CHP / Electricity Plants for Municipal or Industrial Solid Waste incineration	15	50,000	0	15	50,000	0
Biodegradable Fraction of Municipal Waste incineration (see Table 1)	2	(256,000)	0	3	(391,000)	?
TOTAL (including all electricity output from waste)	**17**	**477,000**	**0**	**18**	**702,000**	**?**
TOTAL (only the non-biodegradable fraction of Municipal Waste	**17**	**221,000**	**0**	**18**	**311,000**	**?**

Estimated contribution from renewable energy and municipal/ industrial waste incineration to London's electricity demand, 2010		
	Electricity Output (MWh)	*Contribution to Total Electricity Demand*
Renewable Energy	274,000 [665,000][12]	0.88% [2.14%][12]
Waste	702,000 [311,000][13]	2.26% [1.00%][13]
Total Electricity Use	**31,000,000**	**100%**

The report recommends the adoption of a *renewable energy electricity target* for London amounting to around 274GWh/year by 2010. This represents around 0.88% of London's current (and assumed future) estimated electricity demand of about 31TWh/year. If the biodegradable fraction of municipal waste incineration is also included, the target becomes around 665GWh/year by 2010 (2.14% of estimated electricity demand).

The key components of this electricity target are as follows:

- 10,000 roof target for domestic photovoltaics
- 100 installations target for commercial-scale photovoltaics
- a target of 500 "small-wind" generators associated with public or private sector buildings
- deployment of at least one "large-wind" scheme associated with a Thames-side setting

This target also includes schemes for the anaerobic digestion of waste and small-scale combined heat and power from wood wastes.

Parallel components of a *target for increased heat production* from renewable energy include:

- 25,000 roof target for domestic solar water heating
- 2,000 roof target for solar water heating associated with swimming pools
- substantially increased deployment of passive solar design in all appropriate building types

In addition to the above the assessment projects that waste incineration schemes across London might generate upwards of 702GWh/year by 2010, representing 2.26% of London's electricity demand (311GWh/year / 1.0% from the non-biodegradable fraction of waste).

The report also outlines the components of a possible action plan that would be required to deliver its targets. The action plan focuses on:

- policy development and implementation
- information and awareness raising
- development of appropriate incentives and opportunities
- flagship "Partnership" projects
- operational Issues

The accompanying assessment appendices provide further information on:

- resource data and technical approaches to estimation
- updates on existing renewable energy schemes
- identification of technical constraints
- illustrative targets based on three scenarios (below)

D1.2.2 Public Attitudes to renewable energy in London, 2003

Overview

This report complements the *Renewable Energy Assessment and Targets* report (2002) – a largely technical assessment, principally from the supply side, by exploring the demand side for renewables in London, according to three key objectives:

Illustrative renewable energy scenarios for 2010 in London

Indicative Renewable Energy Generation Type/Size	*Existing Situation*		*Scenario 1- Business As Usual*		*Scenario 2- Accelerated Deployment*		*Scenario 3- Green Future*	
	Schemes	Output (MWh)	No. of New Schemes	Output (MWh)	No. of New Schemes	Output (MWh)	No. of New Schemes	Output (MWh)
Domestic PV Installations (1.5-3kW$_p$)	≈50	150	2,200	2,475	4,400	4,950	8,400	9,450
Commercial PV Installations (50kW$_p$)	?	188	26	975	44	1,650	62	2,325
M'way PV Installations (160kW$_p$/km)	0	0	0	0	4	480	10	1,200
Domestic-scale Solar Water Heating installations (1.2MWh/yr)	> 2,700	3240	2,400	2,880	6,000	7,200	18,800	22,560
Solar Water Heating installations for Swimming Pools (6 MWh/yr)	?100?	?600?	250	1,500	600	3,600	1,800	11,000
Solar Water Heating (14 MWh/yr) for commercial / industrial installations	?	?	10	140	20	280	50	700
PSDesign in Domestic dwellings (1-2 MWh/yr)	?	?	100	100-200	500	500-1000	3,500	3,500-7,000
PSDesign in Comm. Buildings (3-9kWh/m2/yr)	?	?	15,000 m^2	45-135	75,000 m^2	225-900	200,000 m^2	600-1,800
MUNICIPAL WASTE ARISING			*3,670,000 tonnes*		*2,520,000 tonnes*		*1,830,000 tonnes*	
CHP / Electricity Plants for Municipal or Industrial Solid Waste incineration	17	477,000	1	225,000	3	563,000	4-30	1,125,000
Anaerobic Digestion Plants part-fuelled by Municipal waste fractions	0	0	1	4,250	3-4	13,600	10-30	110,500
Incineration Plants for Sewage Sludge	2	78,000	0	0	0	0	2	70,000
Anaerobic Digestion Plants Fuelled by Sewage Gas	8	100,000	0	0	5	50,000	15-20	150,000
CHP Plants fuelled by arboricultural / civic amenity wood wastes (0.3-3MWe)	0	0	2	45,000	4-20	270,000	6-40	544,000
CHP Plants fuelled by forestry wastes arising in & around London (3MWe)	0	0	0	0	1	135,000	2	270,000
Landfill Gas schemes	1	64,000	0	0	0	0	0	0
Single Large Wind Turbines (1.5MW)	0	0	0	0	2	6,200	6	18,600
Single Small Wind Turbines (2 kW)	5	0.2	25	105	100	420	500	2,100
Small or Micro-Scale Hydro Power	1	44	0	0	1	44	3	5,100
Total	**34 + Solar**	**723,000**	**29 + Solar**	**283,000**	**119-136 + Solar**	**1,058,000**	**548-633 + Solar**	**2,350,000**

1. to gauge public and stakeholder attitudes to, and perceptions of, renewable energy in London

2. to seek agreement of a suitable renewable energy target for London through consultation with key stakeholders

3. to identify what support is needed by stakeholders to take action to meet the renewable energy target for London

Methodology

Alongside desk research and policy assessment, research comprised four stages:

1. electronic survey of stakeholders

2. focus groups with London residents

3. London survey of residents

4. stakeholder workshops with key audiences

Recommendations/ targets

The research makes the following overall conclusions:

- while there is much goodwill towards renewables across most audiences in London, the barriers are such that rapid uptake is highly unlikely

- energy is a low priority issue and, given the low cost of electricity compared to the high initial cost of renewables, demand is weak. This is accentuated by 'inertia' in the system, with organisations (many conservative in nature) adopting a risk averse approach to new technologies which they perceive to be immature rather than tried and tested

- a 'cycle of blame' also operates where each group expects someone else to assume responsibility for renewables

- the groundwork has not been done for London to be in a position where a 'critical mass' of support allows for a sustained take-up of renewable technologies

- rather than striving for high profile 'headline grabbing' actions, it is recommended that London Renewables undertake a series of low profile 'behind the scene' interventions as part of a period of 'sustained nurture', where the focus is on facilitation, capacity building and developing relationships

Overall conclusions are backed up by 30 recommendations for action.

D1.2.3 Integrating Renewable Energy into new developments: toolkit for planners, developers and consultants, 2004

This toolkit aims to support planners, developers, consultants and other interested parties with planning policies in London which require renewable energy in new developments or major refurbishments. It offers advice on which renewable technologies are suitable to London including aesthetic issues, risks and reliability. It gives an insight into the cost benefit analysis of installing renewables, information on successful case studies and suggestions on how problems can be overcome.

D1.2.4 Green Light to Clean Power: Mayor's Energy Strategy, 2004

This strategy sets out the Mayor's proposals for change in the way energy is supplied and used within London over the next ten years and beyond, against a long-term vision of a sustainable energy system in London by 2050. The strategy aims to improve London's environment, reduce the capital's contribution to climate change, tackle fuel poverty and promote economic development.

The strategy's specific objectives are:

- to reduce London's contribution to climate change by minimizing emissions of carbon dioxide from all sectors (commercial, domestic, industrial and transport) through energy efficiency, combined heat and power, renewable energy and hydrogen
- to help to eradicate fuel poverty, by giving Londoners, particularly the most vulnerable groups, access to affordable warmth
- to contribute to London's economy by increasing job opportunities and innovation in delivering sustainable energy, and improving London's housing and other building stock

Targets for renewable energy production by 2010 are largely based on *Development of Renewable Energy Assessment and Targets* (2001). The strategy states that London should aim to generate at least 665GWh of electricity and 280GWh of heat, from up to 40,000 renewable energy schemes by 2010. To meet this target, London should aim to install:

- at least 7,000 (or 15MW peak capacity) domestic photovoltaic installations
- 250 (or 12MW peak capacity) photovoltaic applications on commercial and public buildings; six large wind turbines
- 500 small wind generators associated with public or private sector buildings
- 25,000 domestic solar water heating schemes

- 2,000 solar water heating schemes associated with swimming pools and
- more anaerobic digestion plants with energy recovery and biomass-fuelled combined heat and power plants

The *Energy Strategy* states that these capacities should then be at least tripled by 2020, although there is no evidence to support this aspiration.

Minimum targets for renewable energy in London

Technology	*Scale*		*2010*	*2020*					
		Number installed	*MWe*	*Elec GWh*	*Heat*	*Number installed*	*MWe*	*Elec GWh*	*Heat*
PV	Domestic	7,000	15	11		21,000	45	34	
PV	Large-scale	250	12	9		250	36	27	
Solar thermal	Domestic	25,000			35	75,000			105
Solar thermal	Swimming pool	2,000			21	6,000			63
Wind	Small	500	0.05	55		1500	0.15	493	
Wind	Large	6	2	32		18	6	284	
AD			5	40	40		15	120	120
Biomass CHP			65	520	780		195	1560	2340
Total				**667**	**875**			**2517**	**2628**
Total Target				**665**	**280**			**1995**	**840**

D1.2.5 London Community Heating Development Study Report, 2005

The GLA commissioned a study of the potential for community heating (CH) in London. The first stage of the work was to review the potential for community heating across London and the technologies that could be used to supply low carbon heat.

The first stage of the study involved collection and collation of available data relating to energy, and particularly heating, demand in London. Questionnaires were sent out to all the London boroughs and other major energy users who were potential heat customers for the new CH schemes.

In parallel with the work on heat demands, a detailed review of heat generation technologies was carried out. This considered the use of CHP at different scales, biomass fuels, energy from waste, heat from existing power stations, heat pumps or other industrial heat sources. The study evaluated a number of approaches to CH ranging from wide-area heat distribution networks such as that developed in Copenhagen to large numbers of smaller localised energy centres supplying groups of buildings.

An initial list of priority areas was drawn up based on economic indicators such as heat density, number of existing CH systems and social indicators such as regeneration areas and the multiple deprivation index. This list of areas was further refined to identify nine specific schemes from which three were selected to be taken forward for more detailed analysis. These were:

- a scheme based on the existing South East London combined heat and power waste to energy plant, taking heat from this plant to supply 8,777 dwellings in LB Southwark, and 4,175 dwellings in Lewisham including the new build development at Convoys Wharf
- a scheme based in Brixton and Camberwell supplying 4,285 dwellings, two hospitals and a college. The heat source would be a 10MWe CHP plant using two gas-fired reciprocating engines, located at or near the hospitals
- a scheme supplying 3,552 dwellings in Tower Hamlets and the London Hospital at Whitechapel. The heat source would be a 20MWe biomass CHP plant able to utilize clean waste wood which is generated in London and currently sent to landfill

The economic, social and environmental benefits and business planning of these schemes is then analysed. The study concludes by identifying four leading opportunities for community heating in London and making recommendations for their successful implementation.

D1.2.6 London Carbon Scenarios to 2026

Overview

The London Energy Partnership commissioned SEA/RENUE to develop a stretch target for carbon savings to 2026 and to then produce four scenarios to meet that target.

In terms of reduction strategies and target development, five carbon scenarios are considered:

- large-scale CHP led
- micro-CHP led
- renewables led
- insulation and energy efficiency led
- hybrid, which consists of a combination of the above scenarios

Project objectives were:

- to produce a stretch target for carbon savings for 2026 and a range of scenarios to illustrate how these targets could be met through a mix of sustainable energy measures

- to focus on carbon savings that can be achieved in the domestic and non-domestic buildings sector. Carbon savings will be calculated for each measure and costs associated with each measure will also be clearly stated, e.g. capital costs of installation, through to maintenance costs and potential income

- to identify four basic scenarios for achieving the carbon target for 2026 to be presented to the financial sector

Methodology

In terms of testing the carbon scenarios, a model was devised in Microsoft Excel. Once a scenario has been selected, the model estimates the heat and power displaced and calculates CO_2 savings. Using this information an economic analysis was carried out in order to estimate yearly cash flows, which then allow the calculation of simple payback, net present value and internal rate of return.

Recommendations/ targets

Summary of results for carbon scenarios

Scenarios	*Description*	*Heat (GWh/y)*	*Power (GWh/y)*	*CO2 Savings (ktpa)*	*Capital Cost*	*NPV (£m)*
Scenario 1	Large CHP	30,296	23,587	10,442	8,392	1,192
Scenario 2	Building & micro CHP	58,478	22,799	10,285	7,455	-531
Scenario 3	Renewables	21,852	13,380	10,414	14,591	-4,237
Scenario 4	Insulation and Energy Efficiency	38,177	14,526	10,362	10,797	-1,429
Scenario 5	Hybrid	29,843	18,184	10,344	8,427	678

Scenario 5 – a hybrid was selected as the preferred scenario.

D1.2.7 Scenario testing for the Further Alterations to the London Plan, 2006

Overview

The broad objectives of this research were to:

1. develop, refine and justify a set of broad scenarios illustrating possible future London circumstances, especially in economic, demographic and transport terms and

2. test the robustness of the London plan's objectives and key policies in the light of the scenarios, identifying those objectives and key policies that may be at risk in the light of changes to the main drivers of change

Methodology

In terms of building the scenarios, population and jobs are considered to be the main drivers of change. Scenarios comprised 'baseline', 'lower growth' and 'higher growth'. Other drivers identified included transport, climate change, lifestyle and values, new technology and social justice.

The study used a set of models relating to four topics:

- population/households
- employment
- transport
- environment

The models helped to identify whether any policies contained within the London plan might be at risk of underperforming against the London plan's six broad objectives under the range of scenarios identified.

Recommendations/ targets

In terms of renewable energy development, the report found that 'there was no particular reason why the lower level of population and employment in the lower or higher growth scenarios should either aid or hinder achieving the objective of increasing the amount of energy generated from renewable sources'.

D1.2.8 Evidence Base: Climate Change in the Further Alterations to the London Plan, 2007

Overview

The aim of this study was to assemble an evidence base that was used in preparing new policy to mitigate against and adapt to climate change in *Further Alterations to the London Plan.*

Amongst other things, the report considers the cost of different means of addressing climate change, based on case study material, existing literature and evidence. The report finds that the cost of climate change technology is feasible in London and that the cost incurred of implementing the proposed climate change policies is preferable to the cost of inaction.

In terms of energy distribution – particularly the encouragement of decentralised area-wide and local power generation and heat distribution, the study considers:

- issues surrounding the distribution of power over the National Grid and heat wastage in energy generation; and
- the potential for CHP/CCHP and for decentralised energy generation

The potential for a wide range of renewable energy technologies is also considered, including:

- biomass
- gasification and pyrolysis of biomass
- hydrogen
- energy from waste
- wind power
- solar design and power
- tidal power

Recommendations/ targets

The report finds that there is potential for a 20% target for carbon reduction through renewable on-site generation, which would be achieved particularly through biomass and solar sources, as well as wind power on larger sites. The findings do however also support alternative mechanisms that might achieve similar outcomes, such as area- or district-wide power and heat generation. An equally strong, but more flexible, policy would allow similar objectives to be met. Policy could, for example, seek 20% reductions to carbon emissions through renewable energy of any kind where the renewable energy source can be explicitly identified and is not transmitted through the National Grid.

D1.2.9 London Wind & Biomass Study Summary Report: Feasibility of the Potential for Stand Alone Wind and Biomass Plants in London, 2007

Overview

This report provides a summary of a study undertaken to evaluate the feasibility of large-scale wind and biomass plant, the main non-building integrated renewable energy technologies relevant to London. The study also sought to identify locations that could offer the potential for landmark renewable energy developments, hosting both wind and biomass plant.

Methodology

The **wind feasibility study** looked at the potential for installing commercial-scale non-building integrated wind turbines in the urban environment of the Greater London area. The key objectives of the study were to:

- identify locations across London that are suitable for commercial-sized (medium to large, >100kW rated capacity) wind turbines, illustrated on GIS maps, and outline how to take them forward

- produce of a set of guidelines detailing what renders a location suitable for installing a wind turbine (large/medium-scale and small-scale (<100kW rated capacity) stand-alone)

The study was undertaken in two phases:

Wind Study Phase 1: Assessment of Constraints and Opportunities - The phase 1 report provides a general assessment of the constraints, development options and opportunities in the Greater London area and explores the current development situation, policy requirements and local targets. GIS assessment, wind resource modelling and other technical expertise were used to identify a number of potential development locations. A range of potentially feasible development opportunities and deployment scenarios were presented and appropriately prioritised for more detailed assessment as part of Phase two of the study.

Wind Study Phase 2: Location Assessments and Guidance – phase 2 of the study involved detailed assessments of the locations identified in phase 1 for larger-scale wind turbines, including financial modelling and identification of partners to be involved in potential projects. The study focused on urban/industrial/brownfield sites, open land and farmland within the designated boundaries of Greater London and within a 5km wide corridor along the M25, which may be able to accommodate large-scale wind turbines. An extended range of site-specific constraints, including aeronautical impacts, noise and residential amenity, landscape and visual impact, ecological considerations, planning policy considerations, and topple distance were addressed within the phase 2 report. Where possible, specific location assessments include economic forecasts and indicative layouts.

The **biomass feasibility study** provides an overview of the current total biomass resource in and around London along with specific proposals for utilising the resource as a fuel.

Recommendations/ targets

The maximum estimated installed (non-building integrated) wind energy capacity identified through this study for the Greater London area is predicted to be 50.34MW, generating 144.5GWh of electricity annually, able to supply approximately 116,015 households and saving 147,015 tonnes of CO_2 each year

If all biomass that is currently not recycled or already used for energy recovery is used in combined heat and power (CHP) plant, the potential would be to displace around 10% of conventional energy sources, saving around 3.5 million tonnes of CO_2 a year. This would constitute a total of approximately 540-660MWe of installed biomass generating capacity1 and generate around 3.6-4.3TWh of electricity and 7.2-8TWh of heat.

During the course of the work, a number of locations were identified which could offer potential for both wind and biomass development, if not at the exact same location, in adjacent or close-by areas. These locations could offer increased potential for landmark renewable energy developments, where both wind turbines and biomass options could be developed as a joint project, and include the Barking Riverside/Thames Gateway development area and the Stratford area.

D1.2.10 Biomass for London: Wood Fuel Demand and Supply Chains, 2008

This report assesses the number and capacity of planned wood fuel plant in London and their potential fuel demand. It then examines the potential sources of fuel and makes recommendations for enabling the growth in fuel production from London's own resources. For some sources of wood fuel such as recycled timber processing capacity within 25 miles of London is considered. It does not cover the import of fuel into London from further afield.

Findings are summarised as follows

Source	*Proposed thermal capacity (kW)*	*Proposed electrical capacity (kW)*	*Estimated wood fuel requirement at 30%mc (t/yr)**
GLA State II (August 2005–May 2008)	~23,500	1300	24,400
Installers – minimum estimate	~13,500		7,700
Local authorities (excluding those likely to be covered by the installers)	6,000	820	10,280
Total	**43,000**	**2120**	**42,380**

* Load factor varies with application type (residential, office hospital etc.). An average of 1750 full load equivalent hours used with 88% boiler efficiency. CHP fuel requirements based on 24 hour running, 25% electrical efficiency and 85% availability.

The key finding of the report is that London has a potential wood fuel resource exceeding the requirements of currently planned wood fuel plant by a factor of 20 if not more. However, a lot of this is waste wood which would require Waste Incineration Directive (WID) compliant boilers and for some of this wood, recycling and reuse might be better environmental options. In general, most of this resource is not available now and policies and support frameworks need to be put in place to ensure London can better develop its wood fuel supply chain.

The report also makes recommendations relating to how London can capitalize on wood fuel for biomass.

D1.3 Monitoring activity

Monitoring of progress towards renewable energy targets is undertaken annually via a number of sources:

- questionnaire sent out to all local authorities
- Ofgem ROC register
- government funding programmes (low carbon buildings and major PV demonstration programme)
- microgeneration certification scheme
- national indicators for local authorities
- core output indicators

Officers have highlighted several barriers to monitoring the implementation of planning permissions and renewable energy installations, with implications for the accuracy of their monitoring data:

- general paucity of data available
- local authorities struggle to identify exactly what the renewable energy capacity of a particular planning application is
- there is a gap between what might be applied for in a planning application and what is subsequently installed on the ground
- it is difficult to monitor which planning applications are actually implemented and the generating capacity of those installations
- microgeneration and small scale installations may not qualify for registration under the renewables obligation
- there is no way of monitoring renewable energy installed as permitted development
- some developers and organisations (e.g. London Fire Brigade) do not register their renewable energy installations under the RO, as there is no financial incentive to do so. Government proposals for a ‘feed-in’ tariff would assist in this respect
- local planning authorities lack the means to calculate renewable energy capacity from planning applications

- the quality of data provided from Government and other organisations such as BERR could be improved – for example registers of Government funding programmes for renewable energy (e.g. Clear Skies) do not actually provide data relating to the renewable energy capacity commissioned, only the volume of funding awarded. Assumptions therefore have to be made with regards to installed generating capacity

- in London, where the majority of renewable energy development is small scale or related building integrated, there is a particular need to improve the ways and mechanisms by which small scale renewable energy development can be monitored. Officers also commented that there is a need to standardise the way that renewable energy development is monitored across all regions; apparently there are some private companies who now offer monitoring services

D1.4 Further work

A full revision of the London plan has been commenced, with a view to publishing an entirely new plan by 2011. The scope of renewable energy work to be undertaken to inform this revision is still in its early stages of development. Any work undertaken is also expected to input into a revised renewable energy strategy. Work is expected to cover a wide range of renewable energy types, although the scope of assessment is likely to be limited by budget and time constraints (for planning purposes, work must be completed in the next 6-8 months). It is anticipated that waste will become a significant renewable energy source for London in the future.

Further Alterations to the London Plan Examination in Public, Panel Report (2007) recommended that the definition of broad locations for renewable energy generation is completed as soon as possible and incorporated into the plan at the next review. We further recommend that Table 4A.1i is updated and revised to comply with paragraph 3 of PPS22 and incorporated into the plan at the next review.

It is anticipated that energy from waste will be an important source of renewable energy in London in the future. Officers have also highlighted the importance of low carbon energy (as opposed to renewable energy) in the context of London.

Officers have emphasized the need for national guidance on how to assess renewable energy capacity. This should clarify and provide a uniform standard relating to issues such as:

- emissions assumptions

- load factors

- standard outputs

- assessment methodologies for specific renewable energy technologies

Appendix E North East

E1.1 RSS renewable Energy Policies

E1.1.1 Introduction

There are currently no plans to review the regional spatial strategy in the near future; however, preparatory evidence base work is currently being undertaken. This section will look at the primary and secondary renewable energy generation policies currently included in the RSS.

E1.1.2 Primary renewable Energy Policies

Chapter 3: Delivering an urban and rural renaissance

3.177: Achieving the commitments set nationally by the Energy white paper will require at least 40% of electricity to be generated from renewable sources by 2060. In the shorter term the Government is committed to the achievement of 10% renewable electricity by 2010 and is aiming for 20% by 2020. The RRES suggests that for the purpose of preparing targets that it should be assumed that efforts to contain the growth in energy consumption will be successful and consumption will be held at the 2003 level.

The key conclusions of the RRES are that there is significant potential to match the minimum national targets at the regional level, if the region embraces the diverse range of potential renewable energy resources, particularly wind generation. By 2020, 20% would be possible if strategic scale wind energy development took place within Kielder Forest. It also proposes sub regional resource estimates and targets for 2010.

POLICY 39: Renewable Energy Generation

Strategies, plans and programmes, and planning proposals should:

a. facilitate the generation of at least 10% of the Region's consumption of electricity from renewable sources within the Region by 2010 (454 MW minimum installed capacity);

b. aspire to further increase renewable electricity generation to achieve 20% of regional consumption by 2020;

c. facilitate the achievement of the following minimum sub-regional targets by 2010:

Northumberland	212MW
Durham	82MW
Tyne & Wear	22MW
Tees Valley	138MW
	454MW

3.178: The RRES brings together estimates of the region's resources by technology. It is clear from the RRES that onshore wind, even without major development at Kielder, is the region's most significant resource, followed by biomass. Although electricity accounts for less than 30% of national energy use, the significance of non-electricity renewables sectors is growing, such as heating from biomass, and transport fuels, with new targets being established. Strategies, plans and programmes should encourage non-electricity renewable energy projects such as biomass district heating plants; photo-voltaics and solar hot water technologies; and the use of hydrogen as a fuel option. It is possible that there will be demands for increases in the amount of land dedicated to production of biofuels.

3.179: The potential consequences of this will need to be fully assessed and acted upon, including potential impacts from hydrological change or nutrient runoff on nature conservation sites and sites of archaeological value.

3.180: Further work is proposed to further assess strategic scale wind energy development potential within Kielder Forest, which will include further discussions with the MoD and the National Park Authority. The results of this work and the review of the RRES, which will include an enhanced assessment of other sources of renewable energy generation, will allow for a reassessment of the 2010 targets. Given advances in renewable energy technology, it is considered there are currently a number of uncertainties when setting sub regional targets to 2020. However, as an aspiration for 2020, the target would be to double the 2010 installed capacity target.

3.181: The role of the planning system in renewable energy generation is restricted to onshore development of schemes and development associated with off-shore schemes on the landward side of the mean low water mark. However, as indicated on the environment information map, there are proposals for offshore wind energy developments along the North East coast which should be supported in principle, subject to local assessment. Given the limited potential of the North East coastline, it seems unlikely that further commercial off shore wind sites, or sites for wave energy generation will come forward in the region before 2010. It is too early to consider the extent and capacity of any future deep water off shore wind and wave energy developments, although this will be reviewed as technology advances.

3.182: In seeking to achieve the following targets, this should not be done at the expense of breaching the requirements of the Habitat Regulations, and appropriate consideration should be given to the factors listed in Policy 40.

3.183: Renewable energy developments have a range of environmental, social and economic benefits; the PPS22 Companion Guide provides further details on the benefits. It is therefore important to provide a positive framework for the development of renewable energy to enable the region to deliver its maximum potential for generation; embedding renewable technologies into new and existing developments; and maximising the region's potential to pioneer new renewables technologies. The sustainable energy sector represents a significant opportunity to support economic regeneration and job creation, and renewable energy policies should be included within a wide variety of documents including: local developement frameworks (LDFs); Community Strategies; Local Agenda 21 Strategies; Local Transport Plans; Housing Strategies; Green Space strategies; Protected Area Management Plans and Waste Management Strategies.

3.185: The key diagram and insets identify the broad areas, with least constraint, which offer the greatest potential to accommodate new renewable energy developments. This does not, however, remove the need to consider the potential for new renewables developments in other parts of the region and LDFs should present a positive rather than a restrictive planning framework. There is currently significant interest in developing the region's renewables sector, for example, through the New and Renewable Energy Centre in Blyth. In addition, there are proposals for a renewable energy exemplar village at the former Eastgate Cement Works site in Wear Valley, where feasibility works have identified that the site has the potential to generate and utilise on-site wind power, biomass, hydro-electricity and heat-exchange pumps, solar power and geothermal energy. An initial study suggested that the renewable energy village could form part of a wider scheme.

POLICY 40: Planning for Renewables

Strategies, plans and programmes should support and encourage renewable energy proposals and identify renewable resource areas. In assessing proposals for renewable energy development significant weight should be given to the wider environmental, economic and social benefits arising from higher levels of renewable energy, and the following criteria should be considered:

a. anticipated effects resulting from development construction and operation such as air quality, atmospheric emissions, noise, odour, water pollution and the disposal of waste;

b. acceptability of the location and the scale of the proposal and its visual impact in relation to the character and sensitivity of the surrounding landscape;

c. effect on the region's World Heritage Sites and other national and internationally designated heritage sites or landscape areas, including the impact of proposals close to their boundaries;

d. effect of development on nature conservation sites and features, biodiversity and geodiversity, including internationally designated and other sites of nature conservation importance, and potential effects on settings, habitats, species and the water supply and hydrology of such sites;

e. maintenance of the openness of the Region's Green Belt;

f. accessibility by road and public transport;

g. effect on agriculture and other land based industries;

h. visual impact of new grid connection lines;

i. cumulative impact of the development in relation to other similar developments; and

j. proximity to the renewable fuel source such as wood-fuel biomass processing plants within or close to the Region's major woodlands and forests

3.186: Renewable energy proposals within or significantly affecting the purposes of internationally and nationally designated areas should be appraised critically. Small scale developments should be considered favourably; including within nationally recognised landscapes (National Parks, AONBs and Heritage Coasts) if they have minimal impact, individually or cumulatively on the special qualities and purposes of the designation of these areas. In the case of wind energy, the development of one or more turbines or a turbine with a ground to hub height of 25 metres or more is unlikely to be acceptable. Other proposals for renewable energy generation will normally be acceptable providing their form; materials and infrastructure do not detract from landscape character, biodiversity, and archaeological and built heritage, or adversely affect local communities.

3.187: The integration of wind and biomass production proposals into the region's varied landscapes will require careful consideration. The location and design of proposals must be informed by landscape character and sensitivity assessments, using the *Landscape Appraisal for Onshore Wind Development* (July 2003), produced as part of the RRES. PPS22 is clear that local landscape designations should not be used in themselves to refuse planning permission for renewable energy developments, and in areas where a number of proposals come forward during the same timescale, or would add to existing developments, cumulative landscape and visual effects must be assessed following the steps set out in PPS22 Companion Guide.

3.188: The regional planning body and partners are conducting local landscape studies to further assess the potential for wind farms within broad areas of least constraint, and local developement frameworks and planning proposals are the appropriate level to deal with these issues. The RPB's RSS annual monitoring report records the progress made on these studies.

3.189: The availability and cost of connection to the electricity grid is a key consideration for developers, and new power lines can be an important planning and landscape consideration. As far as possible, a proliferation of new lines each serving a separate development should be avoided. Planning authorities should take a pro-active approach when dealing with wind and other renewable energy developments and seek to ensure that the environmental impact of new grid connection lines is limited, for example, placing overhead lines sympathetically within the landscape. Where appropriate, new routes should be shared by a number of wind and other renewable electricity projects, for example those using hydro and biomass.

POLICY 41: Onshore Wind Energy Development

Strategies, plans and programmes should provide a positive policy framework to facilitate onshore wind energy development within the following broad areas of least constraint for wind energy developments:

a. Kielder Forest has the potential to become a Strategic Renewables Resource Area, including large scale wind energy development;

b. The following areas have potential for medium scale development:
   - South and West Berwick upon Tweed
   - North/South Charlton
   - Knowesgate Area
   - Harwood Forest
   - Northern Coalfield south of Druridge Bay
   - Kiln Pit Hill Area
   - North Durham Upland Coalfield
   - South Durham Upland Coalfield
   - East Durham Limestone Area
   - Tees Plan
   - Teesside

c. Small wind farms in urban areas and on the urban rural fringe should also be supported particularly within the following areas:
   - Sunderland;
   - South Tyneside; and
   - Tees Valley.

The broad locations of these areas should be identified within Local Development Frameworks using Policy 40. Their identification does not preclude proposals being considered in other areas in terms of Policy 40.

3.190: The use of relatively small-scale technologies such as photo-voltaics, solar hot water and biomass can help to increase general awareness and acceptance of renewables. However, to deliver the regional targets set out in policy 39, will rely on a substantial contribution from wind energy generation, particularly from onshore wind energy developments.

3.191: The key diagram and policy 41 indicate the broad areas with the least constraints identified by the regional renewable energy strategy, which offer the greatest potential to accommodate onshore wind energy developments resulting from an appraisal of potential constraints. This does not, however, remove the need to consider the potential for onshore wind energy developments in other parts of the region. Proposals for onshore wind energy development within and outside these broad areas should be assessed against the criteria contained within policy 40.

3.192: PPS22 national planning guidance is clear that development plans, including regional spatial strategies, should not set arbitrary limits on the numbers of turbines that will be acceptable in particular locations. This is because planning applications present the opportunity to assess the cumulative impact of proposals. Within RSS, Medium scale wind energy development is broadly defined as up to 20-25 turbines, with small scale up to five turbines, although this may change dependent on advances in technology.

3.193: It is possible that broad areas of least constraint could sustainably accommodate more than one wind energy development subject to the requirements of policy 40.

3.194: In particular, Kielder Forest is highlighted as having significant potential for wind energy development on a regionally strategic scale. Realising the potential in this area will be essential to meeting the regional aspiration of 20% renewables by 2020, although this will be dependent on overcoming MoD constraints and any environmental constraints. Upgrading of the grid system in that area could also release further potential for significant biomass and possible hydro resources and as such, this area is referred to as a Strategic renewables Resource Area (SRRA). Policy 41 and the Kielder Forest SRRA will be kept under review as work with the MoD progresses.

3.195: PPS22 and ODPM/DfT Circular 1/2003 *Safeguarding, Aerodromes, Technical Sites and Military Explosives Storage Areas* contain guidance on procedure for consulting relevant authorities and interested parties when considering the potential impact of wind turbine proposals upon aviation operations. If a local planning authority is minded to approve a wind farm application against which there is an outstanding objection by an airport, the Civil Aviation Authority or the Ministry of Defence must be notified.

E1.1.3 Secondary renewable Energy Policies

Chapter 2: Delivering principles and locational strategy

2.12: The Government seeks to reduce energy use, increase efficiency and increase the proportion of energy generated from renewable and low carbon technologies. The Energy white paper *Meeting the Energy Challenge* (May 2007) sets out a framework for action to meet these objectives. The Government has agreed to a legally binding target to reduce greenhouse gas emissions by 12.5% below 1990 levels over the period 2008-2012 (the UK's Kyoto obligation). The UK also has domestic goals for 2010 and 2050 to cut carbon dioxide emissions. These goals aim to contribute to and go beyond the United Nations Framework Convention on Climate Change and its Kyoto Protocol and the North East region will need to play its part in meeting these national commitments.

2.13: The government published the draft Climate Change Bill in March 2007 which proposed UK targets to reduce carbon dioxide emissions through domestic and international action by at least 60% by 2050 and by at least 26% by 2020 against a 1990 baseline. In addition to carbon reduction targets the draft Bill makes provision for climate change adaptation. The aim is for the Bill to receive Royal Assent by autumn 2008.

2.15: The North East England *Climate Change Adaptation* Study published by Sustaine in 2008, projects climate changes across the region to the 2050s. Key findings from those projections show that the projected climate impacts will threaten human health, our quality of life, economic activities, biodiversity, soil and water resources, landscape and agricultural land uses. For example: increased flood risk, from rivers, flash flooding, and rising sea levels increased likelihood of storms and other severe weather events that may affect buildings, transport infrastructure and business activities changes in the growing season, affecting biodiversity and agriculture changes in winter and summer temperatures and the patterns of rainfall, affecting agriculture, forestry, biodiversity, tourism and leisure changes in suitability of habitats for plants and animals, with some areas becoming less suitable for existing species, and the possibility that new species will move in as conditions change.

2.16: The challenge is to reduce emissions and adapt to the impacts that will result from climate change.

2.17: There is a need to change attitudes and behaviours to energy use; to move people and goods in ways that minimise emissions; to reduce energy consumption; to generate energy from renewable resources; to minimise water consumption and to deal with waste in accordance with the principles of the waste hierarchy. Improvement to communications which do not involve movement – for example telecommunications – can also help in this.

POLICY 3: Climate Change

All strategies, plans and programmes in the Region shall contribute to mitigating climate change and assisting adaptation to the impacts of a changing climate by:

3.1 Helping the Region to contribute to meeting national policy as set out in the Energy White Paper to put ourselves on a path to cutting the UK's carbon dioxide emissions by some 60% by about 2050, with real progress by 2020, by including policies and proposals that:

a. focus substantial new development on locations with good accessibility by sustainable transport modes, particularly public transport, walking and cycling;

b. reduce road traffic growth and promote sustainable alternatives to the private car;

c. increase renewable energy capacity;

d, seek opportunities for and encourage the use of decentralised energy supply systems based on renewable and low-carbon forms of energy;

e. seek opportunities to maximise the energy efficiency of new developments through planning and design;

f. recognise the potential of, and encourage, land use and land management practices and related infrastructure that help capture or store carbon;

g. integrate climate change considerations into all spatial planning concerns, including transport, housing, economic growth and regeneration, water supply and sustainable drainage, and waste management.

3.2 Planning for the successful adaptation to the impacts of climate change in the Region by:

a. locating and designing new development for the climate, and climatic impacts, it is likely to experience over its intended lifetime;

b. considering the desirability of avoiding new development in those areas likely to be vulnerable to the impacts of climate change, particularly in situations where measures to provide resilience are not viable. Options should be brought forward for adapting existing development in areas that are, or are likely to become, vulnerable to such impacts;

c. taking into account and assisting adaptation to the impact of climate changes on the natural environment, ecosystems and biodiversity, agriculture, water resources, economic activities, transport, built environment and energy supply;

d. maximising opportunities from positive impacts of climate change in the Region.

POLICY 3: ***continued***

3.3 Helping the Region mitigate and adapt to climate change. The Regional Planning Body will work with regional and local partners to ensure that:

a. A regional greenhouse gas emissions inventory is developed, and regional trajectories are set out for the expected carbon performance of new residential and commercial development planned for by the RSS.

b. Mechanisms are established to coordinate a programme of data collection and monitoring on climate change that will enable future revisions of the RSS to fully take this into account. This will include development of a regional Climate Change Action Plan, and updating the regional climate change impacts report, 'And the Weather Today is', in line with the most recent scenarios available from the UK Climate Change Impacts Programme and updates to the national Climate Change Programme.

2.20: The RSS supports, and provides a positive contribution to the achievement of this objective. Effective planning to reduce emissions and adapt to the impacts of climate change will require the implementation of a range of policies in the RSS. For example, policies on the location of development, encouraging sustainable forms of transport, sustainable construction, waste management and flood risk. The following policy provides a context for these.

POLICY 8: Protecting and Enhancing the Environment

Strategies, plans, programmes, and planning proposals should seek to maintain and enhance the quality, diversity and local distinctiveness of the environment throughout the North East by:

a. promoting a high quality of design in all development and redevelopment;

b. promoting development that is sympathetic to its surroundings;

c. protecting the special qualities of the environment in the nationally designated areas of the Northumberland National Park, and the North Pennines and Northumberland Coast AONBs and upholding their statutory purposes, while recognising their role in a living, working and vibrant countryside. Major development should not take place in these areas other than in exceptional circumstances when it can be demonstrated that there is an overriding national need and it could not be located elsewhere;

d. Seeking to conserve and enhance historic buildings, areas and landscapes;

e. identifying and giving an appropriate degree of protection to historic parks and gardens, battlefields, ancient field systems, green lanes trackways, industrial monuments and other unscheduled archaeological sites, which reflects their national or regional importance;

f. identifying and giving appropriate protection to the Region's internationally and nationally important sites for biodiversity and geodiversity, including full assessment of the potential impacts of development on Internationally Designated Nature Conservation Sites;

g. identifying and protecting existing woodland of amenity and nature conservation value, particularly ancient woodlands;

h. encouraging and facilitating the implementation of the Regional Forest Strategy, Great North Forest and Tees Forest community forestry strategies, related biodiversity initiatives and other woodland planting;

i. paying due regard to the needs of the aquatic and marine environment including taking into account the potential risk of coastal squeeze, and considering measures to address this; and

j. encouraging and supporting the establishment of green infrastructure including strategic wildlife corridors.

In pursuit of a more effective and sustainable use and management of the region's environment, the main objectives are to:

- integrate environmental considerations into decision making at every level, ensuring that plans, strategies, programmes and development options are assessed for potential positive contributions as well as negative effects on the environment
- promote high quality design in all development and redevelopment
- promote the benefits of a quality environment as complementary to measures aimed at urban and rural renaissance
- ensure that development does not cause significant environmental harm; harness the region's natural resources and ensure that the region optimises the broad range of benefits presented by a quality, accessible environment, without compromising its value
- ensure that decisions on proposed development affecting the natural beauty of internationally and nationally designated sites and areas, such as National Park AONBs, World Heritage Sites, Ramsar Sites, Special Protection Areas, Special Areas of Conservation, do not compromise their statutory purposes
- measure and record the biodiversity heritage of the region
- effectively tackle the causes and effects of climate change in the region
- successfully adapt to any resulting impacts of climate change and maximise the potential economic, environmental and social opportunities
- reduce the risk and impacts of flooding
- achieve the sustainable management of existing woods and forests
- promote sustainable construction and design principles
- maximise energy generation from a broad range of renewable sources
- reduce demand for energy and increase energy efficiency
- reduce the amount of waste produced and treat and dispose of that which is generated in the most sustainable manner
- ensure the sustainable use of natural resources such as soil and water and
- encourage public access to the region's natural and built environment

2.88: The RSS contains policies which set broad principles to guide the strategic planning of the region and the preparation of local developement frameworks. These include, for example policies which aim to guide development to sustainable locations, reduce the need to travel, and to reduce the use of private motorised transport in favour of public transport, which is likely to be increasingly energy efficient and low emission.

2.89: Policy 3 aims to manage trends in the emissions from the burning of fossil fuels. This is currently aimed primarily at CO_2 but it seems a reasonable presumption that NOx emissions would be similarly affected.

2.91: The RSS contains policies which aim to increase the proportion of energy generated from renewable sources (and thereby reduce reliance on fossil fuels for energy generation). A number of specific policies would contribute to the achievement of policies 2, 3, 4 and 6 in terms of air pollution.

POLICY 9: Tyne and Wear City Region

Strategies, plans and programmes, and planning proposals should support the polycentric development and redevelopment of The Tyne & Wear City-region by:

(Please Refer the Point C below)

9.6 Environment

a. supporting the establishment of strategic networks of green infrastructure that links existing and proposed greenspace with green corridors running through urban, suburban and urban fringe areas to the countryside and coast
b. subjecting development proposals in or likely to affect internationally designated areas of nature conservation importance and the Heritage Coast to rigorous examination;
c. encouraging the development of renewable energy whilst carefully considering the local impacts of proposals.

POLICY 10: Tees Valley City Region

Strategies, plans and programmes, and planning proposals, should support the polycentric development and redevelopment of the Tees Valley City Region by:

10.2 – Economic Prosperity

b. Supporting the expansion of the renewable energy and recycling sector and their links to sustainable regeneration;

10.6 – Environment

c. encouraging the development of renewable energy whilst carefully considering the local impacts of proposals.

2.169: This unique combination of established modern facilities, skilled workforce and research and development capability, is proving attractive to the rapidly developing renewable energy industry and environmental technology sector. Major projects being developed include biomass, biofuels, recycling and green hydrogen. Of particular importance is the establishment of a national Fuel Cell Application Centre at the Wilton Centre. Renew Tees Valley is an organisation set up to drive forward the use and development of renewable energy in the city-region. This organisation will work closely with the New and Renewables Energy Centre (NaREC) set up in the Tyne and Wear City-region.

POLICY 20: Key Employment Locations

In planning for Key Employment Locations, Local Development Frameworks and planning proposals should ensure a high level of sustainability. The should:

a. prepare a detailed masterplan prior to the commencement of development setting out such considerations and meeting the requirements of clauses b-e;
b. seek to achieve zero or low carbon emissions, including energy conservation measures and secure energy supply from decentralised and renewable or low-carbon sources in accordance with the approach set out in Policy 38;
c. encourage high levels of public transport, walking and cycling accessibility and use;
d. discouragement of the need to travel by car through limited parking, the use of other demand management measures, and required a Travel Plan for each future occupier;

Please refer to Point B above.

POLICY 24: Delivering Sustainable Communities

Strategies, plans and programmes and planning proposals, should assess the suitability of land for development and the contribution that can be made by design in relation to the following criteria:

n ensuring that development has low consumption of natural resources both in construction and in operation, and incorporates embedded renewable energy generation where appropriate;

3.156: Trees, woodland and forests provide a diverse range of benefits: providing timber; employment; sport and recreation activities; enhancing the beauty of the countryside; revitalising derelict landscapes; catering for wildlife habitats; improving health; contributing towards targets on renewable energy through the production of biomass; and acting as sinks of carbon dioxide (CO_2)

which helps improve air quality and contributes to tackling climate change. The North East Regional Forestry Strategy provides the regional framework for the England Forestry Strategy, identifying key regional opportunities and priorities. It is the overarching strategic context both for the North East Community Forests programme and other local initiatives.

POLICY 36: Trees, Woodlands and Forests

Strategies, plans and programmes, and planning proposals should:

a. in line with the North East Regional Forest Strategy, seek to maximise the social, economic and environmental opportunities that trees, woodlands and forests present, particularly in regeneration areas and on derelict, damaged and underused sites;

b. support the expansion of community forestry;

c. facilitate the expansion of tree cover, particularly in urban centres and the rural urban fringe, to provide accessible leisure, recreation and environmental education opportunities;

d. support the establishment of integrated timber processing facilities, including related industries such as renewable energy, close to existing facilities and timber resources;

e. seek to maximise the tourism development opportunities presented by woodlands and forests, particularly in rural areas; and identify and ensure strong protection of areas of ancient woodland; and

f. ensure that proposals for expansion of tree cover do not have adverse effects on internationally designated sites of nature conservation importance.

3.157: The value of trees within development schemes and urban areas is increasingly being recognised through initiatives such as Greening for Growth in South East Northumberland. Trees in urban environments are effective at improving local air quality by removing fine airborne particulates. However, on a global scale, trees are one of the most significant carbon sinks on the planet. The region's forests make a very significant contribution to reducing climate change through provision of sustainable timber, the ultimate low carbon renewable building material.

3.158: One of the most distinctive features of woodlands and forests in the region is the high proportion (49%) owned and managed by the Forestry Commission. This 50,000ha of publicly owned woodland is available as a regional resource to help meet key economic, social and environmental targets. Forestry is economically productive in areas such as Kielder Forest which is the largest block of land in single ownership anywhere in England. This provides opportunities for delivery at a large and strategic scale. The importance of this area is well recognised in the case of timber, water and tourism. However, it has only recently been appreciated in relation to red squirrel conservation and renewable energy. The potential of the forestry industry within the region should be realised in the most sustainable way, including through the appropriate provision of infrastructure and facilities enabling integrated plants for processing timber close to source.

3.159: The regional renewable energy strategy (RRES) recognises biomass as the region's second most significant renewable energy resource; with key projects including the use of wood derived fuel in a co-firing trial at the ALCAN power station and Teesside SembCorp project which envisages the development of a wood burning power station at Wilton. Other important projects using biomass to heat schools and homes, particularly in areas not linked to the gas network and in properties using electricity for space and water heating. The expansion of the biomass sector therefore has a key role in supporting rural recovery and developing sustainable communities.

POLICY 38: Sustainable Construction

Strategies, plans and programmes, and planning proposals should:

d. promote and secure greater use of local renewable energy in new development, including through Development Plan Documents, setting local level size thresholds for major new development and require all relevant developments, particularly major retail, commercial and residential developments, to secure an ambitious but viable percentage of their energy supply from decentralised and renewable or low carbon sources. In advance of local targets being set in DPDs, major new developments of more than 10 dwellings or 1000 m^2 of non-residential floorspace should secure at lest 10% of their energy supply from decentralised and renewable or low-carbon sources, unless, having regard to the type of development involved and its design, this is not feasible or viable.

3.169 The *Regional Renewable Energy Strategy*, March 2005 (RRES) sets out how the region can contribute to achieving these objectives and targets. Achieving these targets will require progress on a number of issues. Transport is a major source of energy use and pollution, and the RSS seeks to minimise its effects through the emphasis on reducing the need to travel, particularly by private modes of transport. It is recognised that there is a correlation between economic growth and energy use, and therefore as the region's economy grows, there will be an upward pressure on energy demand. It will be important to decouple this link by seeking to improve energy efficiency and reduce energy consumption, particularly through the use of more sustainable building practices in new development and during refurbishment. The region will also need to move towards a more sustainable generation of energy, particularly electricity. RSS seeks to encourage sustainable forms of development that: minimise demand; use energy more efficiently; increase the amount of energy derived from renewable resources; and increase the efficiency and minimise the environmental effects of the continuing use of fossil fuels.

3.174 An important element in decoupling the link between economic growth and energy use is the need for renewable energy generation to be embedded in the design and implementation of new developments. A wide range of renewable technologies and design approaches are available and can be readily embedded into many forms of development, such as the Middlehaven macro combined heat and power project.

3.175 For energy supply, the RSS requires local level size thresholds for major new developments to secure within them an ambitious but viable percentage of energy supply from renewable sources. In advance of local targets being set within Development plan Documents, local planning authorities are expected to secure sustainable energy supply from new developments within the terms of policy set out below.

3.176 A practical tool the “micro-renewables toolkit” has been developed by the regional planning body to help local authority planners and developers to achieve the requirement for embedded renewable energy generation. The toolkit demonstrates the most appropriate form of micro-generation technologies that can be applied to different development. All those involved in the construction industry in the region are encouraged to use this tool.

E1.2 Renewable energy evidence base document

Document	*Date*	*Author*	*Client*
A Study of Future Residual Waste Treatment Capacity and the Potential for Refuse Derived Fuel Production	2006	Entec UK Limited	North East Regional Assembly
North East Regional Renewable Energy Strategy: Review	*2005*	*TNEI Services*	*North East Regional Assembly*
Regional Spatial Strategy (RSS) for the North East – Technical Background Paper No. 7: Energy	2005	North East Regional Assembly	North East Regional Assembly
North East Regional Renewable Energy Strategy: Final Report	*2003*	*TNEI Services North East Regional Assembly*	*North East Regional Assembly*
The Development of a Regional GIS for the North East Renewable Energy Strategy	2003	Northumbria University and Centre for Environmental and Spatial Analysis	North East Renewable Energy Group
North East of England Renewable Energy Strategy – Examination of Grid Connections	2003	Parsons Brinkerhoff Power	North East Renewable Energy Group
Landscape Appraisal for Onshore Wind Development	2003	University of Newcastle and Landscape Research Group	Government Office for North East
A Biomass Action Plan for the North East of England	2003	TNEI Services	North East Regional Assembly
Towards a Waste Strategy for the North East of England	2003	Environmental Resources Management (ERM)	Unknown
Proposed Targets for the Development of Renewable Energy in the North-East to 2010	2000	*Unknown*	*Unknown*
(Italics denotes key evidence base document)			

E1.2.1 The Development of a Regional GIS for the North East Renewable Energy Strategy, 2003

This study aimed to develop a regional geographical information system (GIS) to support the development of the NE of England renewable energy strategy. A series of GIS parameters were agreed by NEREG in January 2003 as the basic building blocks. The GIS overlays each of these parameters on an OS base map so that they can be viewed as a series of constraints. Areas free of constraint show uncoloured. No relative weightings have been applied to the constraints plotted and no buffers have been added to designated areas. The approach has been one of defining an agreed threshold at which the relevant constraint applies, and treating each as having the same weight as the others. The GIS study is the subject of a full separate report by The Centre for Environmental and Spatial Analysis, University of Northumbria at Newcastle which can be found on the NE Assembly website.

It is important to recognise the boundaries between the scope of the GIS and work normally undertaken by developers. The GIS together with the landscape and grid studies provide broad guidance on possible locations for wind development in terms of the constraints covered by the GIS and degrees of landscape sensitivity. The work completed has not gone into the level of detail undertaken by developers, which can include: disturbance to microwave links, access, detailed terrain, location of nearby trees, services, effects on bird habitats landscape cumulative impacts, noise constraints in relation to individual dwellings etc. These and other locally significant constraints can significantly affect the potential of a particular area. Of even greater significance are landowner attitudes. Wind turbines do not produce particularly high rental levels and the prospect of a number of turbines may be attractive to owner occupier hill farmers, but may be less important to the owners of large estates. In either case owners may simply prefer not to have turbines on their land.

The fact that there are further levels of detail beneath the regional GIS means that it is difficult to predict development capacity for wind energy in specific areas. More detailed work in both SE Northumberland and Tees Valley has made it possible to be more confident about the potential wind capacity in those areas, and progress made by developers since July 2003 has also provided useful information which is reflected in this report. However, resource estimates must be treated with a degree of caution and certainly do not imply that planning permissions will follow as a matter of course.

E1.2.2 North East of England Renewable Energy Strategy – Examination of Grid Connections, 2003

This study assessed the capability of the electricity grid in the North East of England to accept the new renewable generation identified by the emerging regional energy strategy. It used the broad areas of potential renewable generation identified within the overall strategy, now shown on the suggested draft RSS indicative key diagram, as a starting point. These were regarded as illustrative locations only. Much of the renewable generation is onshore wind power, including the possible large scale exploitation of wind resources in the Kielder area.

Around 7,100 MW of fossil fuel generation and interconnector capacity is planned for the region by 2009/10. Given that peak demand in the region is expected to rise to only 3,600 MW by 2009/10 and 3,800 MW by 2019/20, the region will continue to be a power exporter, routing power south through the transmission network. The total capacity of all the renewables projects identified in July 2003 was approximately 1,660 MW, representing the maximum power that would be produced from all the wind and other projects operating at full output at the same time.

Most of the renewables projects, with generating capacities of 50 MW or more, will require connection at 66 kV or higher voltages. The projects can be grouped into two general categories:

- generation in remote rural areas, distant from the grid and with very small local loads. Power will need to be exported from the area, requiring new lines to reach grid connection points

- generation in the more populated, coastal areas with nearby grid connections and significant local load. These projects can be considered as true embedded generation, supplying power to the local area. Only short connection distances to the grid will be needed

In modelling the grid to assess the connection of new generation, different scenarios were considered representing approximately 25%, 50% and 100% implementation of the potential capacity. These were compared to a "no-renewables" scenario to separate the impact of renewables from other changes in the grid. Overall, the performance of the grid improved when renewables were added to the system:

- utilisation: Several key circuits and transformers will experience reduced loading as local generation cancels out some imported power flows. The reduction in loading generally increases as more renewables are connected. Only the 400 kV circuits exporting power south out of the region are likely to experience significant loading increases

- outages: Lower loading will reduce overloads and improve voltage conditions in several locations. The increased loading on the 400 kV export network, however, may have the potential to cause an overload if an outage in the Norton-Osbaldwick line concentrates power flows through the Seal Sands-Lackenby line. In practice it is likely that in such an event generation would be constrained to reduce the overload

- short-circuit fault levels: There will be minimal effect on fault levels under all three renewable scenarios

In summary, the connection of the renewables identified within this report is considered feasible with the grid as currently planned, and is in fact likely to provide some benefits to it. The significant area of new investment required will be for new lines connecting remote rural generation to the grid. Routes for new connections must be considered as an integral part of planning the development of the renewable generation areas, since they will be crucial in allowing the region to meet its renewables targets.

Since the July 2003 report was completed further work on the ability of the grid to handle the amount and location of renewable electricity put forward has been undertaken by Northern Electric Distribution Ltd, NEDL. This work is ongoing and is informed by contact between NEDL and developers active in the region.

E1.2.3 Landscape Appraisal for Onshore Wind Development 2003

This landscape appraisal aimed to review, survey, assess and refine the landscape character of the region into a consistent and integrated standard, drawing on existing character information including the *Countryside Character Initiative North East Study* (Countryside Commission, 1998), more recent work on a national landscape character typology (Countryside Agency, in progress), a detailed assessment by Durham County Council (in progress) and an assessment for the Northumberland Coast AONB (Countryside Commission, 1997). The work has also drawn on the latest guidance from the Countryside Agency and Scottish Natural Heritage (2002). Twenty-seven landscape character types have been defined, characterised and mapped.

A decision was taken not to limit the study only to those areas where wind speeds are considered to be most commercially advantageous. This is because of possible future changes in technology and economics. The fieldwork, although detailed and representative of the range of landscape character types and the variations within these types, did not cover every landscape unit nor every possible viewpoint within a unit assessed; therefore no detailed findings or conclusions regarding particular locations are reached. The work therefore does not replace the need for environmental impact assessment and related assessments for particular development applications.

E1.2.4 A Biomass Action Plan for the North East of England 2003

This situational analysis recommends that the North East region is justified in committing public resources to the development of a biomass industry and the action plan makes recommendations as to how that industry should be developed. The action plan presents an approach that will assist the development of a local market for wood heat in the short, medium and long term. It also recommends actions to ensure that assistance is given to any potential large scale user and to any party wishing to supply overseas markets.

E1.2.5 Towards a Waste Strategy for the North East of England, 2003

This waste management strategy focuses on all the primary waste streams: commercial and industrial waste (C and I), construction and demolition waste (C and D) and municipal solid waste (MSW). It also includes information on agricultural waste and special, or hazardous, wastes.

In developing this strategy, ERM has focused on developing options for managing these wastes in the year 2016. 2016 has been selected as an appropriate year as it coincides with the end of the period covered by regional planning guidance.

ERM has identified the stakeholders' preferred option for managing waste in 2016 for the North East region and a vision for dealing with waste up until 2025. This recommended waste management strategy for the North East region is presented in sections 12 and 13 of this report.

E1.2.6 North East Regional renewable Energy Strategy: Final Report, 2003

Overview

In November 2002 the Government Office for the North East, GO-NE, commissioned The Northern Energy Initiative, TNEI, the Centre for Environmental and Spatial Analysis at the University of Northumbria, CESA; and the Landscape Research Group at the University of Newcastle, LRG, to prepare a regional strategy for renewable Energy.

Having established figures which relate to the Government's specific targets and aspirations for renewable electricity, and bearing in mind the wider objectives for renewables not yet having stated targets, the study reviewed the resources potentially available in the Region. It includes reference to previous reports carried out relevant to resource assessments. It also included spatial planning and implementation (spatial allocation) at the sub-regional level.

Methodology

The following table indicates the methodology used in making renewable energy installed generation assumptions.

Biomass	In April 2003 TNEI completed a *Biomass Action Plan for the North East of England* for the Environmental Industries Federation, EIF, and One North East. Use of biomass for energy production is very limited in the region at the present; this situation is likely to change significantly by 2010.
Photo-voltaics	A range of between 1 to 6MW of PV installed in the region by 2010 was considered suitable for the region based on PV applications and PV contributions to date.
Hydro	As in the case of PV, RSS and other planning policy should support the installation of solar hot water panels. An estimate of total capacity has been based on reservoir capacity and possible development.
Landfill Gas	The report *Towards a Waste Management Strategy for North East England* (Report 6) suggests a significant ongoing role for landfill to the extent of requiring a combined annual capacity of 3,375,000 tonnes per annum in the period up to 2015, even in the context of waste minimisation, recycling and a possible new energy from waste facility.
Energy from Waste	There are no proposals for new municipal waste incinerators in the region; therefore no figures for electricity derived from waste incineration have been included in the resource estimate for 2010.
Geothermal	There are few applications of this technology in the region, as it provides heat by using power it is not included in the assessment of regional resources. However if and when targets are set for heat from renewable sources this technology should be included.
Marine Renewables	Some R & D deployment and testing of equipment may take place in the region as part of the work of NaREC.
Offshore Wind Resource	In the period up to 2010 offshore wind development in the North East of England would be limited to the, now operational, Blyth two turbine, 4MW project. Northern Electric Generation Ltd (NEGL) successfully bid in respect of a location at the mouth of the River Tees.
Onshore Wind Resource	As shown in the table representing evidence based documents three different reports fed into a regional based assessment of the wind resource potential. Further discussed below.

Harnessing the Region's Wind Resource (GIS Study, Landscape Study and Grid Connection Stud): Onshore wind power would be required to provide 60% of the 10% renewable electricity target by 2010, and 76% by 2020, if these targets are to be met. It is possible, although uncertain at the present time, that deep water offshore wind may form part of the region's portfolio of renewable energy resources after 2010. Preparation of this study included three parallel exercises, the creation of a GIS (*Report 8*), a landscape study (*Report 13*), and a grid study (*Report 12*). TNEI reviewed the methodology and findings from each of the three studies. The results are presented at the regional level in Sections 8 and 9 of the report. Annex 2 of the report considers the spatial potential for wind farm development within each local authority.

Recommendations/targets

The figures for electricity from biomass are at the high end of what the region's resources can support, and there is no certainty that current projects will proceed. The rate of progress in implementing the other technologies is also uncertain. There is no particular reason for using 2010 as a planning horizon in RSS. There is a major role to be played by onshore wind by 2020. If other technologies perform well up to 2010 then this reduces the need for onshore wind in that period, but not thereafter. It is essential that the RSS strategy is sufficiently robust to deal with the challenge of catering for onshore wind up to 2020. It will also be important to review progress in relation to the Government's targets.

The draft RRES did not contain specific renewable energy targets for the region as a whole or for sub-regions. It concluded that there are sufficient resources to generate 10% of the region's electricity consumption by 2010, and that achieving a 20% would be possible if strategic scale wind development took place within Kielder Forest.

E1.2.7 North East Regional Renewable Energy Strategy: Review, 2005

Overview

The RRES Final Report as discussed above was the subject of consultation which was taken into account in preparing this report. Although this strategy touches upon aspects of renewable energy such as economic development opportunities, environmental and social benefits, its primary purpose is to assist in the creation of a positive planning policy framework for renewable energy at a regional and local level, and to support the RSS as it progresses through its consultation and examination in public stages.

TNEI Services Ltd were commissioned by the North East Assembly to update the draft *North East of England Regional Renewable Energy Strategy*, (draft RRES), which was submitted in July 2003 to the Government Office for the North East (GO-NE). Some of the material within the draft RRES, revised in light of progress and changes in Government policy, has been reintroduced into this report so that it can be read as a stand alone document. Other material, in particular suggestions for regional spatial strategy (RSS) policies, has not been included as its purpose has been served now that RSS is approaching publication.

Methodology

This is the first review of the strategy, prepared for the North East Assembly. Some of the material within the draft RRES, revised in the light of progress and changes in Government policy, has been reintroduced into this report so that it can be read as a stand alone document. The review of the draft RRES confirmed and increased earlier estimates of renewable energy resources available in the region. The draft RRES proposed that Kielder Forest should be considered as a strategic renewables resource area (SRRA), for biomass, major wind and hydro power. Realisation of the substantial wind power resource remains delayed by Ministry of Defence (MoD) tactical training requirements. An initial SEA scoping exercise was undertaken for GO-NE to initiate the process. However, at the time of this report it was too early to consider the extent and capacity of any future deep water offshore wind developments off the North East coast.

Recommendations/targets

Estimates were made after reviewing information available during August and September 2004. This information includes developer intentions and the result of recent resource studies in South East Northumberland and Tees Valley. It is recognised that there is significant uncertainty regarding the extent to which the estimates that follow will be implemented. To allow for this uncertainty the suggested targets for inclusion in RSS were reduced to those indicated in the table below.

(Table 22 for March 2005 Review) Indicative regional and Sub-regional Resources to 2010

Area	*Target installed renewable electricity capacity by 2010 in MW*	*Output: GWh/pa*
Northumberland	212	659
Tyne and Wear	22	96
County Durham	82	237
Tees Valley	138	508
NE Region	454	1,500

A regional contribution for onshore and offshore renewable technology has been grouped in the table below. A technological split for 2020 targets can also be found below

Regional Summary: onshore and offshore capacity for 2010 and 2020

Regional Capacity		Onshore to 2010	Onshore to 2020	Total Onshore	Offshore	Total On and Offshore	of which current capacity
Northumberland	MW Installed	314	89	403	24	427	18.6
	Output: GWh/pa	924	225	1149	36	1185	103
Tyne and Wear	MW Installed	29	24	53	(N/A)	53	10
	Output: GWh/pa	112	51	163	(N/A)	163	60.5
County Durham	MW Installed	125	35	160	(N/A)	160	19.5
	Output: GWh/pa	346	72	418	(N/A)	418	61
Tees Valley	MW Installed	195	68	263	100	363	8.25
	Output: GWh/pa	659	178	837	263	1100	22
Total	**MW Installed**	**663**	**216**	**879**	**124**	**1003**	**56.35**
	Output: GWh/pa	**2041**	**526**	**2567**	**299**	**2866**	**246.5**

Regional Summary: onshore resources by technology for 2020				
Technology	*MW installed*	*Output: GWh/pa*	*% of total installed capacity*	*% of total output*
Biomass power	45	332	5	11
Biomass CHP	14	101	2	4
Wind	744	1,954	85	77
Landfill gas	12	89	1	4
Photovoltaics	53	38	6	2
Hydro	11	53	1	2
Total	**879**	**2,567**		

E1.2.8 North East Regional Renewable Energy Strategy: Review, 2005

Overview

As well as providing an updated overview of renewable energy development in the region from the last review in March 2005, this November 2005 Review also provides detailed technology specific information. The main findings of this Review can be summarised as follows:

- wind developer activity has increased significantly over the year to September 2005 to the point where there is now about 100MW of wind power capacity with planning permission awaiting construction, a further 76MW at the planning application stage, and over 700MW at the pre-planning/scoping stages. Further work is needed to evaluate the ability of the National Grid in the region to accommodate increasing renewable generation

- Kielder Forest was put forward in RSS and RRES as a strategic renewables resource area, including a significant cluster of major wind farms together with hydro and biomass resources. Further work and discussions with the Ministry of Defence has made it clear that at best only one wind farm has any prospect of being developed in the short to medium term

- the region has a number of significant biomass projects and

- the region is also host to the UK's largest biodiesel manufacturing plant now being completed in Middlesbrough

Examination of each of the county sub-regions shows that Northumberland is set to make the greatest contribution towards meeting the region's renewable energy targets followed by Co. Durham, where a significant number of new wind projects were approved in the year to September 2005. Northumberland is experiencing the greatest level of interest from wind developers. Tyne and Wear will continue to make a modest renewables contribution mainly from landfill gas, and Tees Valley is making a particularly diverse and innovative contribution across a wide range of technologies.

The overall conclusions of the report stated the renewable energy policies in RSS are soundly based, and are helping to secure national and regional objectives for renewable energy and for sustainable development.

Methodology

Assessments within the review were based on information from the RRES, previous review, local authorities, developers, government department and other agencies. Information gaps within the RRES were filled and the detailed coverage of certain technologies was increased. The RRES March 2005 focused largely upon electricity producing renewable technologies, because of their direct relevance to the Government's targets and emerging RSS targets. This review included coverage of biodiesel and heat from renewables.

Tables 7-15 within the main report bring together the projections for 2010 and 2020; these are discussed in 'targets' below. However, the assumptions for some projections differ from the March 2003 RRES; including:

- *Onshore Wind*: High and low projections were put forward using the 2005 figures as a starting point, the assumptions used were as follows:

Onshore Wind, low projection to 2010: Total of 440MW, which includes all projects operational and with planning permission and 40% of all projects currently seeking permission and at pre-planning and scoping stage.

Onshore Wind, high projection to 2010: Total of 635MW, as above but assuming that 65% of projects currently at planning and pre-planning are built.

- *Offshore Wind*: In the context that after 2010 the public and decision makers will be able to assess the benefits and impacts of wind developments in the light of experience on the ground, there will be less uncertainty in the wind planning process. Simple figures of additional wind capacity be added 2010 as follows:

Onshore Wind, low projection to 2020: Total 640MW comprising 440MW to 2010 plus a further 200MW.

Onshore Wind, high projection to 2020: Total 935MW comprising 635MW to 2010 plus a further 300MW.

- *Small/Domestic Scale Wind*: March RRES did not include specific figure. Based on estimates (list of projects, discussion with regions largest installer of this size of turbine), figure for small scale wind turbines in September 2005 was 200kW. The report assumed that this figure will double by 2010, and depending on fuel price and the availability of grants, it could further double (1MW) by 2020.

The Government has not set a target for renewable heat, and as this review has demonstrated for the region there is more work to be done before such a target could be established. The amount of renewable heat being produced at the present time is unclear; more work is needed to establish the base position for each source of renewable heat.

Recommendations/targets

The main messages from the assessment of capacity in 2010 are that:

- by 2010 the region could be producing 13% to 16% of its electricity requirements from onshore renewable resources. At the top end of the projection this is a better outturn than that suggested in RRES
- offshore wind could add a further 2% to the above figures
- onshore wind will become the region's most significant renewable resource, accounting for between 57% of output (low projection) and 66% of output (high projection)
- wind development at Kielder Forest is not now expected to be on the scale anticipated in RRES
- biomass fired electricity will be the next most significant source of renewable electricity followed by landfill gas and energy from waste
- the development of biomass fuelled CHP plant is a possibility by 2010 and
- the draft RSS target of 10% renewable electricity by 2010 is achievable and likely to be exceeded

The main messages from the assessment of capacity in 2020 are that:

- by 2020 the region could be producing 16% to 21% of its electricity requirements from onshore renewable resources. The top end of the projection is lower than that suggested in RRES because of the reduced Kielder wind capacity figure
- offshore wind could add a further 2% to the above figures. Onshore wind remains the region's most significant renewable resource, accounting for between 66% of output (low projection) and 74% of output (high projection)
- there will be further growth in the use of biomass for heat production, possibly including from biomass fired CHP plant, but this is very difficult to quantify at the present time

- the draft RSS aspiration for 20% renewable electricity by 2020 is achievable and but seems less likely to be exceeded than was suggested in RRES because of the reduction in capacity at Kielder

E1.2.9 Regional Spatial Strategy for North East England – Technical Background Paper 7, 2005

The purpose of this paper was to provide an explanation of the RSS policy approach. The report includes regional initiatives related to energy generation; however it also draws to the importance of the three studies discussed above; regional GIS, landscape appraisal, and examination of grid connections.

E1.2.10 A Study of Future Residual Waste Treatment Capacity and the Potential for Refuse Derived Fuel Production, 2005

In October 2005, Entec was commissioned to conduct a study into the number, type and location of residual waste treatment plants planned for the North East region in the short to medium term. The work built upon a previous study, namely a regional LATS capacity study prepared by Entec in March 2005, which considered the implications of the landfill allowance trading scheme (LATS) and where there may be potential shortfalls in capacity.

The data collected in the 2005 regional LATS assessment was revised so that better estimates could be made of the number and sub regional location of any residual treatment facilities that were definite, planned or just a possibility. The study then identified geographical areas where there remained a need for further residual treatment capacity and the timescale for such facilities were then identified.

A questionnaire was sent to the relevant officer from each WDA requesting the following data:

- current (2004-05) municipal waste arising data, including waste recycled, composted, treated and disposed

- information on residual treatment facilities including: stage of planning, potential start date, size of plant, technology, expected outputs and diversion rates

- in addition disposal data on commercial and industrial (C and I) and construction and demolition (C and D) wastes within the North East region was also gathered

The data obtained was used to assume a composition of wastes disposed to landfill within the region and determine the quantity of waste suitable for conversion to energy, rather than disposal. Information was also gathered from discussion with major waste management companies in the region. The discussions centred on the future plans of the companies in terms of residual MSW treatment facilities as well as treatment of C and I and C and D wastes.

Data on tonnages and types of waste sent to landfill in the North East was also sourced from the Environment Agency and used to estimate the quantity of potentially combustible of waste sent to landfill. The waste stream was further categorised to determine which materials were suitable for combustion or other forms of energy recovery.

The study found that 370,000 tonnes per annum residual waste treatment capacity was planned for the region in addition to the 300,000 tonnes currently available. A further 310,000 tonnes of capacity was also considered to be potentially available in the region in the long-term.

E1.3 Monitoring activity

As part of the annual monitoring process, the North East regional assembly asks local authorities to provide information on the number and potential generating capacity of renewable energy projects.

The 2007-08 AMR reports however that there is still a challenge in getting consistent and accurate information on the potential capacity of projects. It is therefore likely that many smaller schemes, in particular for solar power and ground source heat pumps, are going unrecorded as they fall outside the requirements of the statutory planning system.

E1.4 Further work

Landscape studies are currently being conducted at a local authority level as part of an overall onshore wind review. No other work has currently been commissioned in reviewing renewable energy policies or targets contained within the North East plan. A number of other actions are currently in place to help encourage the development and targets installed in policies 38-41, including:

- ensure that work on a landscape capacity study relating to onshore wind in north and south upland Durham is completed. This will ensure that all of the ‘Ws’ identified in the RSS have had capacity studies
- make progress in developing a policy to help to monitor the installation of combined heat and power (CHP) schemes and measure their capacity
- refresh the micro-renewables toolkit, and ensure the implementation of the toolkit can be monitored effectively
- review the information to be collected for the 2008-09 AMR and
- establish a consistent database of developments, which will contribute to targets being met in the future

Appendix F
North West

F1.1 RSS renewable energy policies

F1.1.1 Introduction

The North West plan was adopted in September 2008. A partial review of the North West plan is currently being undertaken, focusing on a limited number of discrete technical issues and addressing strategic gaps in RSS policy relating to gypsies and travellers, travelling show people and car parking. 4 NW is also in the process of creating North West regional strategy 2010, which is currently undergoing a 12 week consultation on the principles and issues paper.

F1.1.2 Primary renewable energy policies

Chapter 9: Environment, Minerals, Waste and Energy

POLICY EM15: A Framework For Sustainable Energy in the North West

Plans and strategies should promote sustainable energy production and consumption in accordance with the principles of the Energy Hierarchy set out in Figure 9.2 and within the Sustainable Energy Strategy. In line with the North West Sustainable Energy Strategy the North West aims to double its installed Combined Heat and Power (CHP) capacity by 2010 from 866 MWe to 1.5 GW, if economic conditions are feasible.

All public authorities should in their own proposals and schemes (including refurbishment) lead by example to emphasise their commitment to reducing the annual consumption of energy and the potential for sustainable energy generation, and facilitate the adoption of good practice by the widest range of local stakeholders.

9.46: The production, security of supply and efficient use of energy is essential to 21st Century society and the increase in global demand will have an impact on life in the North West. The Government's 2003 Energy white paper recognised the scale of the challenge faced and set out strategic priorities for UK energy policy (110). The Energy Review in 2006 (111) assessed progress against these objectives, and the subsequent Energy white paper 2007 (112) contains a range of proposals designed to address the climate change and energy challenge by reducing the demand for energy, by securing a mix of clean, low carbon energy sources and by streamlining the planning process for energy projects. The legislative aspects of the Energy white paper 2007 will be implemented by the Energy Bill 2007-8. These themes have also been developed in the North West Sustainable energy strategy (113), which supports national targets to reduce CO_2 emissions through a combination of approaches pursued as parallel initiatives.

9.47: In July 2007, the Government published *Building a Greener Future*, a policy statement outlining a timetable for tightening national Building Regulations to achieve a 25% reduction in carbon emissions from new homes in 2010, and 44% in 2013, before reaching zero carbon in 2016. The Government also announced in the Budget 2008 an ambition for all new non domestic buildings to be zero carbon from 2019 with consultation on the timeline and its feasibility.

9.48: The *Planning and Climate Change* PPS (PPS1 Supplement) confirms that there will be situations where it could be appropriate for local planning authorities to expect higher levels of building sustainability than the prevailing standards set nationally through building regulations. Local requirements should be brought forward through development plan documents and focus on known opportunities. Local planning authorities are expected to demonstrate clearly the local circumstances that warrant and allow the local requirement.

9.49: When proposing any local requirements for sustainable buildings, local planning authorities should, in line with the PPS on climate change, focus on development area or site-specific opportunities. They should fulfil the tests set out in paragraph 33 of the supplement including ensuring that any requirements are evidence-based and viable, and consistent with securing the expected supply and pace of housing development (114). Any local requirements should be specified in terms of the achievement of nationally described sustainable buildings standards, for example, in the case of housing, by expecting identified proposals to be delivered at a specific level of the code for sustainable homes.

POLICY EM17: Renewable Energy

In line with the North West Sustainable Energy Strategy, by 2010 at least 10% (rising to at least 15% by 2015 and at least 20% by 2020) of the electricity which is supplied within the Region should be provided from renewable energy sources. To achieve this new renewable energy capacity should be developed which will contribute towards the delivery of the indicative capacity targets set out in Tables 9.6 and 9.7a-c. In accordance with PPS22, meeting these targets is not a reason to refuse otherwise acceptable development proposals.

Local authorities should work with stake holders in the preparation of sub-regional studies of renewable energy resources so as to gain a thorough understanding of the supplies available and network improvements, and how they can best be used to meet national, regional and local targets. These studies should form the basis for:

POLICY EM17: Renewable Energy *continued*

- informing a future review of RSS to identify broad locations where development of particular types of renewable energy may be considered appropriate; and
- establishing local strategies for dealing with renewable resources, setting targets for their use which can replace existing sub-regional targets for the relevant authorities.

Plans and strategies should seek to promote and encourage, rather than restrict, the use of renewable energy resources. Local planning authorities should give significant weight to the wider environmental, community and economic benefits of proposals for renewable energy schemes to:

- contribute towards the capacities set out in Tables 9.6 and 9.7a-c; and
- mitigate the causes of climate change and minimise the need to consume finite natural resources.

Opportunities should be sought to identify proposals and schemes for renewable energy. The following criteria should be taken into account but should not be used to rule out or place constraints on the development of all, or specific types of, renewable energy technologies:

- anticipated effects on local amenity resulting from development, construction and operation of schemes (eg. air quality, atmospheric emissions, noise, odour, water pollution and disposal waste). Measures to mitigate these impacts should be employed where possible and necessary to make them acceptable;
- acceptability of the location/scale of the proposal and its visual impact in relation to the character and sensitivity of the surrounding landscape, including cumulative impact. Stringent requirements for minimising impact of landscape and townscape would not be appropriate if these effectively prelude the supply of certain types of renewable energy, other than in the most exceptional circumstances such as within nationally recognised designations as set out in PPS22 paragraph 11;
- effect on the region's World Heritage Sites and other nationally and internationally designated sits or areas, and their settings but avoiding the creation of buffer zones and noting that small scale developments may be permitted in such areas provided there is no significant environmental detriment;
- effect of development on nature conservation features, biodiversity and geodiversity, including sites, habitats and species, and which avoid significant adverse effects on sites of international nature conservation importance by assessment under the Habitats Regulations;
- maintenance of the openness of the Region's Green Belt;

POLICY EM17: Renewable Energy *continued*

- potential benefits of development to the local economy and the local community;
- accessibility (where necessary) by the local transport network;
- effect on agriculture and other land based industries;
- ability to make connections to the electricity distribution network which takes account of visual impact (as qualified above);
- integration of the proposal with existing or new development where appropriate;
- proximity to the renewable fuel source where relevant – eg. wood-fuel biomass processing plants within or in close proximity to the region's major woodlands and forests;
- encourage the integration of combined heat and power (CHP), including micro CHP into development.

Developers must engage with local communities at an early stage of the development process prior to submission of any proposals and schemes for approval under the appropriate legislation.

9.55: In the short to medium term, the majority of the power generated in the North West will continue to come from the large-scale nuclear, coal and gas-fired power stations that supplied around 80% of the region's electricity in 2001 (120). However, as fossil fuel resources are in serious decline and nuclear stations are scheduled to close, the UK is likely to become a major importer of energy during the next two decades. Much of the region's existing capacity for generating power is from long term unsustainable non renewable sources, although there may still be a role for cleaner coal production. Renewable energy technologies must now be developed to support an increasing proportion of the region's capacity for generating electricity. Tables 9.6 and 9.7 a-c provides indicative regional and sub regional targets. These are flexible and will change. However they provide an important indication of the way in which regional and sub regional targets might be met and new renewable energy capacity should be developed with the aim of meeting or exceeding these targets. It is proposed that the targets should be subject to bi-annual review, allowing them to be revised periodically through an active process of monitoring of renewable energy deployment against proposed targets and regional energy consumption. The replacement of non-renewable capacity by improved energy efficiency and combined heat and power (CHP) will bring new economic opportunities to the region, as part of a strategic and sustainable approach to energy.

9.56: The *Energy and Greenhouse Gas Emissions Study* published by NWRA in 2007 (121) examined the potential for installation of renewable heat technologies, and proposed regional targets for their uptake. Work to agree such targets for renewable heat will be considered in a future review of the RSS.

9.57: Each renewable technology has its own locational characteristics and requirements and different areas will be better suited to different technologies. The international importance of much of the coastline and all of the major estuaries of the region for nature conservation is likely to inform choice of location for marine schemes.

9.58: In line with PPS22, developers must consult and engage with local communities at an early stage of the development process prior to submission of any proposals and schemes for approval under the appropriate legislation.

POLICY EM18: Decentralised Energy Supply

Plans and strategies should encourage the use of decentralised and renewable or low-carbon energy in new development in order to contribute top the achievement of the targets set out in Table 9.6 and 9.7a-c. In particular, local authorities should, in their Development Plan Documents, set out:

- targets for the energy to be used in new development to come from decentralised and renewable or low-carbon energy sources, based on appropriate evidence and viability assessments; and
- the type and size of development to which the target will be applied

In advance of local targets being set, new non-residential developments above a threshold of 1,000m^2 and all residential developments comprising 10 or more units should secure at least 10% of their predicted energy requirements from decentralised and renewable or low-carbon sources, unless it can be demonstrated by the applicant, having regard to the type of development involved and its design, that this is not feasible or viable.

9.59: PPS1 supplement on climate change expects local planning authorities to provide a framework that promotes and encourages renewable and low carbon energy development. Local planning authorities should have an evidence-based understanding of the local feasibility and potential for renewable and low-carbon technologies, including microgeneration, to supply new development in their area. Targets for the percentage of energy to be use in new development to come from decentralised and renewable or low-carbon energy sources should be set out and tested in development plan documents to ensure they are evidence-based, viable and consistent with ensuring housing and affordable housing supply is not inhibited.

9.60: Microgeneration has the potential to play a significant role in moving towards the Government's objective of sustainable, reliable and affordable energy for all, delivered through competitive markets. The *Microgeneration Strategy*, published in 2006, aims to create conditions in which microgeneration is a realistic alternative, or supplementary energy generation source, for individual householders, the wider community and small businesses (122).

9.61: Government policy, as re-stated in the Energy white paper 2007 (123) and Energy Bill 2007-08, is quite clear that diversity in the provision of energy is fundamental and that it is essential to maintain electricity supply system security. Therefore, whilst renewable energy and microgeneration have an important role to play, there will be a continued need for other electricity generation including potentially nuclear, clean coal and gas generation technologies.

F1.1.3 Secondary renewable energy policies

Chapter 4: Spatial Principles

4.14: If used positively, spatial planning can play a significant role in reducing our carbon emissions, promoting the use of renewable energy and shaping sustainable communities that are resilient to future climate change.

POLICY DP9: Reduce Emissions and Adapt to Climate Change

As an urgent regional priority, plans, strategies, proposals, schemes and investment decisions should:

- contribute to reductions in the Region's carbon dioxide emissions from all sources, including energy generation and supply, buildings and transport in line with national targets to reduce emissions to 60% below 1990 levels by 2050; in particular, for residential and commercial development, by developing trajectories or other yardsticks for identifying trends in carbon performance;
- take into account future changes to national targets for carbon dioxide and other greenhouse gas emissions;
- identify, assess and apply measures to ensure effective adaptation to likely environmental, social and economic impacts of climate change.

Measures to reduce emissions might include as examples:

- increasing urban density;
- encouraging better built homes and energy efficiency, eco-friendly and adaptable buildings, with good thermal insulation, green roofs and microgeneration;
- reducing traffic growth, promoting walking, cycling and public transport;
- facilitating effective waste management;
- increasing renewable energy capacity;
- focusing substantial new development on locations where energy can be gained from decentralised supply systems;
- the improved management and rewetting of the regions blanket and raised bog resource.

Chapter 7: Living in the North West – Ensuring a Strong Healthy and Just Society

In addition to new build and conversion activity, the opportunity exists to make better use of existing housing stock. Local authorities are encouraged to take a positive, coordinated approach towards dealing with under used housing stock, for example by identifying vacant and underused properties and introducing empty property strategies to help bring them back into full use. The domestic sector accounts for nearly 30% of greenhouse gas emissions resulting from energy use. If this is to be reduced, then high standards of energy efficiency in new and existing housing is crucial, and other measures, such as microgeneration of energy from renewable sources on residential property should be encouraged (see policy EM16 and EM18). In addition, the predicted changing climatic conditions (67) mean that climate proofing of new and existing dwellings, using future climate change data will also be important to ensure that the provision of housing stock is fit for purpose. New housing development should incorporate sustainable drainage systems and water conservation and efficiency measures to the highest contemporary standard, and retrofitting of sustainable drainage systems and water efficiency within existing development should be encouraged (see policy EM5).

F1.2 Renewable energy evidence base document

Document	*Date*	*Author*	*Client*
Renewable Energy Targets for the North West (Technical Briefing Note) – A Report to the North West Regional Assembly	*2006*	*Future Energy Solutions: AEA Technology*	*North West Regional Assembly*
Advancing Sustainable Energy in the North West: Mapping the way forward to 2020	*2004*	*Environmental Resource Management (ERM)*	*North West Regional Assembly*
From Power to Prosperity – Advancing Renewable Energy in the North West	2001	Environmental Resource Management (ERM)	North West Climate Group
Renewable Energy in the North West: Investigating the Potential and Developing the Targets	*2001*	*Environmental Resource Management (ERM)*	*Government Office for the North West*
(Italics denotes key evidence base document)			

F1.2.1 From Power to Prosperity – Advancing Renewable Energy in the North West, 2001

Overview

This report summarises the Northwest of England's regional renewable energy study which has:

- determined the region's potential for developing renewable energy resources

- identified opportunities and constraints
- developed targets for deployment to 2010 and
- proposed priorities for action and potential initiatives

The different technologies considered include both on and offshore wind, biomass, solar, small-scale hydro, landfill gas and energy from waste. The targets proposed will see the region's renewable energy capacity increase from less than 1.3% of total electricity generation capacity today, to around 8.5% by 2010.

F1.2.2 Renewable Energy in North West England: Investigating the Potential and Developing the Targets, 2002

Overview

This study carried out by ERM aimed to:

- determine the regions potential for developing renewable energy source, identifying opportunities and constraints for different categories of renewable energy and
- develop a set of short, medium and long term renewable energy targets for the region, taking account of the opportunities and constraints identified during the study

The study was broken down into three reports which considered planning policy background, resource development and setting targets and actions. Attention will be paid to the resource development and targets reports.

Methodology

The study concentrated on three resource categories for the description of each technology; technical resource, accessible resource and practicable resource. The practicable resource and estimates of a range for different technologies are the main focus. The study also included the 'acceptability to society' constraint through the process of a number of consultations. A description for and methodology for wind, energy from waste and biomass can be found below given their predominant feature in regional targets. Further information can be found in Annex A which accompanies the report.

- Onshore wind energy: The study proposed a series of scenarios and calculated the implications of these in terms of regional and sub-regional "nominal" wind farms. The approach primarily focused on alternative views of wind scheme spacing and on the effect of designated areas upon deployment. This did not include a landscape character approach; however it was recognised that this should be used in later work.

Assumptions at lower end of range – 90MW (38.7MW$_{DNC}$)	Wind energy schemes will typically come forward within a supportive regional and sub-regional planning context. This is likely to result in close scrutiny of all proposed schemes and also those in close proximity to existing schemes elsewhere within the region. It is assumed that there will be no examples of deployment within designated areas.
Assumptions at higher end of range – 200MW (86MW$_{DNC}$)	Wind energy schemes will typically come forward within a supportive regional and sub-regional planning context. There will be scrutiny of all schemes and any cumulative issues but with less restriction. There will probably be some isolated examples of deployment within designated areas but these will remain tightly controlled and of small scale.

- Energy from biomass (forest residues and energy crops): Assumptions regarding the technical potential for wood resources and the growth of energy crops included; transport distance of 40km, schemes (between 5 and 40MW) that are economically deployable, 5000 oven dry tonnes/year of wood to fuel a plant of 1MW, and wood resource from outside the North West is likely to be significant. Two scenarios were assessed based on practical potential of coppice: Scenario 1 – little or no new coppice appears within the regions by 2010, and Scenario 2 – significant amounts of new coppice appear within the region by 2010.

- Energy from waste (landfill gas and MSW): Estimates of landfill gas resources are based initially on remaining NFFO schemes within the region that are as yet non-operational, but with the possibility that further landfill sites may still emerge within a region with a large waste volume arising. A review of waste authorities' plans was carried out across the region to estimate the potential for combustion schemes.

Recommendations/targets

In order to determine the target, a combination of the information provided with the report (predominantly in **Annex A**) has been inserted into a number of scenarios which illustrate alternative ways in which renewable energy might appear within the region. Five scenarios were used in total, two scenarios represent low and medium deployment of all technologies and a further three represent high rates of deployment for wind, biomass and waste.

The regional assessment of renewable energy resources implied a target of between **180 and 474MW$_{dnc}$** (or **1062 – 2977GWh/yr**) of capacity by 2010.

F1.2.3 Advancing Sustainable Energy in the North West: Mapping the way forward to 2020, 2004

Overview

In early 2004, ERM and FES were commissioned by the North West Regional Assembly (NWRA) to build upon the GONW 2001 Report, revising where appropriate the information on which it is based, developing scenarios and targets, and presenting recommendations to cover the period from 2010 to 2020.

Against the backdrop of EU legislation and the UK renewables obligation, the North West is committed to ensuring that by 2010 at least 10% of electricity supplied is drawn from renewables. This target, together with the additional target of 15% by 2015, has become the key 'driver' of renewable energy policy and support in the North West.

Methodology

Future scenarios of renewable energy deployment to 2010 and 2020 were developed on the basis of an agreed list of identified projects in the North West. This list of projects has been drawn up by ERM with assistance from FES and RNW and is given in full in Annex A. Projects are placed in different categories:

- operational - currently generating electricity to the national grid
- construction - granted planning permission and currently under construction
- pre-construction - granted planning permission and awaiting construction
- application - currently in planning application, including appeal
- pre-application - identified project, not in planning yet

For 2020 targets, scenarios have been provided to offer a broad framework for looking into the future. The proposed scenarios out to 2020 are described below.

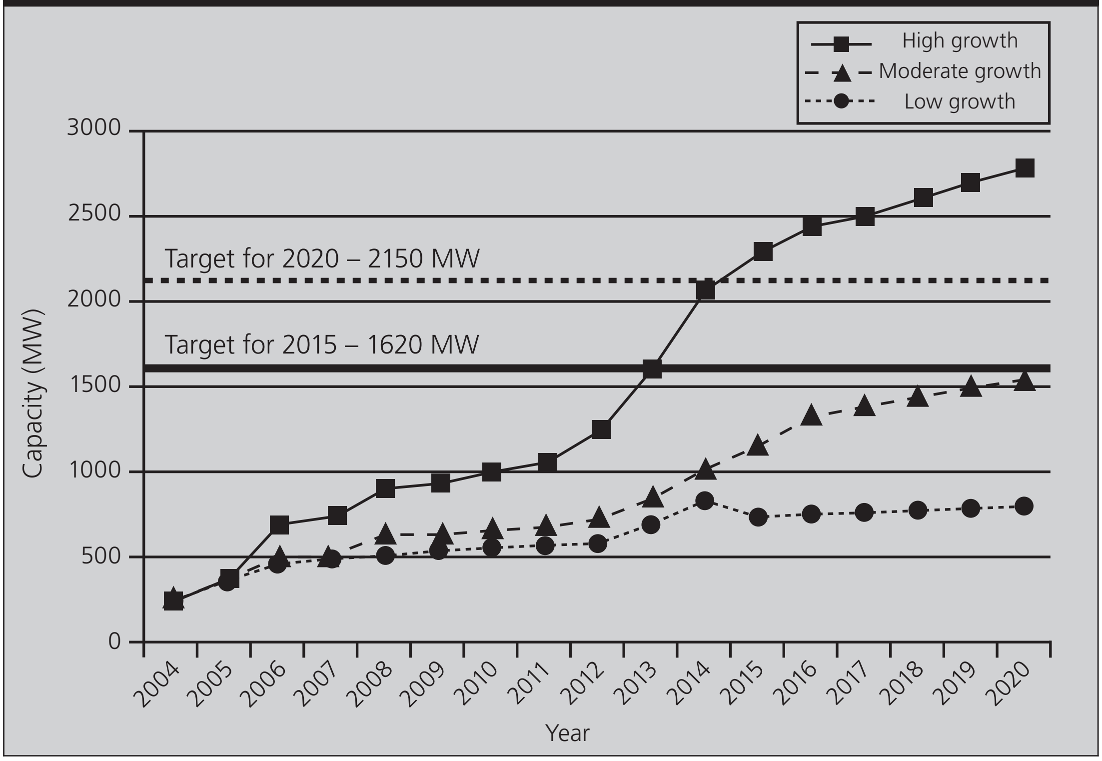
High Deployment: This scenario represents a continuation and acceleration of the trends underlying the North West's regional 2010 target, which it is assumed, has been achieved on time. By 2020, this scenario would result in around 41-43% of the region's electricity capacity by installed capacity and 16-18% by annual electricity output being available from renewable energy sources.

Moderate Deployment: This scenario represents a significant extension to the region's 2010 target. It is assumed, however, that the period until 2010 still sees only slow growth in renewables deployment. After that date, we assume that the period from 2010 to 2020 sees a much faster rate of deployment as the gravity of issues such as greenhouse gas emissions and energy security begin to become apparent on a much wider basis. In addition, there is a clear differentiation of support for individual technologies, which mirrors the identification of strategic priorities at regional and local levels.

Low Deployment: This represents a greatly delayed implementation of the North West's 2010 target, by 2020 instead of the current target date of 2010. As such it assumes that all technologies fail to achieve significant deployment by 2010 itself, and that the pace of deployment remains significantly slower than that implied within the Government's policies.

The figure below shows how each of the 2020 scenarios develops over time.

Cumulative capacity growth to 2020



Recommendation/targets

Of those projects awaiting construction or currently at the planning or application stage, the vast majority are wind. Based on our knowledge of projects in the pipeline, the immediate future – the period to around 2010 – of renewable energy growth (in terms of capacity) will therefore largely be dictated by the success rate of on- and offshore wind farm development. In the 2001 report *From power to prosperity* the renewable energy targets (including energy from waste) for the region were set at 857MW (converted from declared net capacity (DNC)) and 3,631 GWh/year. As 2010 is close this analysis looks at how this target might be achieved by examining those schemes already operational or on the drawing board at various different stages of development. It also remains the target in the light of current problems with the deployment of renewables.

At the time of *From Power to Prosperity* a 2010 regional target was set at the level of 857 MW (3,631 GWh/yr). Nominally it could be anticipated that – for the region to 'do its bit' relative to the national context - a 2020 target based upon this previous analysis would be of the order of twice as large (i.e. ca. 1700MW or 7,200 GWh/yr).

More recent regional experience suggests that the current actual energy outputs occurring for particular renewable energy technologies are lower than long-term or theoretical performance factors. However despite these lower figures, it may be anticipated that long-term energy output or load factors will raise as the significance of maintaining and increasing plant operational performance rises.

Regional renewable energy target ranges for 2015 & 2020

	Installed Capacity (MW)	*Installed Capacity (% of regional installed)*	*Implied Energy Output (GWh/yr)*	*Implied Energy Output (% of regional electricity distributed)*
2015	1,400 - 1,630		4,550 - 5,300	
2020	1,580 - 2,150	24 - 33	5,150 - 7,000	12-16

To achieve this level of regional target implies regional uptake somewhere between the levels shown in the high and moderate development scenarios. However, as outlined above, the high growth scenario makes significant assumptions about an increased enabling framework for renewable energy in the future, acting at a national, regional and local level. Similarly, the moderate scenario assumes that a number of existing barriers to renewable energy are overcome. The 'business as usual' scenario is represented by the low growth scenario, under which barriers are generally not addressed, future deployment of renewable energy is limited, and the regional targets will not be met.

Indicative sub-regional targets have been produced from the report as well as measures to increase awareness and ensure policy development and achieving the targets through consultation and an action plan.

F1.2.4 Renewable Energy Targets for the North West, 2006

Overview

This technical note which provides the technical support for the ERM report *From Power to Prosperity*, determines regional RE electricity targets on the basis of "providing its share" of national targets. This equitable approach would be to set RE targets as a percentage of the electricity actually used within the North

West. In order to do this, it is first necessary to estimate how much electricity the region will be using in the future, projecting forward from today's usage. Three indicative scenarios are used to generate these estimates.

SCENARIO 1Assumes an increase of regional electricity use of 1% per annum, lower than the current rate of increase and a decrease in real termsSCENARIO 2Assumes no increase in regional electricity usage over the 15 year period to 2020SCENARIO 3Assumes a decrease in regional electricity usage of 1% per yearAll scenarios represent a decrease in the recent trend of electricity demand. Scenarios 2 and 3 represent progressively more stringent and sustained efforts to reverse these long-running trends. To estimate the future use of electricity across the three scenarios, it is necessary to know the current regional electricity demand. Data from DTI Energy Trends gives the regional electricity demand in 2003 as 33.449 TWh. Using this as the baseline; it is possible to project forward to future years under each of the three scenarios:

Target scenarios

Target Year	*Scenario*		
	1	2	3
2010	35.92	33.5	31.22
2015	37.75	33.5	29.69
2020	39.67	33.5	28.24

Methodology

In line with current national Government targets and aspirations, it is proposed that regional RE targets of 10%, 15% and 20% of electricity demand should be adopted for 2010, 2015 and 2020 respectively. Assuming that Scenario 1 is the closest approximation to current reality, and in line with likely energy requirements arising from the implementation of RSS (and RES), overall regional targets for RE electricity would be as shown in Table 6.5.

Proposed regional RE Electricity Targets for the North West

Target Year	*RE Electricity Targets (TWh / Year)*
2010	3.59
2015	5.66
2020	7.93

It can be seen that the choice of scenario for future electricity demand is crucial in determining the scale of RE target. In particular the level of target is dependent upon the extent to which the region can successfully achieve sustained reductions in electricity demand. Given this uncertainty, it is proposed that the targets should be subject to bi-annual review, allowing them to be revised periodically through an active process of monitoring and review. More specifically, monitoring should be carried out for:

- RE deployment against proposed targets and
- regional electricity consumption

Assumptions underlying indicative regional and sub-regional technology breakdowns included within the report as described below:

Offshore Wind: These targets are based on projects receiving support from the DTI's Offshore Wind Capital Grants programme. These schemes largely already exist, and a judgment has been made over those that can be expected to emerge in some form over the next 10 years. In particular we assume that:

- by 2010, three of the "Round One" schemes (Burbo, Barrow and the "hybrid" Barrow project) are all in place and operational
- by 2015, one of the two "Round Two" schemes is also operational
- by 2020, a new phase of offshore wind projects has been agreed and that one such "Round 3" scheme with a capacity of 600MW is installed off the North West coast

Onshore Wind: For onshore wind farms, a method has been adopted derived from earlier work estimating the UK's wind resource (*A Review of the UK Onshore Wind Resource, ETSU-R99*). This method used factors such as average mean wind speed, landscape designations and economic factors within a geographic information system (GIS) to determine the possible number of windfarms of certain sizes and characteristics that could be accommodated within certain geographical areas. Professional judgment has also been used to estimate how these figures could be deployed in practice in the light of evolving technology and public acceptability issues. This approach was the basis of the regional and sub-regional figures set out in *From Power to Prosperity*.

Single 'on-site' wind turbines and small-scale wind: Judgments on the possible uptake of single wind turbines are based on the premise that these installations will occur principally at industrial, commercial or 'municipal' sites. These will be where site owners or occupiers stand to gain financially from their installation, or will – in the case of the public sector – be looking to demonstrate their contribution to environmental education or other public sector commitments to green energy production. Larger turbines can be expected to be present primarily in urban or semi-urban locations.

Building-Mounted Wind: A new generation of building-mounted wind technology - suitable for deployment at the domestic scale - is now starting to emerge. It is assumed that uptake of this technology within the domestic sector is primarily dependent upon:

- the development of wider consumer markets for domestic energy products;
- the extent to which the technology is 'endorsed' (or possibly subsidised) by Government, through initiatives such as the DTI's emerging "Micro Generation" programme;
- regulatory requirements, such as the need to achieve a certain proportion of domestic or
- commercial developments' energy requirements from renewable energy sources (as proposed elsewhere within RSS)

Specifically, it is assumed that regional uptake of building-mounted wind is given major impetus after 2010 through its adoption within both the national building regulations and local authorities' planning policy requirements.

Biomass-fuelled CHP / electricity and biomass co-firing: In *From Power to Prosperity* a GIS was used to derive estimates of wood arising within and around the region from conventional forestry operations and the potential growth of fast growing energy crops. These estimates set a context for the possible number of combustion plant that could be deployed across the region using available wood resources. In practice however, the market for electricity from "stand-alone" biomass projects has proved very difficult and the indicative technology targets for this area in *From Power to Prosperity* are very unlikely to be met.

However the market for usage of biomass has instead recently been driven by large-scale biomass co-firing in conventional coal power stations such as Fiddler's Ferry. To derive future regional targets in this area the following is assumed:

- until 2010 – and beyond – the primary market for biomass fuel for power generation will be through co-firing at Fiddler's Ferry. A few small-scale local schemes also appear by that time
- by 2015, the conditions and requirements associated with biomass co-firing mean that this use of biomass ceases within the region. More local biomass-fuelled projects have emerged and their average size is increasing as commercial and operational experience continues to develop
- by 2020, independent biomass-fuelled power plants are beginning to make headway. A large-scale project (40MW) is now situated at the Fiddler's Ferry site, making use of the existing supply and fuel storage infrastructure

Farm biogas: A GIS was used in *From Power to Prosperity* to estimate available digestible resources from slurry. As for wood biomass, this was used to generate estimates of possible numbers of schemes across the region. This approach has been maintained within this analysis, assuming that the numbers of such schemes increases slowly but steadily over the next 15 years.

Small-Scale Hydro Power**:** A primary source (Small-Scale Hydroelectric Generation in the UK, ETSU SSH-4063 Parts 1-3) for understanding small hydro opportunities was used within *From Power to Prosperity* to identify 84 possible small hydro sites across the North West. However experience to date suggests that the regulatory and economic hurdles associated with the development of small hydro projects have been very difficult to overcome. It is therefore assumed that only a small increase will take place in deployment of hydro schemes across the region.

Photovoltaics: Three categories of possible deployment for PV were identified within *From Power to Prosperity*; domestic, commercial and ‘motorway’ schemes. Domestic PV installations are assumed to be adopted at only a slow rate to 2010 due to cost considerations. However in the period from 2010 to 2020, it is assumed that a major proportion of all new-build housing across the region adopts PV as a result of forcing action through the Building Regulations and the widespread adoption of PV within forthcoming local plan documents and associated development briefs for major sites.

Commercial PV installations may be somewhat more favoured where individual companies perceive the value of this demonstration for their ‘green credentials’, but major uptake may again be very dependent upon Building Regulations. Motorway installations represent roadway verge schemes integrated into sound barriers or other structures. We assume that their uptake broadly parallels that of the other PV categories.

Marine technologies: The North West is unlikely to be amongst the forefront of UK locations for the deployment of tidal or wave energy devices, due to more favourable resources in other regions. However over the period to 2020 it is possible that technology, economics and infrastructure issues will improve for these technologies, allowing commercial deployment to take place off the coast of the North West. It is assumed that schemes of this kind appear within the region from 2015 onwards.

Waste-to-energy technologies: Three main categories of waste-to-energy technology are considered here, landfill gas, sewage gas and thermal treatment of municipal / industrial waste. The level of deployment of energy-from-waste technologies will depend primarily upon the success of the region’s approach to adopting and implementing the waste hierarchy, rather than these technologies’ capacity to act as sources of energy supply.

Landfill gas schemes are currently the single largest contributor to the region’s renewable energy supply. It is assumed that energy from landfill gas sites will diminish greatly with time. In particular the assumption is made that by 2020 there will no longer be any energy generation from residual landfill sites within the region, an assumption which is consistent with the operation of the waste hierarchy. Sewage gas schemes are a continuing part of the water and waste treatment infrastructure across the region. It is assumed that no change occurs in current levels of energy generation from sewage gas over time.

Thermal treatment of municipal / industrial waste: Estimates have been made of the future quantities of municipal waste arising across the North West. From these estimates, sub-regional plans are in preparation for waste processing and treatment plants across the region. Most of these plans foresee some future role for thermal treatment of waste.

Recommendations/targets

Tables showing an indicative breakdown of renewable targets for 2010, 2015 and 2020 for the region as a whole, and further tables broken down to the sub-regional level can be found below.

Indicative breakdown of target for 2010

RE Type/Scale	*Existing Schemes*		*Indicative Composition of Target*		
	No of Schemes	Capacity (MW)	No of Schemes	Capacity (MW)	Energy Output (GWh/yr)
Offshore wind farms	0	0	3	297	937
On-shore wind farms			37-51	600	1,183
On-shore wind clusters	16	68.9			
Single large wind turbines			30	45	88.7
Small stand-alone wind turbines	Small	Small	50	1.5	3.0
Building-mounted micro-wind turbines	0	0	1,000	1	1.7
Biomass-fuelled CHP/elecricity schemes	2	11.1	7	31.1	150.5
Biomass co-firing	2	103	2	103	498.5
Anaerobic digestion of farm biogas	0	0	5	10	48.4
Small Hydro	9	2.7	12	3.5	7.1
Solar photovoltaics[5]	V small	V small	1,000	2	1.7
Tidal energy	0	0	0	0	0
Wave energy	0	0	0	0	0
Energy from waste					
Landfill gas	52	113.4	52	113.4	548.8
Sewage gas	16	13.4	16	13.4	64.9
Thermal treatment of Municipal/ industrial waste	1	10.5	1	10.5	50.8
TOTAL	**98**	**323**	**215-229 + PV + Micro Wind**	**1,231.4**	**3,584.1**
Target = 3.59 TWh/yr (3,590 GWh/yr)					

Indicative breakdown of target for 2015

RE Type/Scale	*Existing Schemes*		*Indicative Composition of Target*		
	No of Schemes	Capacity (MW)	No of Schemes	Capacity (MW)	Energy Output (GWh/yr)
Offshore wind farms	0	0	4	747	2,356
On-shore wind farms			44-62	720	1,561
On-shore wind clusters	16	68.9			
Single large wind turbines			50	75	162.6
Small stand-alone wind turbines	Small	Small	75	2.25	4.9
Building-mounted micro-wind turbines	0	0	10,000	10	16.6
Biomass-fuelled CHP/elecricity schemes	2	11.1	12	56.1	271.5
Biomass co-firing	2	103	0	0	0
Anaerobic digestion of farm biogas	0	0	10	20	96.8
Small Hydro	9	2.7	12	3.5	7.1
Solar photovoltaics[6]	V small	V small	25,000	50	52
Tidal energy	0	0	2	30	67
Wave energy	0	0	0	0	0
Energy from waste					
Landfill gas	52	113.4	19	79.1	382.8
Sewage gas	16	13.4	16	13.4	64.9
Thermal treatment of Municipal/ industrial waste	1	10.5	3	125.5	607.4
TOTAL	**98**	**323**	**215-265 + PV + Micro Wind**	**1,931.9**	**5,650.6**

Target = 5.66 TWh/yr (5,660 GWh/yr)

Indicative breakdown of target for 2020

RE Type/Scale	*Existing Schemes*		*Indicative Composition of Target*		
	No of Schemes	Capacity (MW)	No of Schemes	Capacity (MW)	Energy Output (GWh/yr)
Offshore wind farms	0	0	5	1,347	4,248
On-shore wind farms			44-62	720	1,561
On-shore wind clusters	16	68.9			
Single large wind turbines			50	75	162.6
Small stand-alone wind turbines	Small	Small	75	2.25	4.9
Building-mounted micro-wind turbines	0	0	20,000	20	33.3
Biomass-fuelled CHP/elecricity schemes	2	11.1	15	106.1	513.5
Biomass co-firing	2	103	0	0	0
Anaerobic digestion of farm biogas	0	0	15	30	145.2
Small Hydro	9	2.7	12	3.5	7.1
Solar photovoltaics[6]	V small	V small	50,000	100	124.8
Tidal energy	0	0	2	30	67
Wave energy	0	0	1	30	39.4
Energy from waste					
Landfill gas	52	113.4	0	0	0
Sewage gas	16	13.4	16	13.4	64.9
Thermal treatment of Municipal/ industrial waste	1	10.5	6	215.5	1,043
TOTAL	**98**	**323**	**241-259 + PV + Micro Wind**	**2,692.8**	**8,014.7**

Target = 7.93 TWh/yr (7,930 GWh/yr)

Indicative sub-regional breakdown of target for 2010

Indicative Renewable Energy Generation Type/Size	*Region-wide Targets*	*Blackpool, Blackburn & Darwen*	*Cheshire*	*Cumbria*	*Greater Manchester*	*Lancs*	*Mersyside*	*Warrington & Halton*	**TOTAL**
Offshore wind farms	3 (297)	-	-	-	-	-	-	-	**3 (297)**
On-shore wind farms On-shore wind clusters	-	2-3 (37.5)	5-7 (82.5)	13-18 (210)	5-7 (90)	9-13 (157.5)	2 (15)	1 (7.5)	**37-51 (600)**
Single large wind turbines	-	1 (1.5)	3 (4.5)	4 (9)	8 (12)	6 (9)	6 (9)	2 (3)	**30 (45)**
Small stand-alone wind turbines	-	2 (0.06)	8 (0.24)	10 (0.3)	12 (0.36)	8 (0.24)	8 (0.24)	2 (0.06)	**50 (1.5)**
Building-mounted micro-wind turbines	-	Within Lancs	95 (0.095)	75 (0.075)	370 (0.37)	205 (0.205)	190 (0.19)	65 (0.065)	**1,000 (1)**
Biomass-fuelled CHP/elecricity schemes	-	0	1 (4)	2 (8)	1 (4)	1 (9)	1 (4)	1 (2.1)	**7 (31.1)**
Biomass co-firing	2 (103)	-	-	-	-	-	-	-	**2 (103)**
Anaerobic digestion of farm biogas	-	0	1 (2)	1 (2)	1 (2)	1 (2)	1 (2)	0	**5 (10)**
Hydro power	-	0	0	8 (2.4)	2 (1)	2 (0.1)	0	0	**12 (3.5)**
Solar photovoltaics[9]	-	Within Lancs	95 (0.19)	75 (0.15)	370 (0.74)	205 (0.41)	190 (0.38)	65 (0.13)	**1,000 (2)**
Tidal energy	0	-	-	-	-	-	-	-	**0**
Wave energy	0	-	-	-	-	-	-	-	**0**
Energy from waste									
Landfill gas	-	1 (0.5)	7 (16.2)	6 (5.4)	13 (23.7)	13 (19.7)	7 (13.5)	5 (34.4)	**52 (113.4)**
Sewage gas	-	0	3 (0.7)	0	5 (8.5)	4 (1.2)	2 (2.0)	2 (1.0)	**16 (13.4)**
Thermal treatment of Municipal/industrial waste	-	Within Lancs	0	0	1 (10.5)	0	0	0	**1 (10.5)**
TOTAL[10]	**5 (400)**	**6-7 (39.6)**	**28-30 (110.4)**	**44-49 (237.3)**	**48-50 (153.2)**	**44-48 (199.4)**	**27 (46.3)**	**13 (48.2)**	**21-229 (1,231.4)**

Indicative sub-regional breakdown of target for 2015

Indicative Renewable Energy Generation Type/Size	*Region-wide Targets*	*Blackpool, Blackburn & Darwen*	*Cheshire*	*Cumbria*	*Greater Manchester*	*Lancs*	*Mersyside*	*Warrington & Halton*	**TOTAL**
Offshore wind farms	4 (747)	-	-	-	-	-	-	-	**4 (747)**
On-shore wind farms On-shore wind clusters	-	2-3 (37.5)	7-10 (120)	15-21 (247.5)	6-8 (97.5)	11-17 (195)	2 (15)	1 (7.5)	**44-62 (75)**
Single large wind turbines	-	1 (1.5)	6 (9)	6 (9)	14 (21)	10 (15)	10 (15)	3 (4.5)	**50 (45)**
Small stand-alone wind turbines	-	3 (0.09)	12 (0.36)	15 (0.45)	18 (0.54)	12 (0.36)	12 (0.36)	3 (0.09)	**75 (2.3)**
Building-mounted micro-wind turbines	-	Within Lancs	950 (0.95)	750 (0.75)	3,700 (3.7)	2,050 (2.05)	1,900 (1.9)	650 (0.65)	**10,000 (10)**
Biomass-fuelled CHP/elecricity schemes	-	0	2 (9)	3 (13)	2 (9)	2 (14)	2 (9)	1 (2.1)	**12 (56.1)**
Biomass co-firing	0	-	-	-	-	-	-	-	**0**
Anaerobic digestion of farm biogas	-	1 (2)	2 (4)	2 (4)	2 (4)	2 (4)	1 (2)	0	**10 (20)**
Hydro power	-	0	0	8 (2.4)	2 (1)	2 (0.1)	0	0	**12 (3.5)**
Solar photovoltaics[11]	-	Within Lancs	2,375 (4.75)	1,875 (3.75)	9,250 (18.5)	5,125 (10.25)	4,750 (9.5)	1,625 (3.25)	**25,000 (50)**
Tidal energy	2 (30)	-	-	-	-	-	-	-	**2 (30)**
Wave energy	0	-	-	-	-	-	-	-	**0**
Energy from waste									
Landfill gas	-	1 (0.5)	2 (8.7)	3 (3.9)	2 (12)	6 (13.8)	3 (9.7)	2 (30.5)	**19 (79.1)**
Sewage gas	-	0	3 (0.7)	0	5 (8.5)	4 (1.2)	2 (2.0)	2 (1.0)	**16 (13.4)**
Thermal treatment of Municipal/industrial waste[12]	-	Within Lancs	1 (25)	0	2 (100.5)	0	0	0	**3 (125.5)**
TOTAL[13]	**6 (777)**	**8-9 (41.6)**	**35-38 (182.5)**	**52-58 (284.8)**	**53-55 (276.2)**	**49-55 (255.8)**	**32 (64.5)**	**12 (49.6)**	**247-263 (1,931.9)**

Indicative sub-regional breakdown of target for 2020

Indicative Renewable Energy Generation Type/Size	*Region-wide Targets*	*Blackpool, Blackburn & Darwen*	*Cheshire*	*Cumbria*	*Greater Manchester*	*Lancs*	*Mersyside*	*Warrington & Halton*	**TOTAL**
Offshore wind farms	5 (1347)	-	-	-	-	-	-	-	**5 (1347)**
On-shore wind farms On-shore wind clusters	-	2-3 (37.5)	7-10 (120)	15-21 (247.5)	6-8 (97.5)	11-17 (195)	2 (15)	1 (7.5)	**44-62 (720)**
Single large wind turbines	-	1 (1.5)	6 (9)	6 (9)	14 (21)	10 (15)	10 (15)	3 (4.5)	**50 (75)**
Small stand-alone wind turbines	-	3 (0.09)	12 (0.36)	15 (0.45)	18 (0.54)	12 (0.36)	12 (0.36)	3 (0.09)	**75 (2.3)**
Building-mounted micro-wind turbines	-	Within Lancs	1,900 (1.9)	1,500 (1.5)	7,400 (7.4)	4,100 (4.1)	3,800 (3.8)	1,300 (1.3)	**20,000 (20)**
Biomass-fuelled CHP/elecricity schemes	-	0	2 (9)	4 (18)	2 (9)	3 (19)	2 (9)	2 (42.1)	**15 (106.1)**
Biomass co-firing	0	-	-	-	-	-	-	-	**0**
Anaerobic digestion of farm biogas	-	1 (2)	2 (4)	3 (6)	3 (6)	4 (9)	2 (4)	0	**15 (30)**
Hydro power	-	0	0	8 (2.4)	2 (1)	2 (0.1)	0	0	**12 (3.5)**
Solar photovoltaics[11]	-	Within Lancs	4,700 (9.5)	3,750 (7.5)	18,500 (37)	10,250 (20.5)	9,500 (19)	3,250 (6.5)	**50,000 (100)**
Tidal energy	2 (30)	-	-	-	-	-	-	-	**2 (30)**
Wave energy	1 (30)	-	-	-	-	-	-	-	**1 (30)**
Energy from waste									
Landfill gas	-	0	0	0	0	0	0	0	**0**
Sewage gas	-	0	3 (0.7)	0	5 (8.5)	4 (1.2)	2 (2.0)	2 (1.0)	**16 (13.4)**
Thermal treatment of Municipal/industrial waste[15]	-	Within Lancs	1 (25)	0	2 (100.5)	1 (40)	1 (40)	1 (10)	**6 (215.5)**
TOTAL[16]	**8 (1407)**	**7-8 (41.1)**	**33-36 (179.5)**	**51-57 (292.4)**	**52-54 (288.4)**	**47-53 (303.3)**	**31 (108.25)**	**12 (73)**	**241-259 (2,692.8)**

The approaches are based largely upon those set out within the background reports to *From Power to Prosperity* (in particular the Annex to the Task 2 report) and the more recent report for the NWRA, *Advancing Sustainable Energy in the North West – Mapping the Way Forward to 2020*.

F1.3 Monitoring activity

Primary data used by 4NW to monitor renewable energy progress against targets comes from BERR Energy Trends, which provides information on installations by location and technology type.

F1.4 Further work

A partial review of the North West plan is currently being undertaken, focusing on a limited number of discrete technical issues and addressing strategic gaps in RSS policy relating to gypsies and travellers, travelling show people and car parking. 4 NW is now in the process of creating North West regional Strategy 2010, which is currently undergoing a 12 week consultation on the principles and issues paper. Some evidence base scoping work is currently being undertaken until work commences on the renewable energy section of RS2010.

Appendix G
South East

G1.1 RSS renewable energy policies

G1.1.1 Introduction

The Secretary of State published proposed changes to the draft regional spatial strategy on 17 July 2008. Consultation on the changes ended on 24 October 2008. The Secretary of State is now considering all responses and the Government Office for the South East is expected to publish the final version of the South East plan in spring 2009. The examination in public of the draft South East plan did not however consider in any great detail topics for which the partial alterations to RPG9 had recently adopted, which included Renewable Energy and Energy Efficiency. Those polices on Renewable Energy and Energy Efficiency proposed in the final version of the South East plan do not therefore differ significantly to those set out in *Harnessing the Elements - Proposed Alterations to Regional Planning Guidance, South East – Energy Efficiency and Renewable Energy* which were published in 2003.

G1.1.2 Primary renewable energy policies

Chapter 9: Natural Resource Management

The region’s key environmental challenges

Energy:

Issue: Reducing greenhouse gas emissions and other pollutants, improving security and diversity of supply.

Response:

- reduce energy demand through efficiency gains
- adopt interim regional targets
- deploy renewable energy schemes
- incorporate renewable energy into new development
- to maintain, supply, develop conventional energy generating schemes

Section 11: Energy efficiency and renewable energy

Careful use and creation of energy supplies is a key challenge for the region. Policies to engender more efficient use of energy in new development have already been included in Chapter 5 (Cross Cutting Polices), and in particular policy CC2. A more detailed policy on energy efficiency and renewable energy in new development is also set out below. In additional, an effective regional spatial strategy can also play a wider co-ordinating role in securing safer, cleaner and more renewable forms of energy supply for future generations, including combined heat and power. The remainder of this chapter therefore provides further policy, guidance and targets for renewable energy deployment. Their effective implementation is imperative if we are to combat climate change, reduce fuel poverty and deliver a more diverse and secure energy supply through reducing reliance on traditional forms of power generation.

The principal national targets of relevance are:

- to meet 10% of UK electricity generation from renewable sources by 2010. The UK will also contribute to a binding EU target of 20% of energy consumption to come from renewable sources by 2020. Consultation is currently underway on proposals for additional measures to generate 15% of electricity from renewable sources by 2020

- to increase installed capacity of combined heat and power (CHP) generation to 10,000 MW by 2010

- to reduce domestic energy consumption by 30% by 2010

- to ensure that all new homes are built to zero carbon standards by 2016 carbon homes

- to eradicate fuel poverty among vulnerable households across the UK by 2016-18 capital grants and tax breaks for energy efficiency improvements and CHP

- provision of energy efficiency advice to households and business minimum energy efficiency standards set by the Building Regulations (which are being progressively tightened in 2010, 2013 and 2016)

- the renewables obligation, which requires all licensed electricity suppliers to supply part of their electricity from eligible renewable energy sources increasing from 3% in 2002-2003 to 15.4% in 2015-16

- the climate change levy, which is charged on all energy supplied to industry and commerce, agriculture and public administration and services

A significant amount of technical work underpins the policies and targets for renewable energy set out in this plan. Regional assessments of renewable energy potential have been made, based upon the capacity, opportunities and constraints of the region to accommodate renewable energy.

Although the primary purpose of the policies set out in this plan is to promote renewable energy and energy efficiency through new development it should also be recognized that there remains scope to encourage further prudent use of energy (for example by using excess heat from electricity generation and industrial processes). In addition there are opportunities associated with the development of renewables in other policy areas, such as rural development (particularly biomass), transport (use of biofuels), economic development (opportunities for new markets, industries and employment) and improving the quality of built environment and urban renaissance (energy efficiency as part of high quality design).

Policies CC3 and CC4 (Chapter 5) set out cross cutting policies on resource use and sustainable design and construction. These two policies, together with policy NRM11 are vital tools in preparing the region for the effects of climate change and the need to reduce the consumption of resources. Policy NRM11 requires local authorities to set ambitious and deliverable targets for the use of decentralised and renewable or low-carbon energy to supply new development. In drawing up and testing local targets and associated thresholds local authorities may wish to consult the technical work developed alongside this RSS.

Local targets should be set out in development plan documents. Supplementary planning documents (SPDs) (including design briefs) may be used to help implement and support adopted policies in DPDs.

As well as encouraging the use of efficient design and layout and renewable energy technology in new development RSS can encourage the use of combined heat and power (CHP) and district heating in new buildings. For the purposes of this guidance district heating should be interpreted as including cooling, and that the term ‘cooling’ includes absorption cooling.

POLICY NRM11: Development Design For Energy Efficiency And Renewable Energy

Local authorities should:

i) promote and secure greater use of decentralised and renewable or low-carbon energy in new development, including through setting ambitious but viable proportions of the energy supply for new development to be required to come from such sources. In advance of local targets being set in development plan documents, new developments of more than 10 dwellings or 1000m2 of non-residential floor space should secure at least 10% of their energy from decentralised and renewable or low-carbon sources unless, having regard to the type of development involved and its design, this is not feasible or viable

ii) use design briefs and/or supplementary planning documents guidance to promote development design for energy efficiency, low carbon and renewable energy

iii) work towards incorporation of renewable energy sources including, in particular, passive solar design, solar water heating, photovoltaics, ground source heat pumps and in larger scale development, wind and biomass generated energy

iv) actively promote energy efficiency and use of renewable and low carbon energy sources where opportunities arise by virtue of the scale of new development including regional growth areas, growth points and eco-towns

Local authorities and other public bodies, as property owners and managers, should seek to achieve high levels of energy efficiency when refurbishing their existing stock.

Combined heat and power

The Government has set a target for the installation of 10,000 MW of combined heat and power (CHP) generation by 2010. CHP and district heating systems use excess heat from electricity generation (including from renewable fuels) or industry to heat or cool buildings in the locality. Traditional CHP is highly fuel efficient (70- 90% compared to 30-50% for conventional heating and electricity generation) and can result in savings in energy use and expenditure. Mini-CHP is applicable at a street scale or for large buildings, and micro-CHP is a replacement for conventional domestic boilers. This uses normally wasted heat to generate electricity. Every 1,000 MW of CHP capacity decreases carbon emissions in the range 0.48 – 0.95 million tonnes a year. CHP plants can be powered by a range of fuels and can vary in size.

CHP deployment will be most effective where the generation plant is relatively close to the users of the heat, where this includes a mix of uses to even out the pattern of demand for electricity and heat through the day and where the density and layout of development reduces costs of installation of the necessary infrastructure and distribution of heat.

There is scope, therefore, to encourage provision of CHP (preferably certified as 'good quality' under the CHP quality assurance scheme) in association with new and existing developments and, in particular, large scale regeneration or mixed use schemes. It may also have the potential for use in remote rural areas that do not have access to mains gas supplies

POLICY NRM12: Combined Heat and Power

Local development documents and other policies should encourage the integration of combined heat and power (CHP), including mini and micro–CHP, in all developments and district heating infrastructure in large scale developments in mixed use. The use of biomass fuel should be investigated and promoted where possible. Local authorities using their wider powers should promote awareness of the benefits of mini and micro-CHP in the existing build stock.

Renewable energy

Most renewable energy developments themselves will require planning permission as they will be below the 50 MW threshold, above which consent is required from the Department of Trade and Industry (DTI) under Section 36 of the Electricity Act 1989.

To date, the South East has experienced a very low level of renewable energy development. This situation is likely to change. The introduction of measures such as the renewables obligation and the climate change levy are providing strong financial stimulus for the development of markets for renewable energy. Capital grants also encourage the development of a range of renewable energy resources and technologies, particularly biomass, offshore wind and photovoltaics. In addition, it can be expected that the UK will continue to face increasingly demanding carbon reduction targets which will be met in part through improving efficiency and an increasing contribution to energy supplied from renewables.

The assessments of renewable energy potential in the region indicate what is possible and could be delivered. However, technological, planning and commercial considerations will guarantee that the actual pattern of deployment will vary.

Local development frameworks and other strategies should reflect this potential and provide a framework for renewable energy development, anticipating the likely range and scale of developments which may come forward over the short, medium and longer terms and encouraging appropriate development.

Regional potential and targets

Regional targets, reflecting the assessment of potential for renewable energy, should be pursued to ensure that the region contributes towards the UK targets for renewable energy.

Although only illustrative of what is possible, the targets identify the potential mixture and relative scale of different resources that have the best prospects of coming forward and providing synergies with other policy areas.

The potential for generation of electricity from renewable energy sources is presented in the targets in Policy EN3 as installed capacity in megawatts (MW) and as a percentage of total capacity. The percentages are based on installed electricity generation capacity in 2001, with an assumption that any growth in demand or consumption of electricity is met by additional generation capacity in the region from renewables only or by imports to the region, and no increase in conventional generation capacity in the region. Improvements in efficiency will help to reduce the growth in demand and consumption.

It is estimated that by 2026, if the target is met, renewable sources would provide enough electricity for one million homes. This would result in an annual saving of almost two and a half million tonnes of carbon dioxide through displacing generation from conventional fossil fuel sources. The use of renewably generated heat will result in even greater savings. Almost 16% of electricity output could then be generated from renewable sources by 2026. It should be noted that this measure of output will be different to figures for installed capacity due to some fluctuations in inputs (for example, varying wind speeds).

The targets relate only to electricity generation, reflecting the national targets. However, heat generation (from biomass, solar and geothermal/ground source) and use, and the development and use of liquid biofuels in transport, although not quantified in the targets, will also be critical in offsetting fossil fuel energy generation and must be encouraged. Heat generation and use is also often the most efficient and cost-effective means of using renewable energy.

The assessments of renewable energy potential identify offshore wind, onshore wind, and biomass as presenting the greatest opportunities for the generation of electricity and heat over the short to medium terms. In the longer term (between 2016 and 2026), solar generated electricity (photovoltaics), wave and tidal stream energy are identified as having increasing potential.

With the proviso that the waste hierarchy will be applied, the targets include energy derived from biomass waste and from thermal treatment and anaerobic digestion. Biomass waste includes discarded woody waste, including waste from gardens and parks, paper and card, kitchen and food wastes and textiles. Non-waste biomass includes wood, agricultural and forestry residues and energy crops. The assessment of potentially available biomass waste has taken account of the priority afforded to recycling and composting in national and regional waste management policy, including in section 6 of this plan. Therefore it is expected that the targets will be largely met and exceeded through the use of non-waste resources.

Waste management decisions will be taken on the basis of waste policy and need to consider the waste hierarchy (prioritising reduction, re-use and recycling) and the management technique representing the best practicable environmental option. Waste management decisions should not be driven by the renewable energy targets but can contribute towards their delivery.

Landfill gas also contributes to the achievement of the Renewable Energy target although energy from this technology may reduce in the long-term as a result of waste policy.

POLICY NRM13: Regional Renewable Energy Targets

The following minimum regional targets for electricity generation from renewable sources should be achieved by the development and use of all appropriate resources and technologies:

Year/ Timescale	*Installed Capacity (MW)*	*(%) Electricity Generation Capacity*
2010	620	5.5
2016	895	8.0
2020	1,130	10.0
2026	1,750	16.0

The renewable energy resources with the greatest potential for electricity generation are onshore and offshore wind, biomass, and solar. The renewable energy resources with the greatest potential for heat generation are solar and biomass.

Spatial implications – sub-regional targets

Sub-regional targets provide an indication of the relative potential for development of different resources at sub-regional level. These indicate that the distribution of resources and potential for development is reasonably even throughout the region, with significant opportunities for the deployment of all of the major resources – wind, biomass and solar – in all parts of the region.

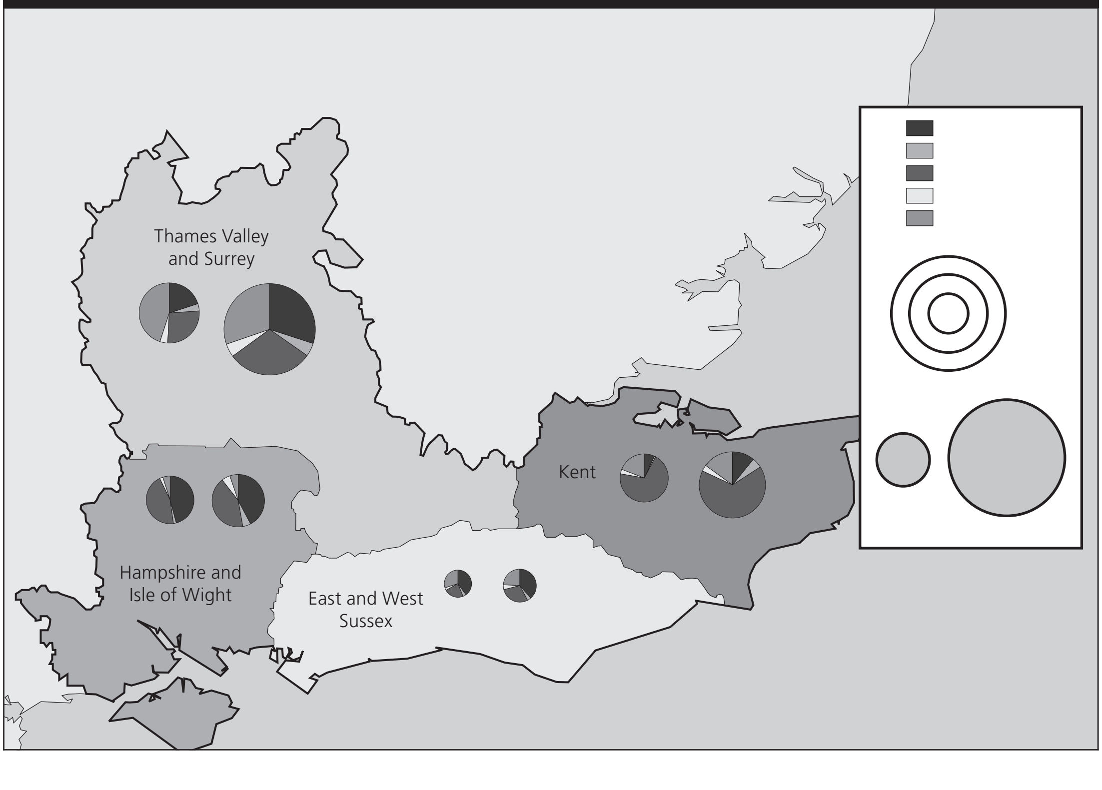
The clear implication is, therefore, that there is potential for the development of all major resources and technologies (apart from those requiring coastal or offshore locations) throughout the region and that all local authorities should include policies in their development plans to contribute to the regional targets through supporting the development of all renewable energy resources.

Overall, Kent, Hampshire and the Isle of Wight, and the Thames Valley and Surrey appear to have the greatest potential for onshore wind development and for the installation of photovoltaics reflecting the likely rate of new development. The Thames Valley and Surrey appear to have the greatest potential for biomass fuelled electricity generation, reflecting the existing woodland resource and the potential for coppice in the area and in adjoining counties and regions.

Unlike other resources that may only be exploited where they occur, such as wind, biomass fuel can be transported some distance and so the location of electricity and/or CHP plants is more flexible than other resources and difficult to specify.

The potential and targets for each sub-region are illustrated in Map EN1.These are based on the broad regional assessments of resource availability.

Map EN1 **Indicative Sub-regional Land-Based and Offshore Potential, 2010-2016**



More detailed local consultation and assessments of potential should be undertaken to refine these indicative targets and define more specific local targets, as is being undertaken, for example, by the Isle of Wight Council. This should involve identification of the technical availability as well as the practicability of development of the full range of renewable energy technologies, the opportunities, and constraints to their development.

Offshore wind, tidal stream and wave power have not been included in the sub-regional targets as development will be outside normal local authority planning jurisdiction. For offshore wind, the consenting and leasing process is managed by the Crown Estate and DTI. This involves the identification of strategic areas for development and strategic environmental assessment. Local authorities will, however, be consultees in the process. The Thames Estuary is one of the three strategic areas in England identified for offshore wind development in the short term as future developments will be expected in this part of the region. Onshore infrastructure, such as substations, may require planning permission. The assumed contribution to the regional targets from offshore wind/marine technologies is 200MW at 2010 and 300MW at 2016.

Sub-regional champions have been nominated to take forward work on compiling more detailed local assessments in each of the sub-regions. It is expected that the results of this work will allow a more detailed geographical breakdown of targets and relative potential of different renewable energy resources. Delivery will be monitored through See-Stats (www.see-stats.org).

POLICY NRM14: Sub-Regional Targets

Local Development Documents should include policies, and developing proposals as far as practicable should seek to contribute to the achievement of the following regional and indicative sub-regional targets for land-based renewable energy (see Map EN1):

Sub-region	*2010 Target (MW)*	*2016 Target (MW)*	*Champion*
Thames Valley & Surrey	140	209	TV Energy
East Sussex & West Sussex	57	68	ECSC
Hampshire & Isle of Wight	115	122	Hampshire CC & Isle of Wight Council
Kent	111	154	Kent Energy Centre

Local authorities should collaborate and engage with communities, the renewable energy industry and other stakeholders on a sub-regional basis to assist in the achievement of the targets through:

i. Undertaking more detailed assessments of local potential

ii. Encouraging small-scale community-based schemes

iii. Encouraging development of local supply chains, especially for biomass

iv. Raising awareness, ownership and understanding of renewable energy

Planning for renewable energy resources

Given the distribution of renewable resources and potential across the region, it is expected that renewable energy developments of all types will also come forward throughout the region. The region's potential will most likely be realised through a mixture of developments of different types and scales, and integration of technologies into buildings. This could translate into a total of around 140

District councils and unitary authorities will be the planning authorities for the majority of Redrafted to reduce length. Land-based renewable energy schemes. Local development documents, together with supplementary planning documents ,should reflect the availability of different resources and include guidance on the circumstances in which renewable energy developments will be acceptable in principle and be most likely to be permitted, taking into account the need to adapt to changing technologies.

Development of renewable energy infrastructure, particularly wind turbines, should be located and designed so as to avoid conflict with landscape and wildlife conservation, as set out in PPS7 (*Sustainable Development in Rural Areas*) and PPG9 (*Nature Conservation*).The scale and number of developments forecast in the assessments indicates that this should be achievable. Civil aviation and military requirements may also constrain wind development in certain areas.

Wind energy may only be exploited where wind speed is sufficiently high. An average wind speed of 6.5 metres per second (14.5 mph) has been generally regarded as the cut-off point for commercially viable developments although development at lower wind speeds (6 m/s) is likely to become more feasible with technological advances and price support provided by the renewables obligation.

Many of the areas with the highest wind speeds are on higher ground, within sensitive and protected countryside, including areas of outstanding natural beauty (AONBs) and the national park in the New Forest and the proposed South Downs national park. However, it is also clear that there are large parts of the region where there are no nationally important landscape or wildlife designations and wind speed is relatively high. It is expected that all local authorities in the region will accommodate at least one wind energy development over the next two decades.

Priority should be given to the development of renewable energy schemes, particularly larger scale ones, in less sensitive areas including previously developed and industrial land and areas where there is already intrusive development or infrastructure, for example major transport corridors. This could help to reduce the potential for conflict and delay in determining applications on visual impact and amenity grounds.

However, wind and other renewable energy development should not be precluded in AONBs and national parks as there will be locations where small scale construction, e.g. a wind development of between one and four turbines not generating more than 5MW, can be accommodated where conflict with statutory landscape protection purposes set out in PPS7 can be avoided or minimised through careful siting and design, including reducing the cumulative impact of a number of individual schemes.

The application of landscape character assessment, drawing on advice from the Countryside Agency, may help in identifying and developing guidance on location, scale and design of developments, particularly in areas of sensitive landscape. Renewable energy developments should not necessarily conflict with the objectives of Green Belt.

For biomass, issues to consider include the transportation of biomass fuel to the plant, the scale and design of buildings and the feasibility of CHP. Operation of such plants, including monitoring and control of emissions, will be regulated by the Environment Agency to strict standards. Co-firing of conventional fossil fuel plants with biomass is likely to contribute to the achievement of the targets, at least in the short term, and should help create a market for, and stimulate, further development of biomass fuels.

Use of biomass fuel sourced close to the plant should be encouraged to maximise benefits in terms of carbon savings, fostering rural diversification and reduced transport distances. Planting of energy crops has the potential to change landscape character and affect biodiversity positively or negatively, depending on location. This is outside planning control but the source of fuel, and location of plant in relation to this (its proximity) should be a consideration in determining proposals.

Potential adverse impacts of all developments on the natural and historic environment, including on wildlife, can often be avoided or mitigated through careful site selection, layout and design. This should be informed by early consultation between developers, local authorities, agencies and communities. In addition, liaison with the electricity supply and distribution companies will be essential to ensure that connections to the electricity distribution network are available and technical constraints are overcome.

Community-based and owned projects, in which communities develop and operate projects and in which economic benefits are retained within a locality, will be important in improving understanding and acceptance, and enabling a steady build up of renewables in the region. In particular, such projects can demonstrate the wider benefits that may result from renewable energy projects, including employment creation and diversification and landscape management, and may be appropriate in more sensitive areas of countryside. The community renewables initiative specifically promotes community-based schemes.

POLICY NRM15: Location of Renewable Energy Development

Local development frameworks should encourage the development of renewable energy in order to achieve the regional and sub-regional targets. Renewable energy development, particularly wind and biomass, should be located and designed to minimise adverse impacts on landscape, wildlife and amenity. Outside urban areas, priority should be given to development in less sensitive parts of countryside and coast, including on previously developed land and in major transport areas. The location and design of all renewable energy proposals should be informed by landscape character assessment where available. Within areas of protected and sensitive landscapes, including AONBs or national parks, development should generally be of a small scale or community based. Proposals within or close to the boundaries of designated areas should demonstrate that development will not undermine the objectives that underpin the purposes of designation

Development criteria

All proposals should be considered on their individual merits with regard to scale, location, technology type and cumulative impact. Identification of criteria may aid decision-making when assessing proposals coming forward.

However, it is essential that such criteria are phrased in a positive way and are seen as supporting other policies that generally encourage renewable energy development. The provisions and criteria of other plan policies, for example for protection of biodiversity, landscape and amenity will apply to all developments and should be considered in addition to those set out below. In addition, these issues will be part of environmental assessments undertaken for such developments.

POLICY NRM16: Development Criteria

Local authorities through their local development frameworks and decisions should support in principle the development of renewable energy. Local development documents should include criteria-based policies that, in addition to general criteria applicable to all development, should consider the following issues:

ii. the contribution the development will make towards achieving national, regional and sub-regional renewable energy targets and carbon dioxide savings

iii. the potential to integrate the proposal with existing or new development

iv. the potential benefits to host communities and opportunities for environmental enhancement

v. the proximity of biomass combustion plant to fuel source and the adequacy of local transport networks

vi. Availability of a suitable connection to the electricity transmission and distribution network.

G1.1.3 Secondary renewable energy policies

Chapter 4: Spatial Strategy

Supporting and Protecting Our Rural Areas, Section B, Box B1

Key Principles for rural policy development

iv: Sustainable natural resources where they are used more prudently with more thought given to alternative energy resources, and the most valuable are protected and conserved.

Chapter 5: Cross Cutting Policies

POLICY CC2: Climate Change

Measures to mitigate and adapt to the current and forecast effects of climate change will be implemented through application of local planning policy and other mechanisms. Behavioural change will be essential in implementing this policy and the measures identified.

In addition, and in respect of carbon dioxide emissions, regional and local authorities, agencies and others shall include policies and proposals in their plans, strategies and investment programmes to help reduce the region's carbon dioxide emissions by at least 20% below 1990 levels by 2010 and by at least 25% below 1990 levels by 2015. A target for 2026 will be developed and incorporated in the first review of the plan.

Adaptation to risks and opportunities will be achieved through:

i) Guiding strategic development to locations offering greater protection from impacts such as flooding, erosion, storms, water shortages and subsidence

ii) Ensuring new and existing building stock is more resilient to climate change impacts

iii) Incorporating sustainable drainage measures and high standards of water efficiency in new and existing building stock

iv) Increasing flood storage capacity and developing sustainable new water resources

v) Ensuring that opportunities and options for sustainable flood management and migration of habitats and species are not foreclosed

Mitigation, through reducing greenhouse gas emissions, will primarily be addressed through greater resource efficiency including:

i) Improving the energy and carbon efficiency performance of new and existing buildings and influencing behaviour of occupants

ii) Reducing the need to travel and ensuring good accessibility to public and other sustainable modes of transport

iii) Promoting land use that acts as carbon sinks

iv) Encouraging development and use of renewable energy

v) Reducing the amount of biodegradable waste land-filled

vi) Availability of a suitable connection to the electricity transmission and distribution network.

In recent years, the evidence that significant climate change is occurring on a global scale has become increasingly compelling. These changes will particularly affect England, and research suggests that the South East could be more affected by these changes than other regions. The precise impacts of climate change are not clear, although there will be some opportunities as well as problems. It is, however, already evident that climate change will particularly affect many facets of development and land use. This plan is therefore put forward in this context, and on the basis recognises that challenging measures for mitigation and adaptation relating to climate change will increasingly need to be acted upon over the plan period, and policy CC2 includes a commitment for the spatial development of the region to play its part in pursuing the Government's stated targets for reduction of carbon dioxide emissions. This will not be delivered by this plan in isolation and requires positive planning to implement energy efficiency and renewable measures through waste management, transport and housing initiatives. One key goal will be the achievement of the Government's stated intention that all new homes should be 'zero carbon' by 2016 and all new non-domestic buildings should follow by 2019.

POLICY CC4: Sustainable Design and Construction

The design and construction of all new development buildings, and the redevelopment and

refurbishment of existing building stock will be expected to adopt and incorporate sustainable construction standards and techniques. This will include:

i) consideration of how all aspects of development form can contribute to securing high standards of energy and water efficiency

ii) designing to increase the use of natural lighting, heat and ventilation, and for a proportion of the energy supply of new development to be secured from decentralised and renewable or low-carbon sources

iii) encouraging reduction and increased recycling of construction and demolition waste and procurement of low-impact materials

iv) designing for flexible use and adaptation to reflect changing lifestyles and needs and the principle of 'whole life costing'

Local planning authorities should promote best practice in sustainable construction and national help to achieve the national timetable for reducing carbon emissions from residential and non-residential buildings. There will be situations where it could be appropriate for local planning authorities to anticipate levels of building sustainability in advance of those set out nationally, for identified development area or site-specific opportunities. When proposing any local requirements for sustainable buildings, local planning authorities must be able to demonstrate clearly the local circumstances that warrant and allow this and set them out in development plan documents.

Chapter 9: Natural Resource Management

POLICY NRM7: Woodlands

In the development and implementation of local development documents and other strategies, local authorities and other bodies will support the implementation of the regional forestry and woodland framework, ensuring the value and character of the region's woodland are protected and enhanced. This will be achieved by:

i) protecting ancient woodland from damaging development and land uses

ii) promoting the effective management, and where appropriate, extension and creation of new woodland areas including, in association with areas of major development, where this helps to restore and enhance degraded landscapes, screen noise and pollution, provide recreational opportunities, helps mitigate climate change, and contributes to floodplain management

iii) replacing woodland unavoidably lost through development with new woodland on at least the same scale

iv) promoting and encouraging the economic use of woodlands and wood resources, including wood fuel as a renewable energy source

v) promoting the growth and procurement of sustainable timber products

Chapter 10: Waste and Minerals

Waste reduction

The waste hierarchy requires reduction as the first stage of resource management. The levels of waste to be managed in the other policies in this chapter are based on a significant slowing in the growth rate so that by the end of the period of the plan the amount of waste produced will have largely stabilised. Policy W1 provides the framework for regional partners to work with consumers, industry and all tiers of local government to raise awareness of the need to reduce waste and achieve the minimisation and reduction rates necessary. Monitoring of growth rates will be essential and forecasts will be regularly reviewed. It is important not to make overly optimistic assumptions about reduction as these may diminish the focus on the scale of new waste management infrastructure that needs to be delivered.

Reducing the growth in waste requires measures other than spatial planning, such as fiscal, and a combination of producer responsibility legislation, raised awareness and behavioural changes by both consumers and industry. Successful initiatives rely on changing people's attitudes and behaviour, through education or encouragement. The Government is committed to a number of initiatives to create opportunities for the reduction, re-use, recycling and energy recovery of waste, such as:

- increasing the landfill tax escalator so that the standard rate of tax will increase by £8 per year from 2008 until at least 2010-2011 to give greater financial incentives to businesses to reduce, reuse and recycle waste (from £24 now to £48 in 2010).

- consulting on removing the ban on local authorities introducing household financial incentives for waste reduction and recycling

- introducing enhanced capital allowances for investment involving the use of secondary recovered fuel (SRF) for combined heat and power facilities

To help reduce commercial and industrial waste generation, and thus the cost to industry, through resource efficiency, design, packaging and labelling, a number of local, regional and national networks and initiatives exist where good practice is promoted and exchanged by the private and public sectors. For example Sustainable Business Partnerships, the Envirowise programme, Egeneration and the South East England Development Agency's (SEEDA) sustainable business awards schemes, which now has a waste minimisation category. There is significant scope for SEEDA to extend its role further, for example in promoting innovation in waste minimisation.

The regional assembly, with SERTAB where appropriate, will continue to review and disseminate best practice, raise awareness, encourage changes in practice and inform advocacy of changes required in legislation and support. Compliance with this strategy, the sustainability appraisal process and guidance provided in the revised South East regional sustainability framework applied to waste and local development frameworks, and waste management plans, will ensure that reduction and the resource management approach become key elements in policy formulation and implementation.

POLICY W1: Waste Reduction

The regional assembly, SEEDA, the Environment Agency and other regional partners will work together to reduce growth of all waste to 1% per annum by 2010 and 0.5% per annum by 2020 by:

- encouraging waste reduction in all regional and local strategies
- identifying and disseminating examples of good practice and encouraging local authorities and businesses to implement waste minimisation programmes
- establishing a regional working group to identify opportunities and priorities for waste reduction in relation to supply chains, product design, manufacture, labelling, retailing, procurement, consumption and resource recovery
- developing enhanced regional information and awareness programmes to alter individual and corporate behaviour

Regional self sufficiency

POLICY W3: Regional Self Sufficiency

Waste authorities and waste management companies should provide management capacity equivalent to the amount of waste arising and requiring management within the region's boundaries, plus a declining amount of waste from London. Provision of capacity for rapidly increasing recycling, composting and recovery should be made reflecting the targets and requirements set out in this chapter.

Provision for London's exports will usually be limited to landfill in line with the Landfill Directive targets and, by 2016, new permissions will only provide for residues of waste that have been subject to recycling or other recovery process. Waste planning authorities should provide landfill capacity for the following apportionment of London's exported waste:

	2006–2015		*2016–2025*	
Sub-regions	Apportionment % (2)	Million tonnes	Apportionment % (2)	Million tonnes
Berkshire Unitaries	9.3	1.12	8.6	0.63
Buckinghamshire	17.6	2.12	16.2	1.18
East Sussex, Brighton and Hove	8.8	1.06	8.1	0.59
Hampshire, Portsmouth, Southampton and New Forest National Park	0	0	7.8	0.57
Kent & Medway	13.1	1.58	12.1	0.88
Milton Keynes	10.8	1.30	10.0	0.73
Oxfordshire	18.7	2.26	17.2	1.26
Surrey	11.5	1.39	10.6	0.77
West Sussex	10.2	1.23	9.4	0.69
SE TOTAL	**100**	**12.1 (1)**	**100**	**7.3 (3)**

Provision for recovery and processing capacity for London's waste should only be made where there is a proven need, with demonstrable benefits to the region, including improving the viability of recovery and reprocessing activity within the region, and where this is consistent with the proximity principle in the nearest appropriate location. A net balance in movements of materials for recovery and reprocessing between the region and London should be in place by 2016.

Sub-regional self sufficiency

Sub-regional self-sufficiency will be sought, while accepting that movement of waste between sub-regions will occur and is often necessary to reduce long distance transport. The level of self-sufficiency capable of being achieved will depend principally on:

i. the characteristics of the sub-region e.g. the extent to which there are major settlements close to its boundaries, and opportunities for use of sustainable transport modes

ii. the nature of the waste stream, with greater control being capable of being influenced over municipal solid waste than commercial and industrial and construction and demolition and

iii. the type of facility, with wider catchment areas necessary to justify more specialised reprocessing facilities such as material recovery facilities (MRFs)

Sub regions will generally be based on combinations of waste planning authority areas where management is more effective on a cross boundary basis. Joint working, particularly on Growth Areas and the provision of larger facilities serving cross-border catchments, will be required between Kent and Medway; Hampshire, Portsmouth, Southampton and the New Forest National Park; West Sussex, East Sussex and Brighton and Hove; the unitary authorities of Berkshire; and between Buckinghamshire and Milton Keynes.

POLICY W4: Sub-Regional Self Sufficiency

Waste planning authorities will plan for net self-sufficiency through provision for management capacity equivalent to the amount of waste arising and requiring management within their boundaries. A degree of flexibility should be used in applying the sub-regional self-sufficiency concept. Where appropriate and consistent with policy W3, capacity should also be provided for:

- waste from London
- waste from adjoining sub-regions (waste planning authority area within or adjoining the region)

Waste planning authorities should collaborate in preparation of plans including identifying and making provision for potential flows across the regional and sub-regional boundaries, and identifying possible sites that could be served by sustainable transport modes. Co-operation will be encouraged between county councils and unitary authorities at the sub-regional level, particularly in respect of meeting the needs of the region’s strategic growth areas.

Other recovery and diversion from landfill

Approximately 45% of material currently collected at amenity sites and/or kerbside collections is green or wood waste which has the potential for use as a biomass fuel. Together with other biodegradable materials this qualifies as biomass under the renewables obligation and could play an important role in generating renewable energy. Ensuring that the material is uncontaminated with plastics – as required by the renewables obligation – will depend on separate collection of these materials, or adequate separation at a MRF.

Use as a fuel will help change perception, away from a waste to a resource with value, however the definition needs to be clarified to reduce association with incineration of mixed waste. Policies NRM 13 and 14 contain targets for renewable energy generation. However the strategy is clear that renewable energy targets should not drive waste management decisions, which should be made in the context of the waste hierarchy and assessment of the optimal management solution. The targets also assume that as much biomass waste as practicably possible will be recycled and composted rather than used for energy generation.

Anaerobic digestion of biodegradable waste converts up to 60% of organic matter into biogas which can be burned to generate electricity and/or heat. The residue is inert and may be used as a soil improver or landfill cover, or further treated to improve its qualities as compost. There are a number of advantages over other recovery methods and this could be considered akin to composting in the hierarchy. There are a number of small plants in the region, including some for the treatment of sewage, but potential for much greater use of this technique.

Mechanical-biological treatment (MBT) where recyclables recovered from sorted or mixed waste are used to produce refuse-derived fuel (RDF) or inert residue, is also a technology that can reduce landfill.

However markets for the residues from biological treatment are currently limited. For example suitable rural land for spreading improved digestate is difficult to find due to issues such as water quality, drainage and landscape character. In parallel with further research, improvement and promotion of the technologies there is also need for further work to provide market outlets for residues. This challenge should not be underestimated.

Energy generated from incineration of mixed waste is not eligible under the renewables obligation order. However the biomass fraction of mixed waste that has been processed by an advanced technology (where gas or liquid fuel is produced using gasification or pyrolysis) qualifies under the order and this may provide a stimulus to the development of these technologies.

Incineration of mixed waste with energy recovery represents a proven technology and there are a number of existing and planned plants in the region. It is often opposed locally due to fears about environmental, amenity and health impacts. However, incinerators are increasingly strictly regulated, emission of pollutants has declined, and the health effects of waste management have been the subject of recent research which did not highlight any adverse effects of incinerator emissions.

There are concerns that incinerators are inflexible and stifle other forms of recycling and recovery. Energy recovery, recycling and composting need not be mutually exclusive and contracts can, and should, be formulated to ensure that incineration will not compromise recycling and composting. Energy recovery should always be part of an integrated approach that allows for the highest levels of recycling and recovery practicable. This is a further advantage of the co-location of a mix of facilities.

Advanced thermal technologies, such as pyrolysis and gasification, are often regarded as a more acceptable and efficient means of recovering energy. These are currently not proven on a large scale in the UK. The development and piloting of new and advanced thermal technologies in the region will be supported if these prove to have demonstrated benefits over other technologies. However, it is not prudent to wait for technologies to develop before taking action to increase recovery and diversion of waste from landfill, and these technologies are considered unlikely to make a major contribution to the management of the region's waste management and recovery and diversion targets in the short-term.

POLICY W11: Biomass

Waste collection, planning and disposal authorities should encourage the separation of biomass waste, as defined in the renewables obligation, and consider its use as a fuel in biomass energy plants where this does not discourage recycling and composting.

POLICY W12: Other Recovery And Diversion Technologies

The regional assembly, SEEDA, the Environment Agency and the regional partners will promote and encourage the development and demonstration of anaerobic digestion and advanced recovery technologies that will be expected to make a growing contribution towards the delivery of the regional targets for recovery, diversion from landfill, and renewable energy generation over the period of the plan.

Waste development documents and municipal waste management strategies should only include energy from waste as part of an integrated approach to management. All proposed waste facilities should:

- operate to the highest pollution control standards
- include measures to ensure that appropriate materials are recycled, composted and recovered where this has not been carried out elsewhere.

Proposed thermal facilities should, wherever possible, aim to incorporate combined generation and distribution of heat and power.

G1.2 Renewable energy evidence base

South East renewable energy evidence base documents

Document	*Date*	*Author*	*Client*
Harnessing the Elements Proposed Alterations to Regional Planning Guidance, South East – Energy Efficiency and Renewable Energy	*2003*	*SEERA*	*South East Regional Assembly*
Harnessing the Elements, Supporting Statement	2003	SEERA	South East Regional Assembly
South East Renewable Energy Targets – Consultation Revisions	*2003*	*AEA Technology*	*South East Regional Assembly*
An Assessment of the South East's Renewable Energy Capacity and Potential to 2026	*2002*	*AEA Technology and Savills*	*South East Regional Assembly*
Development of a Renewable Energy Assessment and Targets for the South East	*2001*	*ETSU/ AEA Technology plc and Terence O'Rourke plc*	*Government Office for the South East and Partnership*
South East England Renewable Energy Planning Study	1998	ETSU	DTI
Renewable Energy in the SEEBOARD Area	1995	ETSU	DTI
An Assessment of Renewable Energy in Southern Electric Region	1994	ETSU	DTI

(Italics denotes key evidence base document)

G1.2.1 An Assessment of Renewable Energy in Southern Electric Region, 1994

This report H1.was undertaken as part of a series of DTI-supported projects of the time involving the regional utilities across most of England. It concentrates upon RE electricity-producing technologies (with the exception of offshore wind) but covers only a small part of the South East region (Berkshire, Hampshire, the Isle of Wight, most of Oxfordshire and small parts of Buckinghamshire, Surrey, West Sussex) as well as parts of the South West region. It also includes technical and economic assumptions that – for wind energy in particular – are now somewhat dated. (ETSU for the DTI, Southern Electric).

G1.2.2 Renewable Energy in the SEEBOARD Area, 1995

This report was part of the same series as the Southern Electric report (above) and – likewise – concentrated upon an assessment of electricity-generating technologies. Its' geographical coverage is most of the "remainder" of the South East (Kent, East Sussex, most of Surrey and half of West Sussex). Its strengths and limitations are similar to those of the Southern study.

G1.2.3 South East England Renewable Energy Planning Study, 1998

This study was intended to complement the SEEBOARD study through the provision of RE resource information designed for planning authorities and officials. Whilst its remit is therefore somewhat closer to that of the current study, its geographical coverage is only equivalent to two of the four sub-regions currently covered by the Government Office of the South East. In common with both of the two studies above, there was no attempt made within this work to undertake wider public consultation on renewable energies.

All three studies were superseded by the *Renewable Energy Assessments and Targets for the South East* (2001), which provided an entirely fresh set of regional assessments.

G1.2.4 Development of a Renewable Energy Assessment and Targets for the South East, 2001

Overview

The aim of this study was to provide a strategic assessment of the potential for generating electricity from renewable energy sources in the region, taking into account the potential economic, technical and environmental constraints to their exploitation.

Informed by this assessment, the consultants attempted to reach a consensus view on possible targets for generating electricity from renewables by 2010 in the South East. Targets were provided for the region as a whole; its four sub-regions (Thames Valley, Hampshire and the Isle of Wight, East and West Sussex with Surrey, and Kent), and for key forms of renewable energy (biomass, energy from waste, solar, hydro and wind). Where appropriate, the study has also attempted to suggest broad locations suitable for the development of renewable energy within the region.

The findings of this study were used to inform the new regional planning guidance (RPG) for the South East and the regional sustainable development framework (RSDF), as well as community interests, policy makers, the energy and development industry.

Research objectives were to:

- establish consensus-led targets for the development of renewable energy for the South East, including, if possible, targets that are broken down by county/unitary area, to aid target setting for structure/unitary plans in regional planning guidance
- map the available resource, and constraints, broken down by category – solar, wind (land and offshore), hydro, biomass, etc
- identify the limitations imposed by planning and other policies
- identify the limitations imposed by the capacity of the electricity distribution network to accommodate new sources of "embedded or distributed generation"
- offer a range of possible scenarios if some of these constraints were to be relaxed;
- inform regional planning guidance and set criteria to help local authorities select suitable sites in their development plans
- make recommendations regarding the establishment of areas where specific types of renewable energy development should generally be resisted or encouraged
- investigate the particular potential for chestnut coppice as a potential renewable energy fuel source

Methodology

Resource assessment - The resource potential for renewables was assessed at the regional and the sub-regional level (Hampshire and the Isle of Wight, Thames Valley, Surrey and East and West Sussex, and Kent. 'Bottom-up' approaches were used to assess the relevant spatial resources using GIS or mapping tools. Where appropriate, the study also identified areas or regions where particular resources would be best placed.

Consultation – ongoing involvement from government agencies, interest groups, relevant industry representatives and communities to refine research findings, recommendations and targets.

Heat – not part of the project remit, but considered to a limited extent, its importance acknowledged and further research recommended.

Resource assessments undertaken for:

- energy from biomass
  - forest residues and energy crops
  - straw
  - poultry litter
  - other (farm livestock manures)
- wind
  - offshore wind
  - onshore wind (three scenarios considered; assumptions set out clearly)
  - wind power for on-site use
  - wind power for off-grid properties
- energy from waste
  - landfill gas
  - municipal solid waste combustion
  - green waste
  - sewage gas
- solar energy potential
  - solar photovoltaics
  - solar water heating
  - passive solar building design
- small scale hydro power potential

- other resources
  - wave energy
  - tidal power
  - geothermal energy

Sub-regional assessments undertaken for:

- Hampshire and Isle of Wight
- Thames Valley
- Surrey and East and West Sussex
- Kent

(Renewable energy capacity assessment and targets provided by technology breakdown for each sub-region)

Other assessments:

- socio-economic assessment
- environmental and planning assessment
- implementation and delivery

Recommendations/ targets

Lower End of Target Range for Deployment (330MW)

- *This represents overall a moderately ambitious deployment. For some technology areas (particularly waste) it continues the current trends within the Region and so could be partly classified as "Business as Usual". For most other technologies (particularly wind, biomass and PV) it represents a major increase from the current minimal regional uptake*
- *In reaching the deployment implied by this target figure, a number of existing technical, economic or infrastructural barriers to some technologies are assumed to be overcome*
- *Relatively few biomass schemes appear, with existing barriers to deployment persisting through the decade. However, hybrid green waste and biomass projects are tested*

- *There is significant growth in grid-connected onshore wind power, in line with moderately supportive planning policies. The number and scale of such installations remains small in comparison with most other regions of the UK*

- *An offshore wind farm is constructed off the SE coast*

- *PV deployment continues to grow, but only at a moderate rate in the absence of economic or other kinds of support incentives*

Upper End of Target Range for Deployment (660MW)

- *This represents a very ambitious level of deployment across the Region, with all of the major technologies contributing very strongly to the overall target.* ***This level of deployment most closely represents the strong majority of views expressed throughout the consultation process***

- *Wind energy, biomass and PV all increase their contributions significantly within this scenario but waste adds little extra to deployment levels*

- *Substantial growth of short rotation coppice resources helps to "unlock" the major barriers to exploitation of the existing woodland resource. More wood combustion schemes appear and the growth in "new" resource helps to improve the economics of smaller scales of deployment*

- *Use of green waste with biomass is seen across the sub-regions*

- *Larger amounts of onshore wind power are deployed. All schemes remain at small scale but there are more of them and a few appear within designated areas*

- *Four offshore wind farms are constructed around the coast of the Region*

- *Deployment of PV expands dramatically in housing, commercial and "motorway" sectors. This expansion is achieved through major economic and infrastructural initiatives (e.g. closer and consistent links between Local Authority building control and planning regimes)*

Summary conclusions: in target terms, the 660 MW of new generation combined with 73MW of existing capacity, plus a modest allowance of electricity off-set by heat producing technologies (17MW) would allow the attainment of **750MW**, or **6.6% of current installed generating capacity for the South East by 2010.** The study also concluded that it would be possible to **achieve 10% (additional 380MW) by 2015.**

Targets for electricity from renewable energy in the South East (GWh/yr)

Renewable Energy Technology	*Thames Valley*	*Hampshire & Isle of Wight*	*Surrey, East and West Sussex*	*Kent*	**TOTAL**
Wood Combustion[1] (existing wood and/or coppice)	112.5 – 225	0 – 187.5	0 – 225	0 – 75	**112.5 – 412.5**
Straw	112.5 – 225	0 – 112.5	0 – 112.5	0 – 112.5	**112.5 – 225**
Chicken Litter	0 – 112.5	0 – 112.5	0	0	**0 – 112.5**
Farm Biogas	0 – 12.75	0 – 12.75	0 – 8.5	0 – 8.5	**0 – 42.5**
Energy from Biomass					**≈225 – 790**
Offshore Wind Farms	0	0 - 160	0 – 160	160 – 320	**160 – 640**
Grid - Connected Onshore Wind Farms	60 – 90	82 - 120	0 – 30	0 –58	**142 – 298**
On-Site Wind Turbines					**4**
Off-Grid Wind Turbines					**0.1 – 0.25**
Wind Energy					**≈306 - 940**
Landfill Gas	199.5	27.8	103.5	91.5	**422.3**
Municipal & Industrial Waste Incineration	225 – 300	311.3	150 – 225	300	**986.3 – 1136.3**
Green Waste	3.8 – 13	0 – 3.8	0 – 9	9 – 19	**13 - 45**
Sewage Gas					**0 – 17**
Energy from Waste					**≈1420 - 1620**
Photovoltaics	0.64 – 3.66	0.34 – 2.48	0.56 – 3.56	0.38 – 2.5	**1.92 – 12.2**
Solar Energy					**≈2 – 12**
Small-Scale Hydro	2.3	0	0	1.4	**3.7**
Hydro Power					**3.7**
TOTAL	**≈716 - 1185**	**≈420 - 1050**	**≈250 - 875**	**≈560 - 990**	**1950 - 3365**

Cumulative electricity generation totals (MW) to 2015

Resource Area	*Existing*	*Upper 2010*	*Further 2015*	*Total*
Biomass	NIL	105	75	180
Wind (off-shore)	NIL	200	200	400
Wind (on-shore)	< 1	122	25	148
Waste	72	216	10	298
Solar	<<0.1	15	25	40
Hydro/Tidal	NIL	1	15	16
Other		18	30	48
Total	**73**	**677**	**380**	**1130**

The annexes provide further information on:

- outlines consultation feedback

- outlines existing renewable energy generation in the region
- outlines total electricity generation in the region
- sets out preliminary renewable energy targets, based on three initial scenarios (MW targets)
- contains some further maps
- lists information sources
- sweet chestnut sub-study for Kent and East Sussex

G1.2.5 An Assessment of the South East's Renewable Energy Capacity and Potential to 2026, 2002

Overview

This assessment provides an amplification of the previous study, *Development of a Renewable Energy Assessment and Targets for the South Eas*t. Further detail was provided in respect of:

- the provision of indicative county-level renewable energy targets for 2010 and 2016, based upon the prognoses of the earlier report
- the projection of regional RE deployment targets to 2026 to assist regional planning guidance, based upon actual and potential policies, trends and other relevant factors over this period
- the provision of good practice planning criteria, to assist local planning authorities and other decision-makers to develop and implement policies appropriate and relevant to the anticipated regional and local targets

In undertaking these analyses the report provides a 'firmer basis on which to develop the region's approach to renewable energy targets', whilst also considering 'a longer-term horizon for framing of short, medium and long-term actions'.

Research objectives were to:

- to define targets for development of renewable energy at structure planning (county) level, initially for 2010 and 2016, having regard to the regional and sub-regional targets set out in the regional capacity assessment
- to define targets at an appropriate geographic scale, for development of renewable energy in the period to 2026

- to review development plan policies regarding renewable energy development and advise on good practice
- To advise on criteria to aid decision making for different renewable energy technologies and resources;
- to consider the potential to realise additional energy efficiency benefits through development of combined heat and power in association with renewable energy development

Methodology

Updates since 2001 assessment:

The report does not consider that *any current uncertainties in biomass or any other RE technology markets should not be viewed as a reason to downplay the contributions that they may make to targets, particularly over the longer-term time horizon*. For this reason the report does not propose that the South East amends the target figures originally set out within the GO-SE report, but instead focuses upon the ways in which deployment opportunities can be seized and the barriers to deployment overcome or minimised.

In line with the approach adopted within the European Directive on electricity from RE sources and the Government's renewables obligation, the report proposes that only the bio-degradable fraction of waste incineration should count towards the RE target. This has the effect of reducing the size of the target in energy output terms.

Increase in the size (installed capacity) of individual offshore wind farms, due to the evolution of wind turbine sizes in advance of installation.

Government encouragement of wider uptake of RE biomass fuels through the inclusion of co-firing of biomass sources within the renewables obligation.

Further initiatives (such as the Countryside Agency's Community Renewables Initiative, the launch of TV Energy within the South East region) seeking to promote and encourage smaller-scale RE projects.

The report also notes that the 2016 data originally provided was not worked through in as much detail as the 2010 calculations. Appropriate updates/ amendments have therefore been undertaken.

A low and high deployment scenario approach is adopted to derive possible levels of deployment to 2026.

Recommendations/ targets

Indicative county level breakdown of RE electricity targets across the South East by 2010

Indicative Renewable Energy Generation Type/Size	Existing Installed Capacity	TOTALS BY 2010									OVERALL TOTAL
		Thames Valley			Hampshire & Isle of Wight		Surrey, East & West Sussex			Kent	
		Oxon	Berks	Bucks	H'shire	IOW	Surrey	W Suss	E Suss	Kent	
Renewable Energy Sources											
Large CHP / Electricity Plants Fuelled by the Combustion of Energy Crops and/or Agricultural & Forestry Biomass (AFB) (15+ MW)	0	Up to 2 (up to 30)	Up to 2 (up to 30)	Up to 2 (up to 30)	Up to 3 (up to 45)	0 (up to 15)	Up to 1 (up to 15)	Up to 1 (up to 15)	Up to 1 (up to 15)	Up to 1	4-5 (75)
Small CHP Plants Fuelled by the Combustion of Energy Crops and/or AFB (5-10 MW)	0	Up to 2 (up to 10)	Up to 2 (up to 10)	Up to 2 (up to 10)	Up to 2 (up to 10)	0 (up to 10)	Up to 2 (up to 5)	Up to 1 (up to 5)	Up to 1 (up to 10)	Up to 2	5 (25)
Anaerobic Digestion Plants Fuelled by Farm Biogas (0.5 MW)	0	1 (0.5)	1 (0.5)	1 (0.5)	2 (1)	1 (0.5)	Up to 1 (up to 0.5)	Up to 1 (up to 0.5)	Up to 1 (up to 0.5)	2 (1)	10 (5)
Offshore Wind Farms (50-75MW ; 20-30 turbines)	0	0	0	0	0	1 (50)	0	Up to 1 (up to 50)	Up to 1 (up to 50)	1-2 (100)	3-4 (200)
Small Wind Clusters (6 MW; 4-10 Turbines)	0	2 (12)	1 (6)	2 (12)	5 (30)	2 (12)	0	0	1 (6)	3 (18)	16 (96)
Single Large Wind Turbines (1.5 MW)	1 (1)	1 (1.5)	2 (3)	1 (1.5)	3 (4.5)	1 (1.5)	1 (1.5)	2 (3)	1 (1.5)	4 (6)	16 (24)
Single Small Wind Turbines/Chargers (0.03 MW)	2 (0.55)	3 (0.09)	4 (0.12)	3 (0.09)	8 (0.24)	2 (0.06)	5 (0.15)	5 (0.15)	5 (0.15)	15 (0.45)	50 (2)
Small-Scale Hydro Power (0.1 MW)	0	1 (0.3)	1 (0.2)	0	0	0	0	0	0	3 (0.3)	5 (0.8)
Domestic PV Installations (1.5-3kW$_p$)		230 (0.6)	295 (0.78)	275 (0.72)	640 (1.69)	60 (0.16)	415 (1.09)	310 (0.81)	325 (0.85)	650 (1.7)	3200 (8.4)
Commercial PV Installations (50kW$_p$)	4 (0.005)	10 (0.5)	20 (1.0)	8 (0.4)	18 (0.9)	2 (0.1)	15 (0.75)	5 (0.25)	5 (0.25)	23 (1.15)	106 (5.3)
Motorway PV Installations (160kW$_p$/km)		2 (0.16)	4 (0.32)	1 (0.08)	3 (0.24)	0	4 (0.32)	2 (0.16)	0	4 (0.32)	20 (1.6)
Renewables Sub-Total	**7 (1.55)**	**8-12[2] (16 –56)**	**9-13[12] (12-44)**	**7-11[12] (15-55)**	**20-25[12] (39-94)**	**7[12] (64)**	**6-10[12] (4-29)**	**7-11[12] (4-75)**	**7-11[12] (9-79)**	**28-33[12] (129-154)**	**109-111[12] (443)**
Waste-to-Energy											
CHP or Electricity Plants Fuelled by Landfill Gas	26 (54)	4 (9.3)	5 (7.5)	8 (25.8)	6 (7)	0	9 (19.3)	5 (11.2)	3 (4.9)	11 (23)	51 (107.9)
CHP or Electricity Plants Fuelled by Municipal or Industrial Solid Wastes	2 (14.2)	1 (10)	2 (42.5)	0	3 (39)	1 (2.5)	1 (20)	0-1 (0-10)	0-1 (0-10)	1 (40)	10 (164)
CHP or Electricity Plants part-Fuelled by Green Waste	0	- (0-1)	- (0-1)	- (0-1)	- (0-1)	0	- (0-2)	- (0-1)	- (0-1)	- (0-1)	Within Biomass (6)
Anaerobic Digestion Plants Fuelled by Sewage Gas (0.5 MW)	7 (4.4)	1 (0.67)	6 (3.1)	1 (0.32)	0	0	1 (0.5)	1 (0.32)	0	1 (0.5)	11 (6.3)
Waste-to-Energy Sub-Total	**35 (72.6)**	**6 (20-21)**	**13 (53-54)**	**9 (26-27)**	**9 (46-47)**	**1 (2.5)**	**11 (40-42)**	**6-7 (12-23)**	**3-4 (5-16)**	**13 (64-65)**	**72 (284)**
Total	**42 (≈74)**	**15[12] (52)**	**24[12] (71)**	**17[12] (55)**	**29[12] (106)**	**8[12] (67)**	**19-20[12] (51-66)**	**14-17[12] (21-96)**	**11-14[12] (14-89)**	**42-43[12] (198)**	**181-183 (727)**

Indicative county level breakdown of RE electricity targets across the South East by 2016

Indicative Renewable Energy Generation Type/Size	Existing Installed Capacity	TOTALS BY 2016: Thames Valley			Hampshire & Isle of Wight		Surrey, East & West Sussex			Kent	OVERALL TOTAL
		Oxon	Berks	Bucks	H'shire	IOW	Surrey	W Suss	E Suss	Kent	
Renewable Energy Sources											
Large CHP / Electricity Plants Fuelled by the Combustion of Energy Crops and/or Agricultural & Forestry Biomass (AFB) (15+ MW)	0	Up to 2 (up to 30)	Up to 2 (up to 30)	Up to 2 (up to 30)	Up to 3 (up to 45)	0 (up to 30)	Up to 2 (up to 15)	Up to 1 (up to 15)	Up to 1 (up to 15)	Up to 1	5-7 (105)
Small CHP Plants Fuelled by the Combustion of Energy Crops and/or AFB (5-10 MW)	0	Up to 2 (up to 10)	Up to 3 (up to 15)	Up to 2 (up to 10)	Up to 2 (up to 10)	0 (up to 15)	Up to 3 (up to 5)	Up to 1 (up to 5)	Up to 1 (up to 15)	Up to 3	10 (50)
Anaerobic Digestion Plants Fuelled by Farm Biogas (0.5 MW)	0	2 (1)	2 (1)	2 (1)	3 (1.5)	1 (0.5)	2 (1)	2 (1)	2 (1)	4 (2)	20 (10)
Offshore Wind Farms (50-75MW ; 20-30 turbines)	0	0	0	0	0	1 (50)	0	Up to 1 (up to 50)	Up to 1 (up to 50)	2-3 (200)	4-5 (300)
Small Wind Clusters (6 MW; 4-10 Turbines)	0	2 (12)	2 (12)	2 (12)	5 (30)	2 (12)	0	1 (6)	1 (6)	5 (30)	20 (120)
Single Large Wind Turbines (1.5 MW)	1 (1)	2 (3)	2 (3)	2 (3)	4 (6)	2 (3)	2 (3)	2 (3)	2 (3)	6 (9)	24 (36)
Single Small Wind Turbines/Chargers (0.03 MW)	2 (0.55)	6 (0.18)	8 (0.24)	6 (0.18)	16 (0.48)	4 (0.12)	10 (0.3)	10 (0.3)	10 (0.3)	30 (0.9)	100 (3.5)
Small-Scale Hydro Power (0.1 MW)	0	1 (0.3)	1 (0.2)	0	0	0	0	0	0	3 (0.3)	5 (0.8)
Domestic PV Installations (1.5-3kW$_p$)		460 (1.2)	590 (1.56)	550 (1.44)	1280 (3.38)	120 (0.32)	830 (2.18)	620 (1.62)	650 (1.7)	1300 (3.4)	6400 (16.8)
Commercial PV Installations (50kW$_p$)	4 (0.005)	15 (0.75)	30 (1.5)	12 (0.6)	27 (1.35)	3 (0.15)	22 (1.1)	7 (0.35)	7 (0.35)	34 (1.7)	157 (7.85)
Motorway PV Installations (160kW$_p$/km)		3 (0.24)	6 (0.48)	1 (0.08)	4 (0.32)	0	6 (0.48)	3 (0.24)	0	6 (0.48)	28 (2.24)
Tidal Current Installations	0	0	0	0	1 (10)	0	0	0	0	0	1 (10)
Wave Energy Installations (30MW)	0	0	0	0	0	0	0	0	0	1 (30)	1 (30)
Renewables Sub-Totals	**7 (1.55)**	**13-17[12] (19-59)**	**15-21[12] (20-65)**	**12-16[12] (18-58)**	**29-34[12] (53-108)**	**10[12] (66)**	**14-19[12] (8-68)**	**15-18[12] (13-83)**	**15-18[12] (12-82)**	**51-56[12] (278-308)**	**190-193[12] (692)**
Waste-to-Energy											
CHP or Electricity Plants Fuelled by Landfill Gas	26 (54)	4 (9.3)	5 (7.5)	8 (25.8)	6 (7)	0	9 (19.3)	5 (11.2)	3 (4.9)	11 (23)	51 (107.9)
CHP or Electricity Plants Fuelled by Municipal or Industrial Solid Wastes	2 (14.2)	1 (10)	2 (42.5)	0	3 (39)	1 (2.5)	1 (20)	0-1 (0-10)	0-1 (0-10)	1 (40)	10 (164)
CHP or Electricity Plants part-Fuelled by Green Waste	0	- (0-1)	- (0-1)	- (0-1)	- (0-1)	0	- (0-2)	- (0-1)	- (0-1)	- (0-1)	Within Biomass (6)
Anaerobic Digestion Plants Fuelled by Sewage Gas (0.5 MW)	7 (4.4)	1 (0.67)	6 (3.1)	1 (0.32)	0	0	1 (0.5)	1 (0.32)	0	1 (0.5)	11 (6.3)
Energy-from-Waste Sub-Totals	**35 (72.6)**	**6 (20-21)**	**13 (53-54)**	**9 (26-27)**	**9 (46-47)**	**1 (2.5)**	**11 (40-42)**	**6-7 (12-23)**	**3-4 (5-16)**	**13 (64-65)**	**72 (284)**
Total	**42 (≈74)**	**19-23[12] (39-80)**	**28-34[12] (73-119)**	**21-25[12] (44-85)**	**38-43[12] (99-155)**	**11[12] (69)**	**25-30[12] (48-110)**	**21-25[12] (25-106)**	**18-22[12] (17-98)**	**64-69[12] (342-373)**	**≈260[12] (976)**

Illustrative renewable energy electricity scenarios for 2026 across the South East

ILLUSTRATIVE RENEWABLE ENERGY ELECTRICITY SCENARIOS FOR 2026 IN SOUTH EAST ENGLAND

Indicative Renewable Energy Generation Type/Size	Existing Installed Capacity (MW)		Low Deployment Scenario		High Deployment Scenario	
	Schemes	Capacity	No. of Schemes	Installed Capacity	No. of Schemes	Installed Capacity
Renewable Energy Sources						
Offshore Wind Farms (50-100 MW; 20-40 Turbines)	0	0	3-4	200	6-8	700
Small Wind Clusters (6 MW; 4-10 Turbines)	0	0	16	96	20	120
Single Large Wind Turbines (1.5 MW)	1	1	16	24	24	36
Single Small Wind Turbines/Chargers (0.03 MW)	2	0.55	50	1.5	100	3
Large CHP / Electricity Plants Fuelled by the Combustion of Energy Crops and/or Agricultural & Forestry Biomass (AFB) (15+ MW)	0	0	1-2 Wood 2 Straw 1 Chicken Litter	30 30 15	2-4 Wood 2 Straw 1 Chicken Litter	60 30 15
Small CHP Plants Fuelled by the Combustion of Energy Crops and/or AFB (5-10 MW)	0	0	5 Wood	25	10	50
Anaerobic Digestion Plants Fuelled by Farm Biogas (0.5 MW)	0	0	10	5	20	10
Small-Scale Hydro Power (0.1 MW)	0	0	5	0.8	5	0.8
Domestic PV Installations (1.5-3kW$_p$)			3200	8.4	Up to 234,000	Up to 351
Commercial PV Installations (50kW$_p$)	4	0.005	105	5.3	200	10
Motorway PV Installations (160kW$_p$/km)			10km	1.6	20km	3.2
Fuel Cell installations	0	0	Up to 1000	Up to 6	Up to 10,000	Up to 60
Tidal Current Installations	0	0	0	0	1	10
Wave Energy Installations (30MW)	0	0	0	0	Up to 5	Up to 150
Renewables Sub-Totals	**7**	**≈1.55**	**109 + PV / FC**	**449**	**196-200**	**1609**
Energy-from-Waste						
CHP or Electricity Plants Fuelled by Landfill Gas	26	54	51	107.9	0	0
CHP or Electricity Plants Fuelled by Municipal or Industrial Solid Wastes	2	14.2	10	164	4-8	80
CHP or Electricity Plants part-Fuelled by Green Waste	0	0	-	6	-	6
Anaerobic Digestion Plants Fuelled by Sewage Gas (0.5 MW)	7	4.4	11	6.3	4	2
Energy-from-Waste Sub-Totals	**35**	**72.6**	**72**	**284**	**8-12**	**88**
Total	**42**	**≈74**	**181 + PV / FC**	**733**	**204-212 + PV / FC**	**1697**

The report also considers factors that may influence long term future renewable energy developments in the South East, relating to:

- wind energy
- biomass
- small scale hydro
- solar photovoltaics
- fuel cells
- tidal energy
- wave energy
- electricity distribution systems

In terms of selecting an appropriate regional target, the assessment considers:

- national influences
- regional influences
- local influences

The report also considers what type of future planning policy framework will be required to facilitate the achievement of medium or high renewable energy targets it proposes, by for example considering existing planning development plans and identifying examples of best practice from elsewhere in the UK. It concludes by identifying actions that will provide a means to tackle potential barriers to the delivery of the region's renewable energy targets and aspirations.

G1.2.6 South East Regional Renewable Energy Targets - Consultation Revisions, 2003

This report proposes revisions to renewable energy targets for 2010, 2016 and 2026, based upon consultation responses received.

Changes include:

- anaerobic digestion of green wastes – a new category of renewable energy plant is proposed, based on the extraction of green waste fractions from municipal and commercial/ industrial waste streams
- offshore wind resources are shown as 'region wide', rather than being allocated to specific sub-regions

- onshore wind targets have been increased to account for wind energy scheme proposals
- level and quantity of landfill gas schemes across the region assumed to stay constant to 2026
- fuel cells removed from 2026 projections, as not considered to be ‘renewable energy’ and their inclusion could lead to double counting

Indicative county level breakdown of RE targets across the South East by 2010

Indicative Renewable Energy Generation Type/Size	Existing Installed Capacity	*TOTALS BY 2010* Thames Valley				Hampshire & Isle of Wight		Sussex		Kent	Region-wide	*OVERALL TOTAL*
		Oxon	Berks	Bucks	Surrey	H'shire	IOW	W Suss	E Suss	Kent		
Renewable Energy Sources												
Large CHP/Electricity Plants Fuelled by the Combustion of Energy Crops and/or Agricultural & Forestry Biomass (AFB) (15+ MW)	0	Up to 2 (up to 30)	Up to 2 (up to 30)	Up to 2 (up to 30)	Up to 1 (up to 15)	Up to 3 (up to 45)	0	Up to 1 (up to 15)	Up to 1 (up to 15)	Up to 1 (up to 15)		4-5 (75)
Small CHP Plants Fuelled by the Combustion of Energy Crops and/or AFB (5-10 MW)	0	Up to 2 (up to 10)	Up to 2 (up to 10)	Up to 3 (up to 15)	Up to 2 (up to 10)	Up to 3 (up to 15)	0	Up to 1 (up to 5)	Up to 1 (up to 5)	Up to 3 (up to 15)		7 (35)
Anaerobic Digestion of green wastes (0.35 MW)	0	1 (0.35)	1 (0.35)	2 (0.7)	2 (0.7)	3 (1.05)	0	2 (0.7)	1 (0.35)	3 (1.05)		15 (5.25)
Anaerobic Digestion Plants Fuelled by Farm Biogas (0.5 MW)	0	1 (0.5)	1 (0.5)	1 (0.5)	Up to 1 (up to 0.5)	2 (1)	1 (0.5)	Up to 1 (up to 0.5)	Up to 1 (up to 0.5)	2 (1)		10 (5)
Offshore Wind Farms (50-75 MW ; 20-30 turbines)	0										3-4 (200)	3-4 (200)
Wind Farms (ca. 50 MW ; 15-30 Turbines)	0	0	0	0	0	0	0	0	0	1 (50)		1 (50)
Small Wind Clusters (6 MW; 4-10 Turbines)	0	2 (12)	1 (6)	2 (12)	0	5 (30)	2 (12)	0	1 (6)	3 (18)		16 (96)
Single Large Wind Turbines (1.5 MW)	1 (1)	1 (1.5)	2 (3)	1 (1.5)	1 (1.5)	3 (4.5)	1 (1.5)	2 (3)	1 (1.5)	4 (6)		16 (24)
Single Small Wind Turbines/Chargers (0.03 MW)	2 (0.55)	3 (0.09)	4 (0.12)	3 (0.09)	5 (0.15)	8 (0.24)	2 (0.06)	5 (0.15)	5 (0.15)	15 (0.45)		50 (2)
Small-Scale Hydro Power (0.1 MW)	0	1 (0.3)	1 (0.2)	0	0	0	0	0	0	3 (0.3)		5 (0.8)
Domestic PV Installations (1.5-3kW$_p$)		230 (0.6)	295 (0.78)	275 (0.72)	415 (1.09)	640 (1.69)	60 (0.16)	310 (0.81)	325 (0.85)	650 (1.7)		3200 (8.4)
Commercial PV Installations (50kW$_p$)	4 (0.005)	10 (0.5)	20 (1.0)	8 (0.4)	15 (0.75)	18 (0.90)	2 (0.1)	5 (0.25)	5 (0.25)	23 (1.15)		106 (5.3)
Motorway PV Installations (160kW$_p$/km)		2 (0.16)	4 (0.32)	1 (0.08)	4 (0.32)	3 (0.24)	0	2 (0.16)	0	4 (0.32)		20 (1.6)
Renewables Sub-Total[2]	**7 (1.55)**	**9-13 (16-56)**	**10-14 (12-44)**	**9-14 (16-61)**	**8-12 (5-30)**	**21-27 (40-100)**	**6 (14)**	**9-12 (5-25)**	**8-11 (9-29)**	**31-35 (80-110)**	**3-4 (200)**	**127-129 (508)**
Waste-to-Energy												
CHP or Electricity Plants Fuelled by Landfill Gas	26 (54)	4 (9.3)	5 (7.5)	8 (25.8)	9 (19.3)	6 (7)	0	5 (11.2)	3 (4.9)	11 (23)		51 (107.9)
CHP or Electricity Plants Fuelled by Municipal or Industrial Solid Wastes	2 (14.2)	1 (10)	2 (42.5)	0	1 (20)	3 (39)	1 (2.5)	0-1 (0-10)	0-1 (0-10)	1 (40)		10 (164)
Anaerobic Digestion Plants Fuelled by Sewage Gas (0.5 MW)	7 (4.4)	1 (0.67)	6 (3.1)	1 (0.32)	1 (0.5)	0	0	1 (0.32)	0	1 (0.5)		11 (6.3)
Waste-to-Energy Sub-Total	**35 (72.6)**	**6 (20)**	**13 (53)**	**9 (26)**	**11 (40)**	**9 (46)**	**1 (2.5)**	**6-7 (11-21)**	**3-4 (5-15)**	**13 (64)**		**72 (278)**
Total	**42 (≈74)**	**15-19**	**23-27**	**18-23**	**19-23**	**30-36**	**7**	**15-19**	**11-15**	**44-48**		**199-201 (786)**

Indicative county level breakdown of RE targets across the South East by 2016

Indicative Renewable Energy Generation Type/Size	Existing Installed Capacity	TOTALS BY 2016: Thames Valley				TOTALS BY 2016: Hampshire & Isle of Wight		TOTALS BY 2016: Sussex		TOTALS BY 2016: Kent	TOTALS BY 2016: Region-wide	OVERALL TOTAL
		Oxon	Berks	Bucks	Surrey	H'shire	IOW	W Suss	E Suss	Kent		
Renewable Energy Sources												
Large CHP/Electricity Plants Fuelled by the Combustion of Energy Crops and/or Agricultural & Forestry Biomass (AFB) (15+ MW)	0	Up to 2 (up to 30)	Up to 2 (up to 30)	Up to 2 (up to 30)	Up to 2 (up to 30)	Up to 3 (up to 45)	0	Up to 1 (up to 15)	Up to 1 (up to 15)	Up to 1 (up to 15)		5-7 (105)
Small CHP Plants Fuelled by the Combustion of Energy Crops and/or AFB (5-10 MW)	0	Up to 2 (up to 10)	Up to 3 (up to 15)	Up to 2 (up to 10)	Up to 3 (up to 15)	Up to 3 (up to 15)	0	Up to 1 (up to 5)	Up to 1 (up to 5)	Up to 3 (up to 15)		13 (65)
Anaerobic Digestion of green wastes (0.35 MW)	0	3 (1.05)	3 (1.05)	4 (1.4)	5 (1.75)	6 (2.1)	1 (0.35)	4 (1.4)	2 (0.7)	8 (2.8)		36 (12.6)
Anaerobic Digestion Plants Fuelled by Farm Biogas (0.5 MW)	0	2 (1)	2 (1)	2 (1)	2 (1)	3 (1.5)	1 (0.5)	2 (1)	2(1)	4 (2)		20 (10)
Offshore Wind Farms (50-75 MW ; 20-30 turbines)	0										4-5 (300)	4-5 (300)
Wind Farms (ca. 50 MW ; 15-30 Turbines)	0	0	0	0	0	0	0	0	0	1 (50)		1 (50)
Small Wind Clusters (6 MW; 4-10 Turbines)	0	2 (12)	2 (12)	2 (12)	0	5 (30)	2 (12)	1 (6)	1 (6)	5 (30)		20 (120)
Single Large Wind Turbines (1.5 MW)	1 (1)	2 (3)	2 (3)	2 (3)	2 (3)	4 (6)	2 (3)	2 (3)	2 (3)	6 (9)		24 (36)
Single Small Wind Turbines/Chargers (0.03 MW)	2 (0.55)	6 (0.18)	8 (0.24)	6 (0.18)	10 (0.3)	168 (0.48)	4 (0.12)	10 (0.3)	10 (0.3)	30 (0.9)		100 (3.5)
Small-Scale Hydro Power (0.1 MW)	0	1 (0.3)	1 (0.2)	0	0	0	0	0	0	3 (0.3)		5 (0.8)
Domestic PV Installations (1.5-3kW$_p$)		460 (1.2)	590 (1.56)	550 (1.44)	830 (2.18)	1280 (3.38)	120 (0.32)	620 (1.62)	650 (1.7)	1300 (3.4)		6400 (16.8)
Commercial PV Installations (50kW$_p$)	4 (0.005)	15 (0.75)	30 (1.5)	12 (0.6)	22 (101)	27 (1.35)	3 (0.15)	7 (0.35)	7 (0.35)	34 (1.7)		157 (7.85)
Motorway PV Installations (160kW$_p$/km)		3 (0.24)	6 (0.48)	1 (0.08)	6 (0.48)	4 (0.32)	0	3 (0.24)	0	6 (0.48)		28 (2.24)
Tidal Current Installations	0										1 (10)	1 (10)
Wave Energy Installations (30 MW)	0										1(30)	1 (30)
Renewables Sub-Total[3]	**7 (1.55)**	**16-20 (20-60)**	**18-23 (21-66)**	**16-20 (20-60)**	**19-24 (10-55)**	**34-40 (45-105)**	**10 (16)**	**19-21 (14-34)**	**17-19 (13-33)**	**57-61 (101-131)**	**6-7 (340)**	**230-233 (770)**
Waste-to-Energy												
CHP or Electricity Plants Fuelled by Landfill Gas	26 (54)	4 (9.3)	5 (7.5)	8 (25.8)	9 (19.3)	6 (7)	0	5 (11.2)	3 (4.9)	11 (23)		51 (107.9)
CHP or Electricity Plants Fuelled by Municipal or Industrial Solid Wastes	2 (14.2)	1 (10)	2 (42.5)	0	1 (20)	3 (39)	1 (2.5)	0-1 (0-10)	0-1 (0-10)	1 (40)		10 (164)
Anaerobic Digestion Plants Fuelled by Sewage Gas (0.5 MW)	7 (4.4)	1 (0.67)	6 (3.1)	1 (0.32)	1 (0.5)	0	0	1 (0.32)	0	1 (0.5)		11 (6.3)
Waste-to-Energy Sub-Total	**35 (72.6)**	**6 (20)**	**13 (53)**	**9 (26)**	**11 (40)**	**9 (46)**	**1 (2.5)**	**6-7 (11-21)**	**3-4 (5-15)**	**13 (64)**		**72 (278)**
Total	**42 (≈74)**	**22-26**	**31-36**	**25-29**	**30-35**	**43-49**	**12**	**25-28**	**20-23**	**70-74**		**302-305 (1048)**

Illustrative renewable energy electricity scenarios for 2026 across the South East

ILLUSTRATIVE RENEWABLE ENERGY ELECTRICITY SCENARIOS FOR 2026 IN SOUTH EAST ENGLAND

Indicative Renewable Energy Generation Type/Size	Existing Installed Capacity (MW)		Low Deployment Scenario		High Deployment Scenario	
	Schemes	Capacity	No. of Schemes	Installed Capacity	No. of Schemes	Installed Capacity
Renewable Energy Sources						
Offshore Wind Farms (50-100 MW; 20-40 Turbines)	0	0	3-4	200	6-8	700
Wind Farms (ca. 50 MW ; 15-30 Turbines)	0	0	1	50	1	50
Small Wind Clusters (6 MW; 4-10 Turbines)	0	0	16	96	20	120
Single Large Wind Turbines (1.5 MW)	1	1	16	24	24	36
Single Small Wind Turbines/Chargers (0.03 MW)	2	0.55	50	1.5	100	3
Large CHP / Electricity Plants Fuelled by the Combustion of Energy Crops and/or Agricultural & Forestry Biomass (AFB) (15+ MW)	0	0	1-2 Wood 2 Straw 1 Chicken Litter	30 30 15	2-4 Wood 2 Straw 1 Chicken Litter	60 30 15
Small CHP Plants Fuelled by the Combustion of Energy Crops and/or AFB (5-10 MW)	0	0	5 Wood	25	13	65
Anaerobic Digestion Plants Fuelled by Farm Biogas (0.35 MW)	0	0	15	5.25	64	22.4
Small-Scale Hydro Power (0.1 MW)	0	0	5	0.8	5	0.8
Domestic PV Installations (1.5-3kW_p)			3200	8.4	Up to 234,000	Up to 351
Commercial PV Installations (50kW_p)	4	0.005	105	5.3	200	10
Motorway PV Installations (160kW_p/km)			10km	1.6	20km	3.2
Fuel Cell installations	0	0	Up to 1000	Up to 6	Up to 10,000	Up to 60
Tidal Current Installations	0	0	0	0	1	10
Wave Energy Installations (30MW)	0	0	0	0	Up to 5	Up to 150
Renewables Sub-Totals	**7**	**≈1.55**	**125-127 + PV**	**498**	**259-268 +PV**	**1636**
Energy-from-Waste						
CHP or Electricity Plants Fuelled by Landfill Gas	26	54	51	107.9	ca. 50	ca. 100
CHP or Electricity Plants Fuelled by Municipal or Industrial Solid Wastes	2	14.2	10	164	4-8	80
Anaerobic Digestion Plants Fuelled by Sewage Gas (0.5 MW)	7	4.4	11	6.3	4	2
Energy-from-Waste Sub-Totals	**35**	**72.6**	**72**	**278**	**58-62**	**182**
Total	**42**	**≈74**	**197-199 + PV**	**776**	**317-330 + PV**	**1818**

G1.2.7 Proposed Alterations to Regional Planning Guidance, South East – Energy Efficiency and Renewable Energy: Harnessing the Elements, 2003

Overview

The objective of these policies was to promote a more sustainable pattern of energy use and generation while ensuring that development des not harm the region's environment or the quality of life of its people. This would be achieved through promotion of greater energy efficiency and ensuring that the region contributes effectively towards the Government's targets for increasing the generation of renewable energy and reducing greenhouse gas emissions.

The proposed policies replaced Policy INF4 and supporting paragraphs 10.19-10.24 of RPG9. They will however be superseded by the South East plan (with proposed changes), once it is adopted in spring 2009.

POLICY EN4: Regional Renewable Energy Targets

The following minimum regional targets for electricity generation from renewable sources should be achieved by the development and use of all appropriate resources and technologies:

Year/ Timescale	*Installed Capacity (MW)*	*(%) Electricity Generation Capacity*
2010	620	5.5
2016	895	8.0
2026	1,750	16.0

The renewable energy resources with the greatest potential for electricity and heat generation are biomass, wind and solar.

POLICY EN5: Sub-Regional Targets

Development plans should include policies to contribute to the achievement of the following regional and sub-regional targets for land-based renewable energy:

Sub-region	*2010 Renewable Energy Target (MW)*	*2016 Renewable Energy Target (MW)*
Thames Valley and Surrey	140	209
East Sussex and West Sussex	57	68
Hampshire and Isle of Wight	115	122
Kent	111	154

Local authorities should collaborate and engage with communities, the renewable energy industry and other stakeholders on a sub-regional basis to assist in the achievement of the targets through:

i. undertaking more detailed assessments of local potential

ii. encouraging small scale community-based schemes

iii. encouraging development of local supply chains, especially for biomass

iv. raising awareness, ownership and understanding of renewable energy

G1.2.8 Proposed Alterations to Regional Planning Guidance, South East – Energy Efficiency and Renewable Energy: Harnessing the Elements Supporting Statement, 2003

This document sets out the background to the proposed renewable energy policy alterations and provides a summary of findings from the renewable energy assessments:

Pp 22-24

The resource assessment identified the following resources as having potential for exploitation in the South East:

- *Biomass – including combustion/thermal treatment of wood from existing forestry, energy crops including short rotation coppice and forestry and agricultural residues, including straw and broiler litter, anaerobic digestion slurry, sewage and biomass waste (biodegradable municipal, commercial and industrial waste).*

- *Wind energy – including onshore grid connected turbines, small scale on-site generators and large scale offshore wind farms;*

- *Solar energy – including active photovoltaic (PV) systems generating electricity plus water heating and also building space heating (passive solar design);*
- *Energy from biomass waste.*

These technologies represent the vast majority of the region's potential (over 95%) in the short to medium term (2010-2016).

Limited additional potential is identified in small scale hydro (using water to drive turbines).

In the longer term, the following emerging technologies may also have increasing potential:

- *Wave and tidal stream energy;*
- *Fuel cells, although this technology represents a use of energy carried by hydrogen (generated using renewably generated electricity) rather than an additional resource.*

Biomass was cited by most consultees as the key resource to be developed and exploited in the region. Exploiting existing resources (including existing wood and coppice) before embarking on large scale planting of new coppice or energy crops was strongly favoured for its potential ecological, economic and social benefits, particularly with respect to rural development opportunities.

Solar energy, including photovoltaics and active solar heating (such as evacuated solar tubes used to heat water), was also strongly favoured for early deployment. Concerns were expressed over deployment of onshore wind energy developments due to siting and scale and the potential impact on landscape, habitats and amenity.

Overall, preference was expressed for smaller, community scale projects with local support, over large scale developments. However, the importance of large scale projects which would act as flagship developments, create a presence in the region and help improve understanding and acceptance, was acknowledged.

The potential of the region, and its contribution to the achievement of national renewable energy targets, is likely to be realised through deployment of a variety of development types and scales – ranging from large scale developments through to very small community based or micro schemes.

The regional assessments were concerned principally with the generation and use of electricity. Heat generation and use will also be important in offsetting fossil fuel use for water and space heating. This will be done through a number *of different measures including combined heat and power (CHP), passive solar design (PSD), and the use of ground source heat pumps to exploit ambient ground heat.*

The regional assessments made assumptions on the uptake of resources and technologies through time, in order to highlight the possible scale and numbers of schemes that might be built in the region. The technology breakdowns shown are only illustrative. In practice, achievement of the targets set out in this Strategy will require development to take place on a wide-ranging scale, from large commercial projects to individual household, farm or community initiatives. The regional assessments have informed the development of the renewable energy targets. However the Regional Assembly has not included landfill gas as a resource and anticipates that the gap between the potential identified in the assessments will be made up through further development of other renewable technologies – biomass, solar and wind.

The report sets out in detail identified regional potential to 2010, 2016 and 2026, as well as outlining sub-regional land based renewable potential by type to 2010 and 2016.

Pp 40:

The following key points emerge from the resource assessments:

- *There is scope for deployment of a range of renewable energy technologies in the region over the short, medium and long terms.*
- *Biomass, offshore and onshore wind have the largest potential in the short (2010) and medium (2016) term.*
- *The distribution of these resources is fairly even throughout the region (offshore wind, wave and tidal power being limited to coastal areas), although some areas appear to have greater potential for development of some resources than others.*
- *All areas have the potential to contribute towards achievement of the regional and sub-regional targets.*
- *In the longer term (2026) it is likely that the potential for offshore wind will continue to grow in addition to photovoltaics and 'emerging' technologies including potentially wave and tidal stream energy.*

Regional potential for electricity from renewable energy sources for 2010

Renewable Energy Type/Indicative Size	*Existing Situation*			*Prospective Total by 2010*[34]		
	No. Schemes	Capacity (MW)	Output (GWh[35])	No. Schemes	Capacity (MW)	Output (GWh)
Large CHP/Electricity Plants fuelled by Biomass Waste/Residues and Energy Crops (15+ MW)	0	0	0	5	75	562.5
Small CHP Plants fuelled by Biomass Waste/Residues and Energy Crops (5-10 MW)	0	0	0	5	35	262.5
Anaerobic Digestion fuelled by Farm Waste, Sewage and/or Biomass Waste (0.5 MW)	7	4.4	37.4	36	12	102
Offshore Wind Farms (50-75 MW ; 20-30 Turbines)	0	0	0	3-4	200	640
Wind Farms (50-75 MW ; 20-30 Turbines)	0	0	0	1	50	
Small Wind Clusters (6 MW ; 4-10 Turbines)	0	0	0	16	96	429
Single Large Wind Turbines (1.5 MW)	1	1	n/a	16	24	
Single Small Wind Turbines/Chargers (0.03 MW)	2	0.55	0	50	1.5	4
Small-Scale Hydro Power (0.1 MW)	0	0	0	5	0.8	3.7
Domestic PV Installations (1.5-3KW_p)				3200	8.4	
Commercial PV Installations (50 kW_p)	4	0.005	n/a	105	5.3	15.3
Motorway PV Installations (160 kW_p/km)				20	1.6	
Total	**14**	**6**	**38**	**140 + PV**	**510**	**2,019**
Landfill Gas[36]	26	54	405	51	108	809

FOOTNOTES

34 The categories of technology type and size shown are indicative. In practice the nature and size of actual schemes may differ. in particular, there may be opportunities for biomass at scales smaller than those shown.

33 GWh = Gigawatt-hour. A unit of energy used to show how much energy is actually generated from a scheme (1 GWh = 1,000 MWh = 1,000,000 kWh). 1 MWh is the amount of electrical energy generated by a 1 MW generator running at full output for one hour.

36 Landfill gas is not considered to be a renewable source by the Regional Assembly and is excluded from the targets in the proposed amendment to RPG9 (see paragraph 2.41). However, landfill gas was included in the assessment of potential conducted by AEA Technology and FPD Savills.

The supporting statement concludes by considering implementation, monitoring and examples of best practice.

G1.3 Monitoring activity

The South East monitor progress against renewable energy targets on a rolling basis, using Thames Valley's South East Renewable Energy Statistics (www.See-stats.org). SEE-Stats is an initiative undertaken by Thames Valley Energy and sub-regional data partners ((TV Energy (The Thames Valley, Surrey and northern Hampshire); CEN (Kent; ECSC East Sussex, West Sussex and Brighton); the

Environment Centre (southern Hampshire, the Isle of Wight)) on behalf of the South East of England Sustainable Energy Partnership, led by the Government Office for the South East. Data is provided from an amalgam of sources and is updated on a rolling basis. SEE-Stats is advantageous as it picks up smaller scale installations, although there are issues relating to systematically being able to maintain and update the database due to its reliance on a variety of data sources.

G1.4 Further work

Preparatory evidence base work is underway in anticipation of the development of a single regional strategy. The regional assembly have commissioned three pieces of research:

- Identification of opportunities for combined heat and power (CHP) and district heating/distributed heat supply in the South East of England. This work is being project managed by Beyond Waste in partnership with Thames Valley Energy and RPS and will include:
  - consideration of additional local constraints on deployment of district heating and CHP
  - mapping potential low carbon and renewable fuel sources including locations of concentration, separation and manufacture of fuels e.g. RDF, wood pellets
  - identification of potential users of renewable and low-carbon fuels
  - comparison and identification of correspondence between fuel supply opportunities and district heating and CHP opportunities
  - elaboration of scenarios of heat and CHP deployment based on analysis of renewable and low-carbon fuel potential
- Work building on the above to provide more detailed assessment of heat loads, identify potential sources of biomass and waste-related fuels, and use this to elaborate on scenarios. This will include:
  - review of current and emerging European and national policy, and where possible examples of good local policy to encourage CHP. It should also include a review of relevant local studies
  - review of constraints and barriers to deployment of CHP and district heating systems, together with solutions to these
  - heat mapping – identification of areas of greatest opportunity for deployment of CHP and distributed heat supply

- review of case studies from the UK to demonstrate delivery of CHP and distributed heat supply, and how barriers were overcome and opportunities realised

- development of scenarios of potential district heat and/or CHP deployment reflecting the potential impacts of policy, incentives, and development of the market. Development of the case studies and scenarios may involve interviewing of developers and/or operators and a workshop with interested parties

- estimate reduction in emissions of carbon dioxide that could be achieved by different levels of deployment of CHP and distributed heat supply in the region (under different scenarios)

• Thames Valley Energy are undertaking a review of the evidence base work which underpinned the renewable energy targets (regional and sub-regional) in RPG9 and the draft South East plan, to inform the review of the renewable energy policies and targets in the preparation of the single regional strategy.

Results from all the studies are expected in March/ April.

Appendix H
South West

H1.1 RSS renewable energy policies

H1.1.1 Introduction

The draft RSS was submitted to Government by the South West regional assembly in April 2006 and was open for public consultation from 6 June to 30 August 2006. Consultation on the proposed changes from the Secretary of State ended in October 2008 and a final RSS is expected in 2009. The main primary and secondary policies contained with the draft RSS are highlighted in this section.

H1.1.2 Primary renewable energy policies

POLICY RE1: Renewable Electricity Targets: 2010 and 2020

Local Development Documents will include positive policies to enable the achievement of the following targets:

By 2010 a minimum target of 509 to 611 MWe installed generating capacity, from a range of onshore renewable electricity technologies in the following broad distribution:

Sub-region	*Installed Electricity Generating Capacity (MWe)*
Former Avon	35–52
Gloucestershire	40–50
Wiltshire	65–85
Somerset	61–81
Devon	151
Dorset	64–84
Cornwall	93–108
Total	**509–611**

By 2020 a minimum target of 850 MWe installed generating capacity from a range of onshore renewable electricity technologies. This onshore target, together with offshore renewable electricity capacity, will help to provide at least 20% of the region’s electricity demand by 2020.

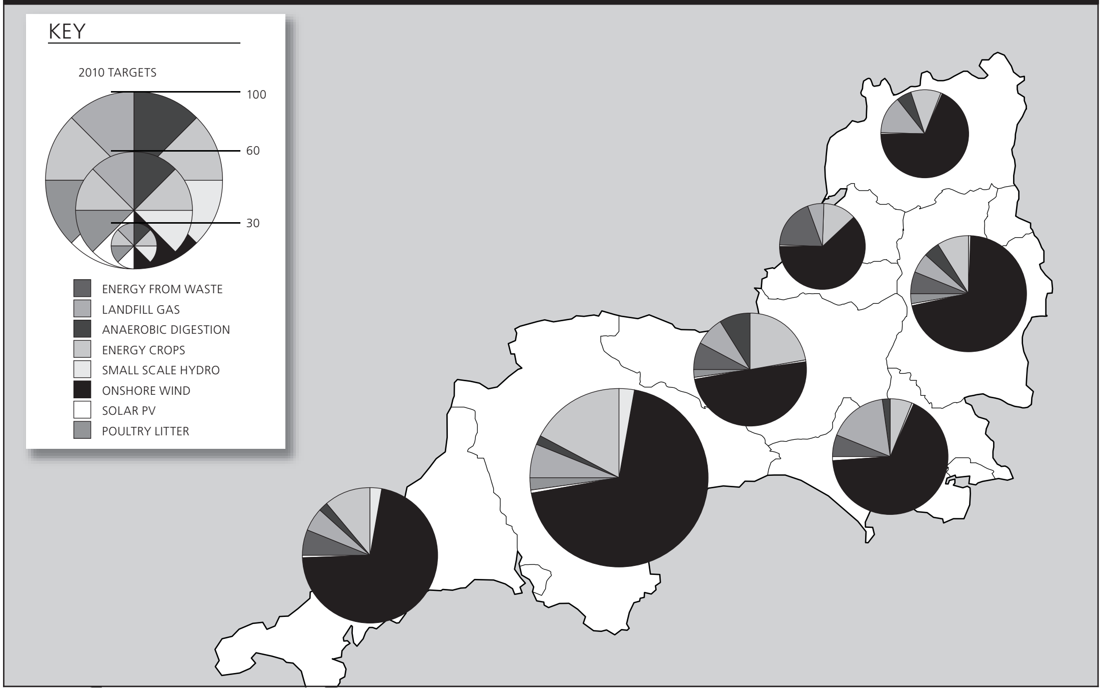
7.3.2: Minimising the level of demand for energy through improving energy efficiency is a major challenge, particularly with regard to existing buildings. There is little scope to deal with existing stock in the draft RSS and this will be addressed through the (forthcoming) *Regional Sustainable Energy Strategy'* A move towards more sustainable construction advocated in development policy G will help address this issue in relation to new development. However, there will still be significant demand for energy. Producing more energy locally and from renewable sources will reduce the 'footprint', as well as providing economic benefits through creating jobs in the region. Renewable energy is one of the key sectors identified in the RES. The Government's position on non-renewable power is currently unclear and so the South West will need to await the outcome of the forthcoming *National Energy Review* before identifying any regional implications.

7.3.3: Achieving the commitments set nationally within the 2003 Energy white paper will require at least 40% of electricity to be generated from renewable sources by 2050. In the shorter term the Government is committed to the achievement of 10% renewable electricity by 2010 and is aiming for 20% by 2020. Although the South West has made a good start and has a range of renewable energy installations using wind, hydro, solar and biomass resources, in 2005 only about 3% of the region's electricity demand was met by these methods.

7.3.4: The South West has one of the best wave and tidal resources within the UK. As a result, offshore renewables are likely to be increasingly developed off the South West coast after 2010, and could play a significant part in achieving the 20% renewable electricity target by 2020. However, in order for the 2020 target to be met it seems likely that there will need to be some strengthening of the grid to accommodate the offshore capacity from marine technologies such as wave and tidal stream. The achievement of this will require appropriate connections to be made to the national grid.

7.3.5: The targets outlined below have been consulted upon and agreed within the counties and/or sub-regions as part of the Revision 2010 Project. Map 7.6 suggests one way in which these 2010 targets may be met, though the actual technology mix itself is not part of the targets and is provided for indicative purposes only.

Map 7.6 **Indicative breakdown of renewable electricity: 2010 Targets**



7.3.6: Further work on establishing appropriate sub-regional targets for the 2020 target will be taken forward as an early review of the RSS. Regional supplementary planning documents on renewable energy will contain more detailed guidance on some of the issues relating to the spatial distribution of renewable energy technologies within the region. However, if the level of energy efficiency assumed within the 20% target for 2020 (see policy RE1, above) is not met, there will need to be a higher level of renewable electricity capacity installed in order for the region to successfully meet its target. In addition, offshore renewable resources, principally harnessing wave power, are available off the Cornish coast in particular and provision needs to be made to enable connection to the national grid.

POLICY RE2: Coastal zones and offshore energy

When defining the Coastal Zone, coastal local authorities with landfalls in their areas will identify opportunities to enable appropriate development to occur. This will facilitate connections opf offshore energy production units to the national grid to enable the region to meet its targets for offshore capacity of 56MWe by 2010 and 400MWe by 2020.

POLICY RE3: renewable heat targets

LDDs will include positive policies to enable the achievement of the following targets by the use of appropriate resources and technologies:

Timescale	*Installed Thermal Capacity (MWth)*
2010	100
2020	500

7.3.7: While there are currently no Government targets for heat production from renewable sources this situation is expected to change during the RSS period. PPS22 refers to increasing the development of ‘renewable energy’ in general, which is taken to cover both renewable electricity and renewable heat. There is considerable potential in the South West for the production of heat from renewable sources, and the South West has a lot to gain from harnessing these. The region has:

- the best solar resource in the UK with considerable opportunities for solar water heating and a significant resource of forest residues that can be used for biomass heating
- a strong indigenous industry able to support the installation of renewable heating technologies
- a high proportion of off-gas area, increasing the economic potential for renewable heating
- opportunities for facilities that produce heat and electricity such as energy from waste

7.3.8: The targets equate to roughly 0.2% of the region’s heat demand (excluding transport) by 2010 and 1.4% by 2020, assuming that the full range of energy efficiency measures set out in the Energy white paper are put into place. There is a key role for local planning authorities within the region in ensuring a synergy between sites for major new developments, and the location of renewable combined heat and power (CHP) generators, to ensure that the heat from the latter can be effectively used, for example as part of community heating systems.

7.3.9: The combination of renewable energy resource distribution within the South West, and the scale and distribution of protected landscapes, leads to the conclusion that the targets are likely to be met through a mixture of technologies dispersed throughout the region, rather than concentrated in any specific area. Local authorities should monitor development for renewable energy and cooperate with adjoining authorities to ensure that renewable energy schemes do not have a significant adverse cumulative impact. Consideration should also be given to minimising any impacts resulting from construction and operation including air quality, landscape and visual impact, atmospheric emissions, noise, odour, water pollution, flood risk, and the disposal of waste.

POLICY RE4: Meeting the targets through development of new resources

When considering individual applications for development of renewable energy facilities. Local Planning Authorities will take into account the wider environmental, community and economic benefits of proposals, whatever their scale, and should be mindful that schemes should not have a cumulative negative impact and that proposals in protected areas should be of an appropriate scale and not compromise the objectives of designation.

POLICY RE5: Renewable energy and new development

Larger-scale developments will be expected to provide, as a minimum, sufficient on-site renewable energy to reduce CO_2 emissions from energy use by users of the buildings constructed on site by 10%. Developers will be expected to demonstrate that they have explored all renewable energy options, and designed their developments to incorporate any renewable energy requirements. Individual Local Planning Authorities may use lower thresholds for what constitutes a larger-scale development and set higher percentages for on-site generation, taking into account the impact on initial and lifetime affordability of homes.

7.3.10: PPS22 emphasises the importance of developing positively expressed policies on building integrated renewables, incorporating renewable energy projects in all new developments. Policies that encourage the onsite generation of renewable energy must be placed within a wider context of the need for development; both new build and refurbishment, to incorporate the principles of sustainable energy design (see also Section 3, Development Policy G). This will involve reducing building energy demand through energy efficiency and low energy design, before meeting the remaining demand from firstly renewable energy and then fossil fuels or grid electricity. This approach has been characterised as the 'energy hierarchy' within the South West, and will ensure that energy efficiency opportunities are maximised before renewable energy is considered within proposals for new developments. The aim is to achieve affordable energy-efficient homes, so reducing both fuel poverty and CO_2 emissions.

7.3.11: All new developments should meet a proportion of their energy from renewable sources. Proposals for larger scale developments (for definition see Glossary) should be accompanied by an energy use assessment which describes how much energy is expected to be used within the proposal and considers ways in which the 'energy hierarchy' can be put into effect. The 10% minimum target in policy RE5 has been set based on available data on costs of available technologies to ensure there is no undue financial burden. This figure will be subject to an early review, as advances in technology and reduction in costs through economies of scale are expected in the short to medium term. It is expected, therefore, that such a review will increase the target but, due to uncertainties over how far costs will be reduced, it is not possible to indicate the level of increase at this time.

H1.1.3 Secondary renewable energy policies

POLICY SD1: The ecological footprint

- Meeting national and regional targets relating to renewable energy, resource consumption/extraction and waste production/recycling.

1.6.6: Successful economic performance could significantly boost growth in the region, with benefits in terms of prosperity, job choice and investment. However, if not managed properly the effects of growth could result in degradation of the environment, more congestion and pollution and exacerbation of economic trends that reinforce intra-regional disparities and disadvantage. Without a planned approach, recognising the importance of the 'environment driver', proposals for sustainable and thriving rural communities and an urban renaissance will not be achieved. Both the RES and Section 8 give more details on the importance of building a sustainable, low carbon, successful economy within environmental limits.

POLICY SD2: Climate Change

The region's contribution to climate change will be reduced by:

- Reducing greenhouse gas emissions at least in line with current national targets, ie. by 30% by 2026 (compared to 1990 levels)
- Following the principles outlined in SD1

The region will adapt to the anticipated changes in criteria by:

- Managing the impact of future climate change on the environment, economy and society
- Identifying the most vulnerable communities and ecosystems given current understanding of future clients and provide measures to mitigate against these effects
- Avoiding the need for development in flood risk areas and incorporating measures in design and construction to reduce the effects of flooding
- Recognising and putting in place policies and measures to develop and exploit those opportunities that climate change will bring
- Requiring 'future proofing' of development activity for its susceptibility to climate change
- Improving the resilience and reliability of existing infrastructure to cope with changes in climate and in the light of future demand. It will be a priority for the places identified in Section 3 to determine potential future climate impacts and plan ways in which key services and infrastructure needs to adapt.

All Local Authorities in their LDDs will need to demonstrate how they intend to contribute towards the required 60% cut in CO_2 emissions by 2050 and how they intend to identify and respond to the potential impacts of climate change in their area.

1.6.11: Recent studies suggest that even deeper and faster cuts are needed to avoid a significant risk of unstoppable and catastrophic climate change. Additional research commissioned in support of the draft RSS and the SSA process has demonstrated the extent to which the draft RSS alone can contribute towards achieving necessary reductions in CO_2 emissions. Using best available estimates, this suggests that the following will be needed to make significant inroads into reducing the South West's CO_2 emissions:

- sustainable construction, including a proposed requirement in development policy G that all major new development should be carbon neutral, and to ensure energy efficiency of existing building stock is improved, should contribute a 10.3% reduction in emissions

- concentrating growth in strategically significant cities and towns (SSCTs) should contribute a further 2.2% reduction

- the effect of the regional transport strategy (RTS), through improved public transport and demand management, bringing regional car use down to the existing level of the 'best' performing quartile, regional CO_2 emissions should be reduced by a further 15%

Achieving these measures through the policies in this draft RSS will reduce CO_2 emissions by about 28% by 2026, which is very near the levels required.

1.6.12: In addition to reducing the region's greenhouse gas emissions, there is a need to consider how the region's communities should adapt to unavoidable climate change given the delayed effect of emissions reduction strategies and current estimates of future climate change and effects. In some cases measures need to be provided to reduce the effects, particularly of flooding and risk to some critical transport infrastructure.

1.6.13: Climate change also brings opportunities that the region needs to capitalise on. New business opportunities may arise for the leisure and tourism industry. With the development of the environmental technology sector, the South West also has the opportunity to become a leader in developing climate change solutions. Warmer temperatures and longer growing seasons could also lead to increased productivity and present opportunities to grow new crops.

POLICY RE8: Forestry and Woodlands

Local authorities and other bodies will support the implementation of the RWFF, ensuring the environmental, social and economic value and character of the region's woods and forests are protected and enhanced in a sustainable way. Woodland areas, including ancient and semi-natural woodland should be maintained at least at 2005 levels and expanded where possible to provide a buffer to core areas of woodland. Where woodland is unavoidably lost through development it should be replaced with appropriate new woodland on at least the same scale.

7.3.20: Areas of woodland should be expanded where appropriate and as indicated in the RWFF, to support other habitats, act as carbon sinks, enhance landscape character and as a key part of providing green infrastructure in and around new development (see policy GI1 in Section 6). Any unavoidable loss of woodland should be replaced via agreements with developers and other mechanisms. Sustainable tourism development opportunities presented by woodlands and forests should be promoted, particularly in rural areas and the wider economic use of woodlands and forests should be promoted, for example with regards to wood fuel (see also paragraph 7.3.7 on renewable heat). The procurement of locally grown timber and wood products to the UK Woodland

Assurance Standard should be supported, particularly in relation to development, in order to achieve improved sustainability of construction and in support of local supply chains.

H1.2 Renewable energy evidence base documents

Document	*Date*	*Author*	*Client*
The Road to 2020	2008	RegenSW and	RegenSW and South West Regional Development Agency
REvision 2020 – South West Renewable Electricity, Heat and On Site Generation Targets for 2020	*2005*	*Centre for Sustainable Energy*	*Government Office for South West and South West Regional Assembly*
REvision 2010 – Establishing County/Sub Regional Targets for Renewable Electricity Development to 2010	*2004*	*Centre for Sustainable Energy*	*Government Office South West and South West Regional Assembly*
Renewable Energy Assessment and Targets for the South West	*2004*	*Terence O'Rourke Plc*	*Government Office for South West*
(Italics denotes key evidence base document)			

H1.2.1 Renewable Energy Assessment and Targets for the South West, 2001

This study used two or three resource categories in order to define the maximum deployment of each renewable technology:

- *technical resource*: A measure of the highest level of available renewable energy resources, limited only by technical limitations (e.g. wind turbine efficiency)
- *accessible resource*: A moderated view of available renewable energy resources, in which the technical resource is constrained by practical incompatibility and by institutional factors
- *practical resource*: This is the lowest level of availability, entails the most constraints and is typically also the most subjective. It applies further constraints to the accessible resource that reflect practicalities and acceptability to society

Many of the renewable energy resources were assessed using GIS which allowed various forms of spatial information to be overlaid so as to identify the effect of multiple criteria upon potential resources or notional schemes.

The regional assessment of renewable energy resources above implies a target range of between 207-545MW (855-2275GWh/yr) of new capacity by 2010. A possible breakdown of this capacity by technology is shown in the table on the following page. Regional renewable energy resource maps are set out on the following pages.

The key points emerging from the resource analysis were as follows:

- there are significant technically available resources across the South West for onshore wind energy. Wood biomass (with the inclusion of short rotation coppice), waste-to-energy schemes (combustion, biological treatment and landfill gas) and offshore wind energy also present opportunities. Resources are also available for solar technologies, other agricultural wastes and small hydro schemes

- the inclusions of economic, institutional and infrastructural factors within the resource assessments have a strong limiting effect on the prospects for all technologies. The factors having most effect on this reduction of potential vary according to the technology in question

- technical resources for grid-connected onshore wind power are significant. The effect of designated areas and other constraints may be to limit the accessible resource from this form of wind energy development, to a degree which the consultation process has attempted to explore

- off-shore wind energy may have prospects off the South West coast. However, a combination of a high concentration of coastline designations, a large tidal range and limited areas of shallow water further offshore may restrict prospects over the period to 2010

- the South West is not particularly well-endowed with existing wood forestry biomass in relation to its overall area. It could, however, potentially grow much more through wider uptake of short rotation (energy) crops. There are infrastructural hurdles to exploitation of the existing resources. Resources from other agricultural wastes (straw, chicken litter, farm slurries) are more limited across the region

- there are moderate quantities of municipal solid waste (MSW) arising across the South West, sufficient to enable incineration plants to be considered within most of the Waste Authorities' plans. However none of these plans is yet far enough advanced to be certain that any facilities of this kind will be deployed within the region by 2010

- energy from landfill gas is likely to continue to grow within the region, reaching peak deployment at or around 2015. Following this point the energy resource from LFG will gradually decline

- there are a large number of potential small-scale hydro sites across the South West. Their deployment will probably be limited by economic and environmental considerations

- tidal barrage, tidal current and wave energy technologies may hold some prospects for limited deployment by 2010

H1.2.2 REvision 2010 – Establishing County/Sub Regional Targets for Renewable Electricity Development to 2010, 2004

The objective of this research was to undertake a resource mapping exercise was to identify the renewable energy resources that could contribute to the 2010 electricity generation targets in each sub-region.

A GIS based approach, similar to that used in the regional resource assessment by Terence O'Rourke and ETSU (TORE) (2001) was used. In some cases resource data was used directly from the report or it was extrapolated from regional data. In others, where variations in yields, technology efficiency, policy or legislation, etc., have had a significant effect, the resource was re-computed from first principles.

This process started with an assessment of the technical resource, e.g. land area available and technology efficiency/yields, etc., then exclusion of designated areas like AONBs, National Parks and Heritage Coasts. A range of other practical constraints such as urban areas, inter-visibility limits, buffer zones around dwellings, roads, etc., were also applied where appropriate. Finally, some assumptions about the economic viability and maturity of each technology were used to estimate the accessible resource potential available within the 2010 time frame. What was left was an estimate of the maximum resource that could be exploited, if all the individual power plants concerned could get planning permission, operating permits, capital finance, electricity supply contracts, and be built by 2010.

Annexes 4-6 within the report describe the methodology of estimating the resource available in the south west. This includes resource mapping for each renewable technology on a regional basis. The table below shows the overall resource as estimated in the report.

Overall resource estimate in South West			
ALL SOUTH WEST	*Capacity MW*	*Accessible Resource % of regional target*	*Energy GWh/yr*
Wave Power - Shoreline	2.00	0.3	5.26
Wave Power - Offshore	1.00	0.2	8.76
Tidal Barrage	28.00	4.7	61.32
Tidal Stream	1.00	0.2	2.63
Small-scale Hydro	8.84	1.5	19.36
Solar PV	1.81	0.3	1.58
Biomass - Forest Residues & Energy Crops	100.40	16.9	791.55
Biomas - Straw	6.63	1.1	52.27
Centralised Anaerobic Digestion	15.38	2.6	121.26
Poultry Litter	14.40	2.4	119.84
Landfill gas	36.69	6.2	305.33
Energy from Waste	252.84	42.5	2,104.13
Onshore wind - Single Turbine	3.58 - 353.60	0.6 - 59.4	9.41 - 1,084.14
Onshore wind - Small	62.71 - 367.90	10.5 - 61.8	164.80 - 1,127.98
Onshore wind - Medium	298.68 - 61.10	50.2 - 10.3	784.93 - 187.33
Onshore wind - Large	422.78 - 911.30	71.1 - 153.2	1,111.07 - 2,794.05
Offshore wind	50.00	8.4	153.30
Total	**1,306.74 - 2,212.97**	**219.6 - 371.9**	**5,816.79 - 8,940.75**

The setting of the county/sub regional targets has been led by a full consultation process that has included county, unitary and district officers and members, the renewable energy industry, environment/landscape NGOs, energy NGOs, community groups and other interested parties.

The consultation process has included:

- pre consultation meetings – to build strategic buy in at regional level and raise the profile of the project at sub regional level
- Aastakeholder survey – outcomes used to help plan the consultation workshops and flag up key issues
- consultation workshops – outcomes used to help develop draft target scenarios/ranges for further consultation
- regional conference – to provide snapshot of progress and to initiate discussion on key issues affecting the delivery of the targets arising out of the consultation

Follow up meetings in each county/sub region to facilitate the adoption of the targets by county and unitary authorities in each area.

The targets are not technology specific but for renewable electricity as a whole. This provides the flexibility for individual areas to respond to the opportunities as they arise rather than predetermining the technology mix in advance. However within the 2010 timeframe the principal technologies which are likely to deliver significant levels of renewable electricity are onshore wind, biomass and energy from waste.

H1.2.3 REvision 2020 – South West Renewable Electricity, Heat and On Site Generation Targets for 2020, 2005

REvision 2020 is a project funded by the Government Office for the South West (GOSW) in partnership with the South West Regional Assembly (SWRA). The project follows on from a number of studies already done in the South West on target setting for renewable electricity, including the REvision 2010 report published in 2004 and the Terrence O'Rourke & Energy Technology Support Unit (ETSU) report published in 2001 (referenced in main text).

The REvision 2020 project extends the existing body of work by looking to establish targets for renewable electricity to 2020 and adding targets for renewable heat for 2010 and 2020 and a target for on-site generation within new development. The outcomes of REvision 2020 will be considered for incorporation within the new regional spatial strategy (RSS). The project therefore also proposes a range of planning policies to support the implementation of these targets

As part of REvision 2020, a GIS-based desktop analysis was used, very similar to that used in the REvision 2010 project, the principal difference being a much greater emphasis on offshore technologies. The resource data was sourced in some cases directly from existing reports or extrapolated from regional data. Where variations from 2020 would have significant effects on yields, efficiency, costs, policy or legislation, the resource was re-computed from first principles. This process started with an assessment of the technical resource, e.g. land area available and efficiency, yields etc, then excluded designated areas such as AONBs, National Parks and Heritage Coasts.

A range of other practical constraints such as urban areas, inter-visibility limits, buffer zones around dwellings, roads etc were also applied where appropriate. Finally, some assumptions about the economic viability and maturity of each technology were made to estimate the accessible resource potential available within the 2020 time frame. What was left was an estimate of the maximum resource that could be exploited, if all the individual power plants concerned could get planning permission, operating permits, capital finance and electricity supply contracts, and be built by 2020.

Summary of accessible resources for 2010 and 2020		
Tecnology	*REvision 2010 resource (MW)*[12]	*REvision 2020 resource (MW)*
Onshore wind	788	1,344
Offshore wind	50	50
Biomass – forest residues	4	6
Biomass – energy crops	96	187
Biomass – straw	7	7
Energy from waste	252	310
Landfill gas	46	30
Poultry litter	14	14
Centralised anaerobic digestion	15	2
Wave – offshore	5	285
Wave – shoreline	1	4
Tidal barrage	28	28
Tidal stream	1	122
Hydro	9	15
Building-integrated	2	100

Key differences between the resource assessments for 2010 and 2020 include:

- onshore wind: The increase results from a reduction in the assumed economic wind speed due to improvements in technology and the opportunity to use larger turbines

- energy crops: The increase results from an increase in land growing energy crops by 2020 as opposed to 2010

- energy from waste: The 2020 figure is based on an updated assessment of waste arisings over the period. The equivalent figure for 2010 would be 199MW. The increase is due to high annual waste arisings for secondary treatment after recycling and composting. Figures are based on Environment Agency estimates

- landfill gas: The reduction is due to an assumed reduction in gas production rates from landfills over the time to 2020

- centralised anaerobic digestion (CAD): The CAD figure is lower due to a change in assumptions for the mix between slurry and food waste. In addition, the accuracy of the data on food waste has been improved and has resulted in a downgrading of the resource

- wave and tidal stream: The increase is due to the forecasted rapid improvements in technology development and commercialisation within the timescale to 2020

In order to enable constructive discussion with stakeholders, the multitude of options for renewable electricity development to 2020 were restricted to three scenarios. These scenarios were based on broad assumptions regarding the climate for renewable energy development. The description of each scenario below highlights the generic assumptions that have been used to distinguish the scenarios.

Technology-specific growth has been considered as a function of:

- the accessible resource
- technical maturity (technology development/learning rates)
- commercial viability (fossil fuel prices, government subsidy)
- environmental impact (landscape character, designated areas)
- institutional and infrastructural support (planning, political, grid)

All scenarios assume that government will continue to provide political support to renewable energy and will put in place a target for 20% of UK electricity supplied from renewable sources by 2020, in line with the aspiration in the Energy white paper. It has been assumed for all scenarios that the renewables obligation is also extended to 20% by 2020.

Base scenario assumptions	
Base Scenario 1 (Low Intervention)	Assumes that the current situation largely persists – i.e. onshore wind, and waste technologies remain as main source of renewable generation, and biomass (electricity generation) and marine technologies don't prove to be technically and commercially viable, though there will be some small capacity increase from demonstrator projects.
Base Scenario 2 (Medium Intervention)	As Scenario 1, plus with the following: • Technical viability of new technologies (biomass, marine) demonstrated, but still institutional (capacity of planning system, local public/political acceptance) and infrastructure (grid) constraints for key technologies • Government subsidies introduced for key technologies like marine (wave and tidal stream). Revenue support for renewable heat provides some support for biomass • CHP (combined heat and power) • Policy for on-site generation from renewable sources for new build in place within all local authority Local Development Frameworks (LDFs) in South West by 2010
Base Scenario 3 (High Intervention)	As Scenario 2, plus with the following: • Institutional (capacity of planning system, local public/political acceptance) and infrastructure (grid) constraints are addressed, allowing more rapid deployment of all technologies • Full economic viability of key technologies delivered through combination of high technology learning rates (particularly for marine) high fossil fuel prices and/or high government support

For the purposes of this project two figures for the South West's electricity demand have been estimated. The first assumes the existing energy efficiency and demand reduction policy measures contained within the government's Climate Change Programme (CCP). On this basis it has been estimated that demand in the South West may increase to 2020 by approximately 15%. The second assumes all the savings forecast within the recent Energy white paper. On this basis it has been estimated that demand in the South West may decrease by less than 3%.

In order to meet 20% of the electricity demand as forecasted, an increase in renewable electricity generating capacity to a level somewhere between scenarios 2 and 3 is required. The main technologies that have the potential for increased capacity in terms of the differences between scenarios 2 and 3 include: Onshore wind, energy from waste, biomass, building-integrated renewables, wave and tidal stream.

From the initial stakeholder consultation meeting in March it was clear that there was significant, though not unanimous, concern around increasing the onshore wind contribution further than was outlined within scenario 2. The two further scenarios outlined below therefore look to meet the two different forecasts for electricity demand in 2020 by increasing the other technologies only.

Scenario 2a: (20% electricity demand assuming climate change programme measures) In order to achieve 20% of electricity demand assuming only the existing policy measures already within the government's Climate Change Programme (CCP) (representing a 15% increase in electricity demand within the South West), requires:

- pushing up energy crops use to 75% of the total resource available
- increasing energy from waste so that the vast majority of the waste going for secondary treatment by 2020 will be to energy recovery
- assuming wave and tidal stream reach the maximum capacity outlined within the recent Seapower South West Review report
- that by 2020 PV more commercially viable or higher government support leading to greater retrofit – small scale generators selling ROCs and roof mounted turbines (permitted development) we have third-generation PV technology enabling a significant increase in installation rates due to greater commercial viability

Scenario 2b: (20% electricity demand assuming energy white paper measures) In order to achieve 20% of electricity demand, assuming the energy efficiency and demand reductions implicit within the Energy white paper (representing an 11% reduction in electricity demand within the South West), requires:

- an assumption that wave and tidal stream capacity is increased substantially, though not as high as within scenario 2a

Scenario summary (achieving a 20% target – electricity)

Scenario summary (achieving a 20% target – electricity)		
Onshore tecnologies	*Scenario2a (MW)*	*Scenario2b (MW)*
Onshore wind	550	550
Energy crops	185	100
Building Integrated Renewables	100	50
Hydro	15	15
Energy from waste (eligable for RO)	150	100
Anaerobic Digestion	2	2
Landfill Gas	30	30
Sub total	**1,032**	847
Offshore technologies		
Offshore wind	50	50
Wave	285	250
Tidal stream	122	100
Sub total	**457**	**400**
Total	**1,489**	**1,247**
% Electricity Consumption	**20.0%**	**20.0%**

H1.2.4 The Road to 2020, 2008

This report lays out an early analysis of what the new UK renewables target for 2020 could mean for the South West of England and where there are opportunities for the region to speed up renewable energy deployment. Key findings include:

- generating 15% and 20% of all energy consumed in the South West from renewables is possible by 2020, but requires rapid changes in national policy and stronger support from decision makers at a local level. Without such changes less than 5% of the region's energy will come from renewable sources

- the challenging nature of a 2020 target and the significant deployment risks mean that it will be essential to achieve high and rapid deployment in all technologies

- achieving 15% is critically dependent on the development of offshore wind in the region; achieving 20% additionally requires very extensive installation of renewable heat systems in existing buildings

- achieving a 15% target could result in the equivalent of two-thirds of the region's total electricity consumption being generated by renewable projects, and will require any constraints in the national and regional electricity networks to be speedily addressed
- reducing energy demand and increasing energy efficiency will play a central role in making these targets achievable
- after taking into account landscape constraints, there remains scope for a large increase in the deployment of onshore wind turbines
- the potential for the retrofit of renewable heat systems in existing buildings is large, and could deliver twice the renewable energy output from new buildings constructed to zero carbon standards
- offshore wind deployment is critically dependent on being able to construct foundations in water depths of 30–50 metres at reasonable cost. There is a need for a UK technology accelerator programme to support engineering innovation in deeper water turbine installation

The report also identifies the delivery risks and economic opportunities for each technology area. It concludes by highlighting fifteen key opportunities for the region, and the national enabling actions essential for these opportunities to be realised.

H1.3 Monitoring activity

Monitoring of progress against renewable energy targets is undertaken on the basis of data provided by the renewable energy statistics database (relating to renewable energy generation) and RegenSW. RegenSW carry out research regarding the current/future installed generating capacity of renewable energy projects across the region. By contacting installers and extracting the relevant data which is later analysed in an annual survey (the next being in April 2009), RegenSW are able to provide the regional assembly/local authorities with up to date renewable statistics. However, RegenSW took this work upon themselves as a matter of interest before government requirements were set to a regional level. There is however an issue relating to national data requirements in relation to core output indicators and those capable of being supplied by RegenSW without further financial support.

H1.4 Further work

Since the RSS has still not been approved by the Secretary of State, the region has been reluctant to review the 2020 target in order to determine whether it could be raised. Yearly surveys are however undertaken to determine current installed capacity – the next survey is due in April 2009.

Appendix I
West Midlands

I1.1 RSS renewable energy policies

I1.1.1 Introduction

This regional spatial strategy (RSS) was first issued as regional planning guidance 11 (RPG) in June 2004. At that time a number of issues were identified for further work. These issues were subsequently divided into three blocks of work, with each one forming a partial revision to the RSS:

- phase 1 – the Black Country (*Now Complete*)
- phase 2 – including housing and employment (*Consultation ended December 2008*), and
- phase 3 – including environment issues (*Preparatory work underway*).

5.1.1 Primary renewable energy policies

Policy EN1: Energy Generation

Local authorities in their development plans should:

i) encourage proposals for the use of renewable energy resources, including biomass, onshore wind power, active solar systems, small scale hydro-electricity schemes and energy from waste combustion and landfill gas, subject to an assessment of their impact using the criteria in iii) below. Specific policies should be included for technologies most appropriate to the particular area;

ii) provide locational guidance through supplementary guidance as necessary on the most appropriate locations for each renewable energy technology, having regard to resource potential, the desirability of locating generation sites close to or within areas of demand, and landscape character assessment where appropriate;

iii) identify the environmental and other criteria that will be applied to determining the acceptability of such proposals including:

a) impact on the landscape, visual amenity and areas of ecological or historic importance;

b) impact on surrounding residents and other occupiers;

c) traffic implications, and proximity to transport infrastructure;

Policy EN1: ***continued***

d) the environmental impact of any additional transmission requirements;

e) the extent to which the proposal helps to achieve wider environmental benefits such as reducing harmful emissions to the atmosphere;

f) the way in which the proposal assists in achieving national targets of new electricity generating capacity from renewable energy sources;

g) the extent to which there has been community involvement in developing the proposal; and

h) the extent to which the proposal supports other policies in the development plan; and

iv) facilitate, where proposals come forward, the construction and upgrading of fossil fuel power stations that incorporate clean coal technology, the dual use of fossil and renewable resources, good quality combined heat and power or significant emissions abatement technologies in line with national policies for abatement at source.

The region should aim to contribute as far as possible towards the achievement of the national energy target – 10% of electricity produced from renewable energy by 2010, with an aspiration to double renewables' share of electricity between 2010 and 2020.

8.50: In 2000, the region generated less than 0.1% of its consumption from renewable sources and had installed capacity to deliver some 30MW from combined heat and power (CHP). In both cases there is scope for major increases. The regional energy strategy should include targets for renewable electricity generation, CHP and heat production from renewable sources, having regard to the changing European and national context.

8.51: Technical studies have indicated substantial regional potential for renewable energy generation over the coming decades from biomass, solar, waste and wind sources. Together these could provide in excess of 15% of regional needs with potential as follows:

(a) Biomass – energy crops, forest management wastes and animal wastes – can be used mainly in rural areas and the urban fringe within both large installations generating electricity for the National Grid and smaller ones providing electricity or heat for local use. These developments can help to diversify the agricultural base and provide rural employment thus supporting rural renaissance policies.

(b) Solar energy can, in the short term, be used throughout the region mostly for passive heating of buildings and for domestic water heating. Planning authorities should ensure that development plans facilitate the use of photovoltaic electricity generation technology as this becomes more economic.

(c) Energy from waste (EfW) developments is already established in the MUAs and can contribute to the value recovery targets of policy WD2. Planning authorities should consider EfW where options higher up the waste management hierarchy (as set out in the National Waste Strategy) are not available. Opportunities may also exist to increase use of methane from landfill sites and by coal measures that are not otherwise being exploited.

(d) Energy from wind is likely to become more feasible as technological advances widen potential areas for use. Both major multi-turbine developments and smaller installations supplying power directly to housing or businesses may become possible throughout the region. Local co-ownership of these may assist community regeneration, supporting policies RR1 and UR3. Other types of development, for example small water turbines, could also contribute to local energy supply.

8.52: The location of renewable energy facilities is a cross-boundary, sub-regional and regional issue. If energy targets are to be met, it is important that development plans where possible incorporate policies to help facilitate the realisation of the energy generation potential from all the above sources. The Energy white paper has highlighted the importance of decision-making at local and regional level, including planning, to deliver energy policy objectives, and has indicated the Government's intention to ensure that a strategic approach to energy is developed and implemented by each English region. The RPB should take account of the targets and objectives of any future regional energy strategy and undertake work to address its spatial implications including, where appropriate, identifying unacceptable and preferred areas for particular sources of energy. In identifying such areas, any protective designations are an important consideration to be taken into account.

I1.1.2 Secondary renewable energy policies

Policy CC1: Climate Change

The Joint Core Strategy, the Area Action Plan for Brierley Hill and other LDDs for the Black Country should:

A. Exploit opportunities to both mitigate and adapt to the worst impacts of climate change by:

(i) developing and using renewable energy;

(ii) reducing the need to travel; and

(iii) reducing the amount of biodegradable waste going to landfill;

Policy CC1: ***continued***

B. Enhance and extend natural habitats so that the opportunities for species migration are not precluded and biodiversity can adapt to climate change and hence help to mitigate its affects by reducing 'heat islands', acting as carbon 'sinks', absorbing flood water and providing renewable energy; and

C. Require all new development to:

(i) minimise resource demand and encourage the efficient use of resources, especially water, energy and materials;

(ii) encourage the construction of climate-proofed developments and sustainable buildings to help ensure their long-term viability in adapting to climate change;

(iii) avoid development in areas at risk of flooding and direct development away from areas at highest risk;

(iv) promote the use of sustainable drainage techniques;

(v) facilitate walking, cycling and public transport;

(vi) facilitate effective waste management; and

(vii) protect, conserve, manage and enhance environmental and natural, built and historic assets;

D. Regularly monitor progress and review policies accordingly.

Apart from promoting a more sustainable pattern of development which reduces the need to travel and encouraging the use of more sustainable forms of transport (T1, T2), this guidance includes a number of mechanisms for responding to climate change. These include encouraging the use of sustainable drainage systems (QE9), increasing tree cover (QE8), promoting the reuse of materials (M3, WD1), supporting new industries and technologies that address climate change, and encouraging renewable energy and energy conservation (EN policies).

Policy QE3: Creating a high quality built environment for all

A. Development Plans and other strategies should promote the creation of high quality built environments as part of urban and rural renaissance and the regeneration strategies for the Region's cities, towns and villages.

B. Particular attention should be given to:

i) securing a high quality of townscape, urban form, building design and urban spaces, through the use of architecture, urban design and landscape design, which respects Regional and local character, culture and history;

ii) promoting public art;

iii) incorporating sustainability considerations such as energy and water efficiency, use of renewable energy, sustainable construction and drainage, building orientation, use of recycled materials, minimisation of waste, construction materials, and prolonging the lifespan of buildings;

iv) assessing and minimising the impacts of noise and light pollution as a result of development;

v) creating safer environments which discourage crime; and

vi) promoting community safety.

C. Regard should be had to how land and buildings could be reused to achieve this objective.

(Policy QE3 – See B (iii))

Policy QE8: Forestry and Woodlandsl

A. Development plans, other strategies and programmes should encourage tree cover in the Region to be increased, where it is appropriate to the character of the area, taking account of the Regional Forestry Framework, and in ways that reinforce and support the Spatial Strategy by:

i) designing new planting and woodland expansion so as to maintain and enhance the diversity and local distinctiveness of landscape character within the Region, ensuring that new planting does not adversely impact on the biodiversity of a site;

ii) replacing woodland unavoidably lost to development with equivalent areas of new woodland preferably in the same landscape unit;

Policy QE8: ***continued***

iii) realising the potential for creating larger multi-purpose woodlands, woodlands along transport corridors and reducing fragmentation of ancient woodlands;

iii) realising the potential for creating larger multi-purpose woodlands, woodlands along transport corridors and reducing fragmentation of ancient woodlands;

iv) encouraging the development of forestry and woodland industries where they can contribute to the rural economy particularly where suitable facilities are available, or can be provided, for local processing;

v) ensuring that woodland expansion and management, and the development of any associated facilities, observe sustainable development principles and minimise environmental impacts;

vi) promoting urban and community forestry, including the continuing development of the National Forest, the Forest of Mercia and the Black Country Urban Forest;

vii)promoting, where appropriate, opportunities for short rotation coppice as a raw material and where this can provide a renewable energy resource; and

viii) involving local communities wherever possible.

B. Development plans and other strategies should seek to conserve and protect woodlands, especially ancient and semi-natural woodlands, by:

i) prohibiting the conversion of semi-natural woodland (as defined in the UK Forestry Standard Notes) to other land uses unless there are over-riding conservation benefits;

ii) increasing the protection of ancient woodland sites or ancient semi-natural woodland through consultation with the Forestry Commission over any planned application within 500m; and

iii) exercising a general presumption against the conversion of any woodland to other land uses unless there are overriding public benefits.

8.35: Tree planting and woodland management can be a significant economic activity as well as providing a range of other benefits. The by-products of woodland management and wood processing together with species such as willows are increasingly important as fuel for renewable energy production in the region.

I1.2 Renewable energy evidence base documents

Document	*Date*	*Author*	*Client*
Heat and Decentralised Energy Feasibility Study	2009	Unknown	Advantage West Midlands
Wind Resource Study for the West Midlands Region	2009	Unknown	Advantage West Midlands
West Midlands Regional Energy Strategy	*2004*	*West Midlands Regional Observatory*	*West Midlands Regional Assembly*
Renewable Energy Prospects for the West Midlands	*2001*	*Halcrow*	*Government Office for West Midlands*
(Italics denotes key evidence base document)			

I1.2.1 Renewable Energy Prospects for the West Midlands, 2001

Overview

For the West Midlands, technologies that tap the significant energy resource at sea (tidal, wave and offshore winds) are not appropriate. In addition, the geological structure of the region is such that temperatures are not sufficiently elevated near to the surface to allow the use of geothermal heat. Whilst parts of the region do have significant rainfall totals, the landscape is generally low lying, and thus not particularly suited to large-scale hydro electric development.

Development will therefore be limited to those technologies that utilise wind, biomass (including energy crops and wastes), solar energy and running water. The theoretically available resource from these technologies is extremely large, at about nine times the current electricity consumption. However the development of this resource can be expected to be limited to projects that are economically viable, which gain the necessary development consents, and have the support of the host community.

Methodology

This study builds on previous resource assessments such as those carried out for Shropshire [1998a] and the Manweb distribution area [ETSU, 1994a], but represents the first analysis of the renewable energy resource on a regional level. Where appropriate, data from previous studies has been used. However, due to recent developments in technology and the rapidly changing commercial regulatory and planning policy framework many of the original assumptions have had to be revisited.

For the purposes of this study the resource has been calculated on 3 different levels – theoretical, economic and deliverable:

- *theoretical resource*: The resource that is technically accessible and limited only by reasonable physical constraints. The technically accessible resource can be expected to increase with time and is calculated here on the basis of existing technology or that which is likely to be developed before 2010

- *economic resource*: The resource that is economically viable within the proposed commercial and regulatory framework. The 'proposed' framework includes the introduction of the renewables obligation, the New Electricity Trading Arrangements and the climate change levy

- *deliverable resource*: The resources that can be harnessed after taking into account both economic constraints and the public policy framework. The policy framework includes environmental protection, development control, land use and waste management practices

The calculations themselves are presented in **Appendix A**, together with a record of all the assumptions that have been made. From this the progression from theoretical to economic to deliverable can be clearly traced.

Chapter 4 of the report looked at the economic and commercial constraints to firstly, determine which renewable energy technologies are likely to be cost competitive in the next 10 years under the proposed legislative framework and, secondly, determine where these technologies will be viable in the West Midlands. This research is then used as the basis for the calculation of the economic resource in **Appendix A**.

Targets/recommendations

Currently 3% of the region's electricity consumption is generated from renewable energy, primarily from energy from waste resources. Whilst there is the potential for the region to treble this figure from sites that are probably commercially viable and generally environmentally acceptable, this would be extremely challenging to achieve in the next decade – particularly as a large proportion of this total resource would have to come from wind developments.

On present indications and without additional support, only projects of existing types - mainly in the energy from waste sector - may actually be delivered by 2010 and these could generate around 5% of the region's electricity consumption. This report provides the data which enables local authorities to identify resources in their areas and review their policies and guidance accordingly.

Specific policies and guidance on the exploitation of renewable energy resources should be included in all strategic and local plans. This study has shown that renewable energy is an issue for all authorities, whether urban or rural, as development throughout the region of all technologies will be required if the environmental benefits are to be realised.

Regional activities should assist central government in continuing to support renewable energy development through mechanisms such as the proposed renewables obligation and by forms of subsidy where appropriate. The importance of pre-commercial developments cannot be stressed enough as they have a vital role in building market and public confidence in change. Additionally, long term stability in support mechanisms is required to enable commercial projects to raise finance from any source

Small-scale projects face particular financial barriers to development under the anticipated market conditions. However, this type of project can be valuable in raising awareness of many types of technologies at a local scale, and can stimulate community involvement in sustainable development. Specific support measures should be developed that recognise these important roles.

The electricity distribution network needs to be developed to recognise that in future it will have to be operated in a way that allows for the benefits of embedded generation to be delivered. Reinforcement of lines and other transmission equipment will be required to enable many renewable generators to be connected.

The time frame of the development of many renewable energy technology projects can be up to 5 - 6 years. Thus, action and support is required immediately if the 2010 targets are to be met, let alone the 2003 targets.

Many renewable energy resources are well suited to the direct delivery of heat to domestic, commercial and industrial applications. To the extent that they substitute for electrically generated heat, they could be argued to contribute directly to the 2010 target. They could also substitute for other fossil fuel combustion and help combat global warming in that way. Therefore, it is recommended that regional assessments are also carried out to research the potential of these resources and of vigorous energy efficiency measures to meet the UK's climate change and sustainability objectives.

I1.2.2 West Midlands Regional Energy Strategy, 2004

The West Midlands regional energy strategy sets out the following vision for the region;

By 2020 we will have delivered the West Midlands' commitment to the climate change challenge, having ensured a sustainable, secure and affordable supply of energy for everyone and strengthened the region's economic capability.

The strategy has four headline objectives:

- improving energy efficiency
- increasing the use of renewable energy resources
- maximising uptake of business opportunities

- ensuring focused and integrated delivery and implementation

Its targets for renewable energy are as follows:

- renewable generation equivalent to 5% of electricity consumption by 2010 and 10% by 2020.

- the 2010 target is equivalent to: up to 75 MW of landfill gas fuelled generators, 100 1.5 MW wind turbines and 27 1MW biomass/biogas powered generators

- heat from renewable sources providing 250 GWh (0.3% of consumption) by 2010 and 650 GWh (1% of consumption) by 2020

- production of 460 GWh of liquid biofuels per year (approximately 44 million litres - 2% of current diesel sales) by 2010

I1.2.3 Wind Resource Study for the West Midlands Region, 2009

This study builds on work originally done in 2001 for Government Office for the West Midlands, which was partially updated in 2004 for the regional energy strategy. The 2007 Energy white paper (EWP) asked regional development agencies (RDAs) to identify opportunities as to how they could bring forward decentralised energy (DE) projects. This study was commissioned in response to the commitments contained within Advantage West Midlands' low-carbon regional economic strategy *Connecting to Success* (2007) and the regional climate change plan.

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

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

The study reveals that 2% of the West Midlands, equivalent to 30 kilo hectares (30k ha), has prioritised practical wind resource available. Data provided by the British Wind Energy Association reveals that the potential for deployment of wind turbines is in the region of up to twenty 1.5MW turbines over an area of 100 hectares. Given this nominal deployment level, the study shows that an upper limit on regional wind power generation would be in the region of 9000MW should all sites be developed to the limit of their capacity.

I1.2.4 Heat and Decentralised Energy Feasibility Study, 2009

The recent Energy white paper (EWP) asked regional development agencies (RDAs) to identify opportunities as to how they could bring forward decentralised energy (DE) projects. This work was commissioned in response to the EWP and commitments set out in the regional climate change plan and *Connecting to Success* delivery plan.

The study shows the potential for combined heat and power networks in the region. The study maps domestic and non-domestic heat and electricity demand by super output areas (LSOA) and has identified a series of scenarios that have been put through economic and technical modelling to identify the best options for supporting CHP.

Key findings were as follows:

- the key opportunities for CHP are in the domestic, public and commercial sectors, principally in flats, hospitals, offices and retail premises
- the opportunities can be realized by awareness raising and some form of financial incentive
- there is the potential to treble uptake of CHP in the region in the public and commercial sector, yielding over 500 GWH/yr additional heat supply, saving over 57,000 tonnes of CO_2 per year and driving an additional £143m capital investment
- awareness raising alone in the public and commercial sector would increase uptake by 28%, yielding an additional heat supply of almost 50 GWH/yr (5,700 tonnes of CO_2 and £14m of capital investment)
- the study estimates that industry (mainly chemicals, food and drink and pulp and paper) could double its uptake of CHP, yielding over 1000 GWH/yr additional heat (over 100,000 tonnes of CO_2 and almost £300m capital investment)
- these figures are complimented with other studies (e.g. URS *Low- Carbon Evidence Base* report estimated that regional support for DE could result in 530,000t CO_2 assuming 8-12% conventional electricity replaced by gas-fired CHP.) This figure would be higher if the sources were renewable or more existing heat sources were used

I1.3 Monitoring activity

In the absence of more accurate regional data, monitoring of progress against renewable energy targets in the region is undertaken on the basis of national statistics provided by BERR.

The West Midlands Regional Observatory currently undertakes renewable energy monitoring for the regional energy strategy and have identified the need for monitoring of renewable energy on a more regular basis.

I1.4 Further work

There is no forthcoming work in relation to renewable energy at present. Renewable energy will however be reviewed as part of the phase 3 revision of the RSS, which will need to address concerns about the lack of significant progress towards national and regional targets. A requirement that a percentage of the energy to be used in new developments is provided from renewable energy sources has been incorporated in the preferred option for the phase 2 revision.

Appendix J
Yorkshire and Humber

J1.1 RSS renewable energy policies

J1.1.1 Introduction

The Yorkshire and Humber plan was adopted in 2008. A review of its housing policies is currently underway. At this time, there are no revisions to the plan's renewable energy policies planned, although the region will begin considering the preparation of its integrated regional strategy soon.

J1.1.2 Primary renewable energy policies

Section 10: Environment

POLICY ENV5: Energy

The region will maximise improvements to energy efficiency and increases in renewable energy capacity. Plans, strategies, investment decisions and programmes should:

A. Reduce greenhouse gas emissions, improve energy efficiency and maximise the efficient use of power sources by:

1. requiring the orientation and layout of development to maximise passive solar heating
2. ensuring that publicly funded housing, and Yorkshire Forward supported development, meet high energy efficiency standards
3. maximising the use of combined heat and power, particularly for developments with energy demands over 2MW, and incorporating renewable sources of energy where possible
4. ensuring that development takes advantage of community heating opportunities wherever they arise in the region, including at Immingham and near Selby
5. providing for new efficient energy generation and transmission infrastructure in keeping with local amenity and areas of demand
6. supporting the use of clean coal technologies and abatement measures

POLICY ENV5: *continued*

B. Maximise renewable energy capacity by:

1. Delivering at least the following regional and sub-regional targets for installed grid-connected renewable energy capacity:

	2010	*2021*
Humber	124MW	350MW
North Yorkshire	209MW	428MW
South Yorkshire	47MW	160MW
West Yorkshire	88MW	295MW
Offshore	240MW	630MW
Total	**708MW**	**1862MW**

2. Monitoring annually planning permissions and developments against the indicative local authority targets for 2010 and 2021 set out in Table 10.2 and taking action accordingly in order to ensure the regional and sub-regional targets are exceeded
3. Promoting and securing greater use of decentralised and renewable or low-carbon energy in new development, including through development plan documents setting ambitious but viable proportions of the energy supply for new development to be required to come from such sources. In advance of local targets being set in DPDs, new developments of more than 10 dwellings or 1000m^2 of non-residential floor space should secure at least 10% of their energy from decentralised and renewable or low-carbon sources, unless, having regard to the type of development involved and its design, this is not feasible or viable.

POLICY ENV5: *continued*

OUTCOMES	*INDICATORS*	*TARGETS*
Renewable and low carbon energy capacity in the Region will have increased significantly.	Installed grid-connected renewable energy capacity (MW). Renewable energy capacity in extant planning permissions (MW). Installed non-grid-connected renewable energy capacity (KW). Installed "good quality" CHP capacity (Mwe). Installed non-grid-connected "good quality" CHP capacity (Mwe). Targets for local renewable energy in new development in DPDs	As set out in policy ENV5 and table 10.2.
Maximum efficient use of existing power sources.	Improved energy efficiency.	Increase average home energy rating to SAP 65 by 2016 for all stock. All new publicly funded housing meets at least level 3 of the Code for Sustainable Homes. All new Yorkshire Forward funded development meets at least BREEAM "very good".

LEAD IMPLEMENTATION ROLES	*MAIN MECHANISMS*
Local Authorities.	Local Development Frameworks.
	Development control.
Yorkshire Forward.	Regional Economic Strategy.
YHA.	Regional Energy Infrastructure Strategy.
	Regional Housing Strategy.
	Integrated Regional Framework.

Table 10.2: **Indicative local targets for installed grid-connected renewable energy in 2010 and 2021 (MW)**

	2010	*2021*
Barnsley	15	34
Doncaster	11	37
Rotherham	11	36
Sheffield	11	52
South Yorkshire	**47**	**160**
Leeds	11	75
Wakefield	11	41
Calderdale	19	53
Kirklees	11	48
Bradford	11	56
Co-firing	25	23
West Yorkshire	**88**	**295**
York	11	31
Craven	18	48
Hambleton	40	97
Harrogate	17	70
Richmondshire	18	39
Ryedale	10	19
Scarborough	5	24
Selby	14	32
Co-firing	75	67
North Yorkshire	**209**	**428**
East Riding	41	148
Hull	6	39
North Lincolnshire	54	112
North East Lincolnshire	23	50
Humber	**124**	**350**
Offshore	**240**	**630**
Total	**708**	**1,862**

10.26 The region has a history of providing power. Its plentiful mineral and water resources have contributed to the development of industry and have also led to the establishment of several major coal-fired power stations in the Selby area.

10.27 These power stations currently provide 17% of the UK's total electricity needs. In 2007, installed renewable energy capacity in the region totalled approximately 168mw but it has the potential to generate far more. The *Sub regional Renewable Energy Assessment and Targets Study* (2004) identified potential renewable energy targets at a regional, sub regional and local authority level to 2010 and 2021. The study suggested that most of this renewable energy might come from wind turbines and biomass for co-firing in the power stations to 2010, and that other technologies such as photovoltaics would be increasingly significant thereafter.

10.28 The Energy white paper (2007) confirms the requirement for 10% of UK electricity to come from renewable energy by 2010 (with an aspiration to double this by 2020). The Building Regulations require increasingly high standards of energy efficiency from new development, and PPS22 provides for much more generation from renewable energy sources, for RSS to provide regional (and sub regional) targets for Renewable Energy, and for local authorities to take a positive and pro-active approach to renewable energy. The new PPS on climate change builds on this and challenges RSS to set regional targets for renewable energy capacity in line with national targets, or better where possible.

10.29 The purpose of policy ENV5 is to increase energy efficiency through passive design, better use of existing power sources and other measures, and to increase installed renewable energy capacity in the region. If the targets set out in policy ENV5 are met then renewable energy could provide 9.4% of the region's electricity consumption by 2010 and 22.5% by 2021. These targets include current installed renewable energy capacity. Individual Local Authority figures help to inform the delivery of the sub regional targets and provide suitable spatial dimension for those targets. The delivery of these targets will lead to wider economic and environmental benefits, reduced greenhouse gas emissions, provision of a secure and diverse energy supply for businesses and residents and reduced instances of fuel poverty.

10.30 The renewable energy targets set out in policy ENV5 and Table 10.2 take into account the fact that wind energy developments within internationally important biodiversity sites are very unlikely to be acceptable. Renewable energy development elsewhere will need to avoid having an adverse effect on the integrity of internationally important biodiversity sites, which could arise for example by affecting bird movements or affecting water quality. Renewable energy policies in development plan documents, and development proposals, may need to be subject to appropriate assessment to quantify on and off-site implications. Further research will be carried out into these implications and this will inform revisions to the renewable energy targets as part of a future review of the plan.

10.31 Local authorities have an important role to promote renewable energy development, ideally with other authorities on a sub regional basis, and provide supplementary locational and environmental criteria to be used in assessing such development as needed; have regard to aviation and Ministry of Defence needs; commit to monitoring and management; and consider opportunities for biomass and CHP and community heating schemes, especially in remoter rural areas off the gas mains network.

10.32 In order to meet the Government's carbon-cutting ambitions, both higher levels of energy efficiency and much greater use of renewable energy is required. PPS1 *Planning and Climate Change* emphasises the important role of local planning authorities in providing an evidence–based understanding of the feasibility and potential for much greater use of local renewable and low-carbon energy in new developments as part of their strategies for mitigating and adapting to climate change. This will mean different things in different locations, with individual planning authorities setting local level thresholds and proportions of the local renewable and low carbon energy that will be expected to supply new development. In doing so, local planning authorities should frame ambitious targets that fully reflect local opportunities and are deliverable alongside wider housing and economic objectives. Policy ENV5 sets out an interim target of at least 10% to be applicable for certain types/sizes of new development where feasible and viable until local targets have been adopted in DPDs.

J1.1.3 Secondary renewable energy policies

Spatial vision and core approach (see Outcome 7)

Table 2.1: **Spatial vision and headline outcomes *continued***

In Yorkshire and the Humber over the next 15 to 20 years there will be more sustainable patterns and forms of development, investment and activity, and a greater emphasis on matching needs with opportunities and managing the environment as a key resource. The following outcomes will be achieved:

Outcomes	*Contextual indicators*	*Headline indicators*
5. Inequalities have been reduced, the **health and well-being** of the population has improved, and currently excluded communities and areas requiring **regeneration** housing markets.have benefited from development and investment.	Unemployment. Basic skills. Workforce skills & training. Culture. Health. Deprivation. Crime. Community well-being. Sport and physical activity.	Amount of development by settlement type and in Regeneration Priority Areas. Change in areas with failing Community, sport and green infrastructure provision in Regeneration Priority Areas.
6. People have better **accessibility** to opportunities and facilities, the use of public transport and walking and cycling has increased, and growth in traffic congestion and transport-related emissions has been addressed.	Traffic volume. Transport use. Access to services.	Accessibility of housing development to public transport services. Progress on achieving modal shift.
7. **Environmental quality** has been raised, resource demands from development minimised, and the region is responding pro-actively to the global and local effects of climate change.	GHG emissions. Air quality. Water quality. Bathing water quality. Sea level change. Annual temperature & rainfall. Woodland cover. Ecological footprint. Local sites in active management. Wild bird population.	Countryside quality. Condition of SSSIs. Development taking place contrary to sustained objections from EA on flood risk. Amount of waste to landfill. Installed renewable energy capacity.
8. The use of the region's land and existing social, physical and green infrastructure has been optimised.	Urban renaissance. Historic and cultural assets. Countryside quality. Green infrastructure.	Amount of development on previously developed land.

Overall approach and key spatial priorities (see point 8)

POLICY YH1: Overall approach and key spatial priorities

A Growth and change will be managed across places and communities in Yorkshire and Humber in order to achieve sustainable development and the Spatial Vision as set out in Table 2.1

B Plans, strategies, investment decisions and programmes should aim to:

1. Transform economic, environmental and social conditions in the Regeneration Priority Areas - the older industrialised parts of South Yorkshire, West Yorkshire and the Humber
2. Manage and spread the benefits of continued growth of the Leeds economy as a European centre of financial and business services
3. Enhance the role of Sheffield as an important business location within its wider city region
4. Optimise the opportunities provided by the Humber Ports as an international trade gateway for the region and the country
5. Support Principal Towns and Local Service Centres as hubs for the rural and coastal economy and community and social infrastructure and encourage diversification of the rural economy
6. Protect and enhance the region's environmental resources including areas of international and national importance, and the character and qualities of the Region's coast and countryside including for economic and social development
7. Avoid exacerbating environmental threats to the region and reduce the region's exposure to those threats
8. Avoid increasing flood risk, and manage land and river catchments for flood mitigation, renewable energy generation, biodiversity enhancement and increased tree cover
9. Ensure that transport management and investment support and help deliver the spatial strategy

Climate change and resource use (see point 7)

POLICY YH2: Climate change and resource use

Plans, strategies, investment decisions and programmes should:

A Help to meet the target set out in the RES to reduce greenhouse gas emissions in the region in 2016 by 20-25% (compared to 1990 levels) with further reductions thereafter by:

1. Increasing population, development and activity in cities and towns
2. Encouraging better energy, resource, and water efficient buildings
3. Minimising resource demands from development
4. Reducing traffic growth through appropriate location of development, demand management, and improving public transport and facilities for walking and cycling
5. Encouraging redevelopment of previously developed land
6. Facilitating effective waste management
7. Increasing renewable energy capacity and carbon capture

B Plan for the successful adaptation to the predicted impacts of climate change by:

1. Minimising threats from and impact of coastal erosion, increased flood risk, increased storminess, habitat disturbance, increased pressure on water resources, supply and drainage systems;
2. Maximising opportunities from: increased growing season; greater tourism potential; and warmer urban environments.

POLICY YH2: ***continued***

OUTCOMES	*INDICATORS*	*TARGETS*
Greenhouse Gas Emissions will have been reduced	Greenhouse gas emissions.	Reduce GHG emissions from the region in 2016 by 20-25% (compared to 1990 levels) with further reductions thereafter.
The Region will continue to adapt successfully to the predicted impacts of climate change.	Number of planning permissions granted contrary to sustained objections from Environment Agency about flood risk.	Nil planning permissions granted contrary to sustained objection from Environment Agency.
Resource use will have reduced	Energy, resource and water efficiency of buildings. Renewable energy capacity. Waste managment facilities.	Increase average home energy rating to SAP 65 by 2016 for all stock. All new publicly funded housing meets at least level 3 of the Code for Sustainable Homes. All new Regional Development Agency funded development meets at least BREEAM "very good".

2.17 Clear evidence shows that greenhouse gas emissions (particularly CO_2) from domestic, industrial and transport-related energy uses are causing climate change, and will continue to do so for decades to come. This has potentially devastating consequences to the global environment, and poses a significant threat to social cohesion and economic systems.

2.18 The Government has set a national target to reduce GHG emissions by 12.5% below 1990 levels over the period 2008 – 2012 and move towards a 20% cut in CO_2 below 1990 levels by 2010 (and aiming towards a 60% cut by 2050). The regional target referred to in policy YH2 is that committed to in the RES. Achieving this target, and ensuring reduced greenhouse gas emissions in the longer term, will require a wide range of actions, many of which fall outside the scope of RSS. The target is intended to provide a strategic framework for these actions, to inform forward planning and for monitoring purposes. Monitoring progress towards the target will be important and this may lead to revisions to this plan and other strategies, plans and programmes. It will not however be appropriate to use this as a basis for making decisions on individual development proposals. The region's climate change action plan with its three year programme, adopted in 2006, highlights some of those actions. When reviewed in 2008 it will have a valuable role in helping to promote and monitor reduced greenhouse gas emissions and regional adaptation to climate change.

2.19 Studies by Cambridge Econometrics identify current greenhouse gas emissions produced in the region by source. It shows how power generation from the power stations (Drax, Eggborough, Ferrybridge) account for at least half of the region's emissions, and also shows projected estimates by source. It shows how power generation will still account for most of the region's greenhouse gas emissions, and that, at present, the region itself is unlikely to meet its reduction targets. This necessitates a greater prioritisation on reducing greenhouse gas emissions.

2.20 Although spatial policy can influence transport, economic development, housing, energy, waste and infrastructure, the plan has little direct influence over emissions from existing housing, power generation infrastructure, industry and commerce. However, other plans, strategies, programmes and investment decisions (especially in the regional economic strategy) have an opportunity to influence these issues, and should therefore also find ways to reduce emissions.

2.21 Perhaps the greatest impact the plan can have on greenhouse gases is through increased urban density and related public transport networks, especially in the Leeds City Region. This will have the added benefits of making public transport more viable, and helping to achieve a transformation of urban areas.

2.22 The *Climate Change Impacts Scoping Study for the Region* establishes climatic scenarios for the 2020s, 2050s and 2080s, and shows that the climate will get warmer, with winters becoming wetter and summers drier. It also shows that there will be increases in rainfall intensity, and that extreme events, such as droughts and floods, will become more frequent, leading to impacts with varying consequences for quality of life.

2.23 Specific threats to the region from climate change include: continued erosion of the east coast; increased flood risk and loss of inter-tidal habitats in the Humber Estuary; loss of montane heathland in the Pennines; loss of peat bogs in the North Yorks Moors and Humberhead Levels; increased winter flood risk in the Vale of York and Aire/Calder river catchments; increased pressure on urban water supply and drainage systems; increased risk of Sherwood Sandstone aquifer depletion. General opportunities include: increased growing season, greater tourism potential; and warmer urban environments.

2.24 The UKCIP 2008 climate change projections will provide a greater level of spatial detail, greater clarity on the likelihood of different climate change impacts occurring over time, and support better risk-based decision-making in the region. The challenge to local authorities and others in the region is therefore to take a twin-track approach to climate change using the most up-to-date information available. This entails reducing emissions and adapting to impacts, and planning for future development accordingly. The sub area sections address this in more specific spatial terms. Issues such as flood risk, water, energy and modal shift are addressed in more detail in sections 10 and 13. This twin track approach should also reflect the importance of managing the region's unique environmental resources, including maintaining the integrity of internationally important biodiversity sites, and the increasingly important role of green infrastructure in helping urban areas adapt to climate change.

2.25 The Government provides annual electricity and gas consumption information at a local level to support regional greenhouse gas and emissions monitoring work. Further work to improve monitoring to provide more detailed annual emissions information at regional, sub-regional and local level is required.

Green infrastructure (see point 4)

POLICY YH8: Green infrastructure

A Areas and networks of green infrastructure will be identified, protected, created, extended, enhanced, managed and maintained throughout the region to ensure that an improved, accessible and healthy environment is available for the benefit of present and future communities whilst protecting the integrity of internationally important biodiversity sites

B LDFs should:

1. Define a hierarchy of green infrastructure, in terms of location, function, size and levels of use, at every spatial scale and across all areas of the region based on analysis of existing natural, historic, cultural, sport and playing field, and river and landscape assets, including the identification of new assets required to deliver green infrastructure;
2. Identify and require the retention and provision of substantial connected networks of green infrastructure, particularly in urban, urban fringe and adjacent countryside areas;
3. Ensure that policies have regard to the economic and social as well as environmental benefits of green infrastructure assets; and
4. Identify the functional role of green infrastructure in supporting the provision of renewable energy, urban microclimate control, and flood risk management.

C Assets of particular significance for the protection and enhancement of green infrastructure include national and inter-regional trails (policy T5E), floodplains (policy ENV1),,woodlands (policy ENV6), biodiversity(policy ENV8) and heritage (policy ENV9) and distinctive landscapes (policy ENV10).

Delivering the core approach over 15-20 years

Table 2.2: **Delivering the core approach over 15-20 years**

	Early Years	Mid Years	Later Years
Economy continued	• Safeguarding employment sites in/around town and city centres and at strategically important locations • Strengthening the role/performance of town/city centres • Enabling priority sectors and clusters to flourish	• Creating a stock of employment land and buildings fit for modern 21st century economy • Realising the opportunities at sites in/around town and city centres and at strategically important locations • More accessible workforce, by public transport	
Environment	• Avoiding development in high flood risk areas • New flood storage and habitat areas being created • Ensuring adequate water supplies • Improving flood defence and sewerage infra-structure in cities and major towns • More planting in urban areas • Important landscapes and habitats protected • Heritage of cities and towns harnessed • Health issues being addressed • Increased generation of renewable energy, but mostly from wind turbines • Development of waste recycling centres • Less primary extraction in National Parks and AONBs	• Upland flood alleviation measures reducing the risk of flooding • More energy provided by combined heat and power, from renewable and more efficient sources • Better public access to woodlands and urban fringes improved • More networks of urban greenspace and ecological corridors • More green recreational opportunities within cities and towns • Greater tree cover • Improvements in worst performing areas in terms of health • Increased generation of renewable energy, with greater contributions from biomass and PVs • Reduced waste production	• Increased woodland cover in the Region leading to greater carbon storage • A more diverse range of uses on agricultural land, particularly in upland and remoter rural areas • Functional habitat networks created to provide functioning networks • Fragmented habitat corridors and distinctive and historic landscapes restored • Greatly reduced disparities of ill health across the region • Greatly increased generation of renewable energy, with biomass and PVs providing mainstay of this • High levels of recycling and recovery

Continued

Sub-regional policies

POLICY LCR1: Leeds City Region

C. Environment continued

6. Use the opportunities provided by increased development in urban areas to maximize renewable energy generation and energy efficiency

3.21 The sub area includes most of the region's energy capacity, with a cluster of coal-fired power stations south of Selby where there is potential for adaptation to allow use of locally produced biomass. Large scale new development associated with growth and regeneration south and east of the core urban areas has great potential to include district heating.

POLICY SY1: South Yorkshire sub area policy

C. Environment continued

4. Encourage planting for biomass in Doncaster, Barnsley and Rotherham

Policy HE1: Humber Estuary sub area policy

C. Environment continued

3. Develop the sub area's renewable energy generation potential, whilst taking into account of the potential cumulative impact of large numbers of wind turbines and associated development.

5.17 The Humber Estuary sub area has a major role to play in terms of the region's renewable energy generation requirement. In part, this is because of planned and/or proposed offshore wind farms which will require on-shore facilities on both banks of the Estuary. Existing power generation infrastructure on the south bank is a particular attraction for further wind turbine development. However, care needs to be taken to protect this area from over-development of wind turbines to the detriment of the area's character and amenity.

5.18 Economic development and renewable energy development will need to be achieved in the sub area in ways which maintain the integrity of internationally important biodiversity resources along the Humber estuary. The extent to which different objectives can be realised will only become clear as local policies are developed and specific development proposals come forward. In particular, the requirement to subject local policies and proposals to Appropriate Assessment is likely to determine the nature, location and scale of development so that it does not affect the integrity of the Humber Estuary's international biodiversity interest. Such assessments may indicate the need to compromise development aspirations or to invoke "IROPI" (as defined in Regulation 49 of the Habitats Regulations 1994 amended by the Conservation (Natural Habitats etc) (Amendment) Regulations 2007) to allow development to take place. If the latter arises, there is potential to develop an integrated approach to habitat enhancement and creation across the whole estuary, linked to other measures such as flood management and managed realignment.

Vales and Tees links

7.7 The sub area has generally good potential for more wind energy development, this need to be balanced by other considerations such as landscape character. Transportation facilities make the sub area suitable for increased biomass production to supply the region's major power stations along the River Aire.

Coast

8.15 There are a number of new off shore issues which challenge the coastal environment. Although the east coast has limited conventional energy generation capacity and related infrastructure, the sub area will have an important role in terms of renewable energy generation. Off shore wind farms, especially off the Holderness coast and the south-east area of the region, will require new on shore infrastructure. Developing these facilities on and off shore will need to account for important environmental and amenity factors. The region's coast and Humber Estuary may have significant potential for hydropower. Off shore sand and gravel extraction may have adverse marine environmental impact.

Remoter rural

9.13 In terms of energy, landscape and biodiversity designations reduce the capacity for wind farms in the sub area – however there may be scope for increases in biomass production and for further exploiting the sub area's potential for hydro power.

Section 10: Environment

POLICY ENV6: Forestry, trees and woodlands

A. The Region will safeguard, manage and enhance its existing tree and woodland resource in line with the regional forestry strategy, and in particular increase the area of woodland under active management and increase the total woodland area by approximately 500 Ha per year.

B. Plans, strategies, investment decisions and programmes should:

1. identify, safeguard and enhance ancient woodlands, especially in South and West Yorkshire
2. provide for increased woodland planting, especially in East, South and West Yorkshire, and Hull, and in upland catchments and most parts of functional floodplains
3. conserve, enhance and increase planting in urban areas, especially on previously developed land and on land by motorways and railways
4. increase planting for biomass and encourage the management of existing woodland for wood fuel
5. improve public accessibility to and within woodlands in or near towns and cities
6. avoid large scale coniferous forestry projects on the Sherwood Sandstone aquifer associated development.

POLICY ENV7: Agricultural Land

A. If development of agricultural land is required it should take place on poorer quality land wherever possible and appropriate.

B. Development or use of agricultural land in appropriate locations will be encouraged for the following:

1. provision of renewable energy crops, especially biomass for co-firing in power stations in the Selby area
2. tourism, especially in the Yorkshire Dales, North York Moors, Yorkshire and Lincolnshire Wolds, Humberhead levels and the coast
3. creation of woodland, especially in East, South and West Yorkshire
4. positive land management for flood alleviation, and increased water storage capacity on farms, especially in remoter rural areas
5. wildlife habitat creation schemes, especially links between habitats
6. outdoor recreation projects, especially in areas of poor health in South and West Yorkshire
7. local produce for sale on site of main farm business
8. local waste management schemes, such as composting

POLICY ENV12: Regional waste management objectives

A. Plans, strategies, investment decisions and programmes should aim to reduce, reuse, recycle and recover as much waste as possible.

B. Local authorities should work with regional partners, including commerce, the Environment Agency, the waste industry, Recycling Action Yorkshire and community groups to ensure the integration of strategies and proposals for sustainable waste management.

C. Local authorities should support the urgent provision of a combination of facilities and other waste management initiatives which best meets environmental, social and economic needs for their areas based on the following principles:

1. moving the management of all waste streams up the waste hierarchy
2. achieving all statutory waste management performance targets during the plan period
3. managing waste at the nearest appropriate location, where necessary by seeking agreement with neighbouring authorities

10.65 Waste has traditionally been seen as a by-product of economic activity, to be disposed of by the cheapest possible method, normally direct land filling without pre-treatment. This approach is no longer acceptable and it is essential that the region places far greater emphasis on applying the waste hierarchy: avoiding waste production in the first place and then recovering value from the waste that is produced through re-using products, recycling/composting materials or energy recovery, only disposing of the residual proportion that has no value. Yorkshire and Humber is currently one of the worst performing regions in terms of recycling and recovery. Priority needs to be given to initiatives and facilities which encourage and promote waste reduction and the reuse of materials and products.

POLICY ENV13: Provision of waste management and treatment facilities

Waste planning authorities should individually or jointly ensure that adequate sites and facilities are available to manage municipal, commercial and industrial, construction and demolition, agricultural, and hazardous waste, taking account of the benchmark figures set out in Tables 10.4–10.8. Specifically, waste planning authorities should:

A Take into account:

1. Capacity of treatment and recovery facilities to deal with municipal and commercial and industrial waste will need to double by 2020 in all sub regions to provide the additional capacity identified in Table 10.4
2. The existing range of facilities for dealing with hazardous waste will need to change to provide for more treatment and less landfill
3. In the short term there is generally adequate landfill capacity, but there may be a need for new capacity to replace existing facilities, particularly in West Yorkshire, before 2020.

B Take into account:

1. The split between the need to provide facilities to manage the final disposal and recovery/recycling of waste
2. The need to meet nationally set targets for recycling and recovery, including those derived from the Landfill Allowance Trading Scheme
3. The contribution made by new and existing waste facilities and the anticipated lifespan of such facilities
4. The provisions of policy E3 (the economy and employment land reviews)
5. Annual waste and waste facility monitoring data provided by the Regional Technical Advisory Body
6. Opportunities to provide treatment facilities for multiple waste streams

POLICY ENV13: ***continued***

C Consider the specific requirements arising from:

1. Significant transfers of waste across the regional boundary
2. The likelihood of significant irregular arisings of hazardous waste from site regeneration/remediation projects during the plan period

D Liaise with neighbouring districts, the RTAB, Recycling Action Yorkshire and community stakeholders to consider any requirements arising from:

1. The need to establish an accessible network of civic amenity or other recyclates collection public "bring" sites
2. The need to make provision for sites for new waste related businesses (either on a grouped "park" or individual basis) to encourage their establishment.

OUTCOMES	*INDICATORS*	*TARGETS*
A network of appropriate waste facilities which provide effective waste management in line with the LA annual waste tonnage allocations.	Adequate waste management facilities in the region.	
	Recycling and composting of household waste.	At least 40% by 2010, 45% by 2015 and 50% by 2020.
	Recovery of municipal waste.	53% by 2010, 67% by 2015 and 75% by 2020.
	Landfill of biodegradeable municipal waste.	As set out in the Landfill Allowance Trading Scheme.

10.71 The waste apportionment set out in Tables 10.4–10.8 is expressed as annual rates. The figures are based on initial data provided by the Environment Agency and Defra from surveys or recorded figures. For municipal waste these were then subject to five scenarios that looked at various growth rates based on historical waste and housing growth and an average of the five scenarios was used. For other types of waste projections for growth used historical data and the impact of employment and industrial growth rates. National waste strategy 2007 targets and other information were used as a source for information on the required capacity for various forms of waste disposal. The figures in tables 10.4–10.8 are not intended to be a detailed forecast but to provide a suitable benchmark for the preparation of local development documents. They also provide the basis for annual monitoring as part of a continuous planning process. The methods for managing municipal, commercial and industrial waste are described in broad terms only, and the minimum levels of treatment and recycling, and the maximum levels of landfill, are based on targets in the waste strategy for England 2007. The technology mix of waste treatment and recovery facilities (including recycling and energy from waste) will differ in different parts of the region and will influence the precise split between recycling and recovery totals. The RTAB will produce an annual monitoring report which will provide additional relevant information to be taken account of by waste planning authorities.

10.72 Waste planning authorities should allocate sites to support the pattern of waste management facilities set out in ENV 13 and tables 10.4–10.8 in accordance with the locational guidance in ENV14. In doing so they should identify the type or types of waste management facility that would be appropriately located on the allocated site or in the allocated area, taking care to avoid stifling innovation in line with the waste hierarchy. Acceptable waste management technologies are set out in the national waste strategy 2007 and include, for example, combined heat and power schemes, on-site thermal treatment, and bio-digesters.

10.76 By setting a minimum recycling quota, local authorities wishing to achieve higher recycling standards can do so. Local authorities that wish to concentrate on treatment and energy recovery can still demonstrate consistency with the waste hierarchy and would be in a position to demonstrate special circumstances on the basis of existing commitments or a strategic approach.

J1.2 Renewable energy evidence base documents

Document	*Date*	*Author*	*Client*
The Status of Biofuels in the Yorkshire and Humber	2008	AEA Energy and Environment	Yorkshire and Humber Assembly
Low Carbon Energy Capacity Review	2007	Arup	Yorkshire Futures and Environment Agency
Yorkshire and Humber Vision for Biomass	2007	AEA Energy and Environment	Yorkshire and Humber Regional Energy Forum
Regional Energy Infrastructure Strategy	2007	Regional Assembly, Government Office, Yorkshire Forward	Regional Assembly, Government Office, Yorkshire Forward
Delivering Sustainable Energy in North Yorkshire	2005	NEF & Landuse Consultants	North Yorkshire authorities
Energy and the Regional Spatial Strategy	2005	Enviros	Yorkshire and Humber Assembly
Planning for Renewable Energy Targets in Yorkshire and Humber	*2004*	*AEA Technology*	*Government Office for Yorkshire and Humber*
Development of a Renewable Energy Assessment and Targets for the Yorkshire and Humber (including Annexes)	*2002*	*AEA Technology*	*Government Office for Yorkshire and Humber and Yorkshire and Humber Assembly*
Energy Forum Foundation Study	2001	Unknown	Unknown
Lancashire and Yorkshire Renewable Energy Planning Study	1998	Unknown	Unknown
(Italics denotes key evidence base document)			

J1.2.1 Lancashire and Yorkshire Renewable Energy Planning Study, 1998

The central aims of the Lancashire and Yorkshire Renewable Energy Planning Study were to:

- identify renewable energy resources in the region and evaluate the opportunities for their deployment and
- promote a local-level development plan policy framework for the utilisation of renewable energy sources

This study is different to the AEAT 2002 study in that it did not set targets for renewable energy deployment; was based on the old NORWEB and Yorkshire Electricity REC areas (which included Lancashire (including Rochdale and Oldham) but not the then Humberside areas); and (3) it did not consider mechanisms for delivering RE potential. Since LYREPS was completed, resource assessment techniques have also improved and there has been progress in terms of the way in which development plans in the study area deal with renewable energy.

J1.2.2 Energy Forum Foundation Study, 2001

This study, supported through the regional energy forum, provided an up-to-date survey of the current "energy baseline" across Yorkshire and the Humber. It covered a broad canvas and thus provides a wider context within which later work has been placed.

J1.2.3 Development of a Renewable Energy Assessment and Targets for Yorkshire and the Humber Research Objectives, 2002

Overview

The overall aim of this project was to prepare an assessment of renewable energy potential, targets for renewable energy across Yorkshire and Humber and an action plan for their implementation.

Principal objectives of the study were:

- an assessment of the region's capacity to generate electricity from renewable sources
- the establishment of targets for the development of renewable energy generation in Yorkshire and The Humber initially to 2010, and then beyond this to 2021

- targets must be sub divided between different renewable energy sources and the following sub regions: 'Humberside', North Yorkshire, South Yorkshire, West Yorkshire. Sub–targets should be set for individual structure plan and unitary development plan areas where it is sensible to do so
- targets must be expressed as 'MW installed targets, which translate at 2001 baselines to a % of overall generation capacity and % of consumption targets for the region', and include time-scales/ delivery profiles. Whilst this work will have regard to the Government targets, they are not to be regarded as a limit or 'final' provision for renewable energy within the region. Identify how those individual elements and targets will be delivered, and make recommendations on areas where specific types of renewable energy development should be encouraged
- define broad locations for specific renewable energy development, and set out criteria, model policies, case studies and examples of good practice, to help local authorities select suitable sites and support applications for development
- identify any barriers to those assessment targets being realised and solutions to enable them to be overcome
- identify any robust and economically realistic opportunities where promotion of specific renewable energy development proposals can bring significant overall benefits to the region and its economy
- identify where specific types or scales of renewable energy development will be resisted, or not counted towards the regional renewable energy targets. These recommendations will need reasoned justification and make clear the implications for the region's renewable energy targets
- produce an action plan with priorities for implementing study recommendations and
- set out appropriate indicators and delivery

Methodology

The study establishes a 'regional baseline' (updated from 2001 Energy Forum report) in terms of existing electricity-producing renewable energy schemes across the region. It then presents the findings from its renewable energy technology assessments, which were undertaken for:

- wind energy (includes GIS analysis etc):
  - offshore wind
  - onshore wind

  - single turbines providing on site power
  - off grid wind energy

Target ranges for grid connected wind energy are developed for 2010 and 2021, and assumptions are clearly set out in relation to the lower and higher end of each range.

- energy from biomass:
  - forest residues and energy crops. A range of target scenarios are developed, based on the inclusion of co-firing of biomass and the amount of new coppicing
  - poultry litter
  - straw
  - other farm livestock manure
- small scale hydro power - Identification of possible sites is based on previous UK study undertaken by University of Salford. Assumptions are then made regarding the level of government support and statutory requirements governing licensing procedures to arrive at a target range
- solar energy technologies:
  - photovoltaics – assumes that significantly enhanced deployment may be possible due to changing planning guidance on new buildings and measures to make cost reductions
  - solar water heating
  - passive solar building design
- wave energy
- fuel cells
- other technologies
  - geothermal energy
  - tidal energy technologies
- energy from waste
  - landfill gas

– thermal treatment of municipal waste

– digestion of sewage

Findings from the renewable energy assessments were refined during consultation. The report also considers the regional planning context of the time to identify its implications for the delivery of renewable energy. It goes on to outline how the planning system response to renewable energy can be enhanced.

Recommendations/ targets

Renewable energy targets for 2010

Renewable Energy Type/ Indicative Size[23]	*Existing Situation*			*Prospective Total by 2010*		
	Schemes	Capacity (MW)	Output (GWh)	Schemes	Capacity (MW)	Output (MW)
Offshore Wind Farms (60-100 MW ; 20-30 Turbines	0	0	0	2	160	490
Wind Farms (25 MW ; 10-20 Turbines)	3	24.15	63	10	200	522
Small Wind Clusters (6 MW ; 4-10 Turbines)	1	1.2	3	13	73	191
Single Large Wind Turbines (1.5 MW)	4	0.78	2	24	31	81
Single Small Wind Turbines/ Chargers (0.03 MW)	?	?	?	30	0.9	2
Co-firing of Biomass in existing Fossil-fuelled power stations	0	0	0	2	50	288
Large CHP/Electricity Plants fuelled by the combustion of Energy Crops and/or Agricultural & Forestry Biomass (AFB) (20+ MW)	1 Wood 1 Chicken Litter	10 16.7	58 96	3 Wood 2 Straw 1 Chicken Litter	72 40 16.7	357 230 96
Small CHP Plants fuelled by the combustion of Energy Crops and/or AFB (5-10 MW)	0	0	0	2 Wood	10	58
Anaerobic Digestion Plants fuelled by Farm Biogas (0.5 MW)	0	0	0	2	1	8
Small-scale Hydro Power (0.1 MW)	0	0	0	15	3	9
Domestic PV Installations (1.5-3 kW_p)				7,000	10.5	8
Commercial PV Installations (50 kW_p)	?	≈0.15	<1	62	3.1	2
Motorway PV Installations (160 kW_p/km)				15	2.4	2
TOTAL	**10**	**53**	**222**	**106 + PV**	**674**	**2,344**

The percentages of installed capacity implied by this technology mix for 2010 are:

- Wind Energy Onshore: 45%
- Wind Energy Offshore: 24%
- Biomass Sources: 28%
- Solar Photovoltaics: 2%
- Small Hydro: < 1%

Sub-regional breakdown for 2010

Indicative Renewable Energy Generation Type/Size	*EXISTING*			*NEW*		
	Existing Schemes	Humber	North Yorkshire	West Yorkshire	South Yorkshire	TOTAL
Offshore Wind Farms (60-100 MW; 20-30 Turbines)	0	2 (160)	0	0	0	2 (160)
Wind Farms (25 MW ; 10-20 Turbines)	3 (24.15)	2 (50)	4 (100)	1 (25)	0*	10 (200)
Small Wind Clusters (6 MW; 4-10 Turbines)	1 (1.2)	6 (36)	4 (24)	1 (6)	1 (6)	13 (73)
Single Large Wind Turbines (1.5 MW)	4 (0.78)	6 (9)	6 (9)	4 (6)	4 (6)	24 (31)
Single Small Wind Turbines/Chargers (0.03 MW)	?	6 (0.18)	4 (0.12)	12 (0.36)	8 (0.24)	30 (0.9)
Co-firing of Biomass in existing Fossil-fuelled power stations	0	0-1 (0-20)	0	0-1 (0-20)	1 (30)	2 (50)
Large CHP / Electricity Plants Fuelled by the Combustion of Energy Crops and/or Agricultural & Forestry Biomass (AFB) (20+ MW)	1 Wood (10) 1 Chicken Litter (16.7)	1 Straw (20)	1 Wood (20) 1 Straw	0*	1 Wood (42)	3 Wood (72) 2 Straw (40) 1 Chicken Litter (16.7)
Small CHP Plants Fuelled by the Combustion of Energy Crops and/or AFB (5-10 MW)	0	0*	1 Wood (5)	0*	1 Wood (5)	1 Wood (10)
Anaerobic Digestion Plants Fuelled by Farm Biogas (0.5 MW)	0	1 (0.5)	1 0.5)	0*	0*	2 (1)
Small-Scale Hydro Power (0.1 MW)	0	0	11 (22)	2 (0.4)	2 (0.4)	15 3)
Domestic PV Installations (1.5-3kW$_p$)		1300 (2.0)	1100 (1.6)	2800 (4.2)	1800 (2.7)	7000 (10.5)
Commercial PV Installations (50kW$_p$)	?	12 (0.6	8 (0.4)	26 (1.3)	16 (0.8)	62 (3.1)
Motorway PV Installations (160kW$_p$/km)		5 (0.8)	0*	5 (0.8)	5 (0.8)	15 (2.4)
Total	**10 (53)**	**24/25 + PV (280/300)**	**33 + PV (183)**	**20/21 + PV (44/64)**	**318 + PV (94)**	**106 + PV (674)**

Each cell within the table above gives an indication of the number of schemes and the potential installed electricity capacity from those schemes, in the form (schemes (Installed Capacity))

Renewable energy targets for 2021

Renewable Energy Type/ Indicative Size	*Existing Situation*			*Prospective Total by 2021*		
	Schemes	Capacity (MW)	Output (GWh)	Schemes	Capacity (MW)	Output (MW)
Offshore Wind Farms (60-100 MW ; 20-30 Turbines	0	0	0	4	400	1226
Wind Farms (25 MW ; 10-20 Turbines)	3	24.15	63	18	400	1044
Small Wind Clusters (6 MW ; 4-10 Turbines)	1	1.2	3	36	211	551
Single Large Wind Turbines (1.5 MW)	4	0.78	2	84	121	316
Single Small Wind Turbines/ Chargers (0.03 MW)	?	?	?	250	7.5	16
Co-firing of Biomass in existing Fossil-fuelled power stations	0	0	0	0	0	0
Large CHP/Electricity Plants fuelled by the combustion of Energy Crops and/or Agricultural & Forestry Biomass (AFB) (20+ MW)	1 Wood 1 Chicken Litter	10 16.7	58 96	11 Wood 2 Straw 1 Chicken Litter	290 40 16.7	1670 230 96
Small CHP Plants fuelled by the combustion of Energy Crops and/or AFB (5-10 MW)	0	0	0	8 Wood	40	230
Anaerobic Digestion Plants fuelled by Farm Biogas (0.5 MW)	0	0	0	20	10	85
Small-scale Hydro Power (0.1 MW)	0	0	0	30	5	16
Domestic PV Installations (1.5-3 kW_p)				95,000	142	107
Commercial PV Installations (50 kW_p)	?	≈0.15	<1	130	6.5	5
Motorway PV Installations (160 kW_p/km)				40	6.4	5
Wave Energy installations (1 or 30 MW)	0	0	0	8	153	?
TOTAL	**10**	**53**	**222**	**472 + PV**	**1850**	**5,597**

The percentages of installed capacity implied by this technology mix for 2021 are:

- Wind Energy Onshore: 40%
- Wind Energy Offshore: 22%
- Biomass Sources: 21%
- Solar Photovoltaics: 8%
- Wave Energy: 8%

- Small Hydro: < 1%

Target levels of deployment for renewable energy heat production to 2010 and 2021

Renewable Energy Type/ Indicative Size	*Existing Situation*		*Prospective Total by 2010*		*2021*	
	Schemes	Output (GWh)	Schemes	Output (GWh)	Schemes	Output (GWh)
Domestic-scale Solar Water Heating installations (1.2 MWh/yr)	4,800	5.8	15,800	19	27,800	33.4
Solar Water Heating installations for Swimming Pools (6 MWh/yr)	?	?	1,100	6.6	2,300	14
Solar Water Heating (14 MWh/yr) for commercial/industrial installations	?	?	25	0.35	50	0.7
PSDesign in Domestic dwellings (1-2 MWh/yr)	?	?	2,500	2.5 – 5	Up to 100,000	Up to 100 - 200
PSDesign in Commercial buildings (3-9 kWh/m^2/yr)	?	?	140,000 m^2	0.42 – 1.26	Up to 1,000,000 m^2	Up to 3 – 9
Plants fuelled by wood wastes (0.25 MW_{th} and upwards	?	?	75	141	400	750
TOTAL	**≈5,000?**	**≈6?**	**≈19,500**	**≈170**	**≈130,000**	**≈1,000**

Applications within domestic buildings and swimming pool applications are assumed to remain the main routes to solar water heating deployment, with uptake proceeding at accelerated rates in line with projections from the Solar Trade Association.

Uptake of passive solar design within the domestic sector is assumed to proceed at a low rate to 2010 but thereafter to be driven in part through changes to the Building Regulations. Within the commercial building sector, the higher potential savings achievable within certain building types is balanced by a much wider range of savings opportunities and the complexity of implementation.

Small-scale 'woodheat" plants may present opportunities within specific buildings, particularly where the driving forces for deployment include issues such as rural re-generation

Anticipated levels of deployment for energy from waste technologies to 2010 and 2021

Technology Type/ Indicative Size	Existing Situation			Prospective Total by 2010			2021		
	Schemes	Capacity (MW)	Output (GWh)	Schemes	Capacity (MW)	Output (GWh)	Schemes	Capacity (MW)	Output (GWh)
Anaerobic Digestion Plants fuelled by Sewage Gas (0.5 MW)	0	0	0	2	1	8	2	1	8
CHP or Electricity Plants fuelled by Municipal or Industrial Solid Wastes	1	6.1	35	5	42.7	246	5	42.7	246
CHP or Electricity Plants fuelled by Landfill Gas	12	25.8	149	39	81.8	471	<39	<81.8	<471
TOTAL	**13**	**31.9**	**184**	**45**	**125.5**	**725**	**<45**	**<125.5**	**<725**

Estimated target contributions from renewable energy schemes to regional electricity consumption

	2010	2021
Proposed RE Target (MW)	670	1,850
% of Current Regional Generation Capacity[30]	5.1	14.1
Proposed RE Target (GWh)	2,344	5,597
% of Current Regional Electricity Distribution	9.4	22.5

The report concludes by setting out an action plan for delivering its proposed targets. The action plan identifies key outcomes, the actions required to achieve those outcomes and key parties responsible for undertaking the actions.

The accompanying report annexes outline technical research details and renewable energy assessment methodologies in more detail. They also provide a summary of consultation feedback.

J1.2.4 Planning for Renewable Energy Targets in Yorkshire and Humber, 2004

Overview

This study was commissioned by the Government Office for Yorkshire and the Humber and the Yorkshire and Humber Assembly to develop the regional and sub regional renewable energy targets set out in the revised draft regional planning guidance 12, and to propose how these might be met through the potential at local authority district level.

The aims of the study were:

- to enable local authorities to put forward realistic and acceptable proposals to meet targets in their areas and feed them into both local development plans and the draft regional spatial strategy. By using a common, coherent and consistent approach the targets can be compared more readily

- to develop more detailed resource information at a local level within the region to enable the implications and feasibility of exploiting renewable energy to be assessed

- to build upon existing regional work and, with local authority engagement, to assess renewable energy potential and appropriate development criteria at a sub-regional and local level to 2010 and 2021

Methodology

The assessment methodology involved:

- technical evaluation of RE resources and their prospective apportionment
- a “strategic capacity assessment” for on-shore wind energy
- group consultation meetings, electronic feedback, individual LPA meetings
- indicative local authority potentials for 2010 / 2021 proposed for wind, solar photovoltaics, hydro
- offshore wind, marine technologies and co-firing of biomass in existing power stations evaluated on a region-wide basis

In terms of technical evaluations, the study adopted the following approach:

1. identify relevant renewable energy technologies - identify those resources that are available for the sub-regional and local authority area and those technologies that are likely to provide electricity generation from renewable sources
2. estimate maximum theoretical potential based on the available resource
3. estimate feasible potential based on the proportion of the maximum theoretical potential that could be exploited within the given timescale
4. propose a refined potential based on the feasible potential but refined through the process of consultation. To illustrate this for wind energy, we have identified opportunities arising for large and small schemes, but using somewhat different approaches

The study provides two scenarios for 2010 and 2021, based on what were believed to be the likely circumstances for renewable energy development both nationally and in the Yorkshire and Humber region. For each scenario, the report identifies a number of key drivers (such as policy developments) that will help to achieve the proposed RE target, as well as outlining how the proposed targets will be met in terms of relative contributions from different RE technologies. In terms of sectoral contributions, these were developed using an approach that reflects both the available resource and the sensitivities associated with delivering that resource.

Renewable energy technologies considered include:

- wind
  - onshore
  - offshore
- biomass

- co-firing
- wood generation
- other

- hydro
- photovoltaics
- marine

Recommendations/ targets

Refined renewable energy potential, 2010

Sub-region	*LA**	*Wind*	*Biomass*	*Co-firing*	*Hydro*	*PV*	*Total*
South Yorkshire							
	Barnsley	15				0.42	15.4
	Doncaster	10			0.15	0.49	10.6
	Rotherham	10			0.10	0.51	10.6
	Sheffield	10				1.60	10.6
Total		**45**			**0.25**	**2.0**	**47**
West Yorkshire							
	Leeds	10			0.24	1.05	11.3
	Wakefield	10			0.18	0.57	10.7
	Calderdale	19			0.10	0.28	19.4
	Kirklees	10			0.24	0.71	10.9
	Bradford	10				0.74	10.7
Total		**59**		**25**	**0.75**	**3.4**	**88**
North Yorkshire							
	York	10			0.90	0.32	11.2
	Craven	17			0.46	0.12	17.6
	Hambleton	40				0.17	40.2
	Harrogate	16			0.90	0.31	17.2
	Richmondshire	17			0.78	0.12	17.9
	Ryedale	10				0.11	10.1
	Scarborough	5				0.24	5.2
	Selby	14			0.27	0.15	14.4
Total		**129**		**75**	**3.32**	**1.5**	**209**
Humber							
	East Riding	40				0.69	40.7
	Hull	5				0.59	5.6
	North Lincolnshire	40	14			0.27	54.3
	North East Lincolnshire	23				0.27	23.3
Total		**108**	**14**			**1.8**	**124**
Wind offshore	n/a						240
Regional Total		**341**	**14**	**100**	**4**	**9**	**708**

* Local Authority administration boundaries and not Planning Authority boundaries

The report also suggests local authority RE targets that will ensure the achievement of its proposed 2010 target.

Indicative potential for 2021

Sub-region	*LA**	*Wind onshore*	*Biomass wood*	*Biomass*	*Hydro*	*PV*	*Total*
South Yorkshire							
	Barnsley	15	2.9	9.5		6.9	34.3
	Doncaster	15	3.7	12.1	0.15	6.6	37.5
	Rotherham	15	3.3	10.5	0.10	7.1	36.0
	Sheffield	15	6.8	22.0		8.2	52.1
Total		**60**	**16.7**	**54.1**	**0.25**	**28.8**	**160**
West Yorkshire							
	Leeds	15	9.3	30.2	0.24	19.7	74.5
	Wakefield	15	4.1	13.3	0.18	8.3	40.9
	Calderdale	38	2.5	8.1	0.10	4.0	52.7
	Kirklees	15	5.1	16.4	0.24	11.3	48.0
	Bradford	15	6.3	20.2		14.3	55.8
Total		**98**	**27.3**	**88.2**	**0.75**	**57.7**	**272**
North Yorkshire							
	York	15	2.2	7.2	0.90	5.9	31.3
	Craven	43	0.7	2.2	0.46	1.5	47.8
	Hambleton	90	1.1	3.7		2.6	97.4
	Harrogate	56	2.0	6.4	0.90	4.6	69.9
	Richmondshire	34	0.7	2.1	0.78	1.5	39.1
	Ryedale	15	0.6	2.0		1.3	19.0
	Scarborough	15	1.4	4.5		3.1	24.0
	Selby	26	0.9	3.0	0.27	2.2	32.4
Total		**294**	**9.6**	**31.1**	**3.32**	**22.8**	**361**
Humber							
	East Riding	120	4.1	13.3		10.8	148.2
	Hull	15	3.3	10.6		10.3	39.1
	North Lincolnshire	100	2.0	6.4		3.9	112.3
	North East Lincolnshire	38	2.0	6.4		3.9	50.2
Total		**273**	**11.3**	**36.6**	**0.00**	**28.8**	**350**
Wind offshore	n/a						600
Biomass co-firing	n/a						90
Marine	n/a						30
Regional Total		**725**	**65**	**210**	**4**	**138**	**1,862**

* Local Authority administration boundaries and not Planning Authority boundaries

In terms of this assessment's relationship to previous work undertaken by AEAT in 2002, the report acknowledges that market and technological developments during the intervening period have resulted in a refinement of their recommendations (generally upwards where overall totals are concerned), although these were generally only minor in scale. In effect, this work reinforced the consultant's earlier view that the RSS targets are achievable but that there could be a slightly different balance of technologies that would contribute to the achievement of the total targets.

The report concludes by considering the way forward in terms of making recommendations for action that will encourage the delivery of its proposed targets.

J1.2.5 Delivering Sustainable Energy in North Yorkshire, 2005

Land Use Consultants and the National Energy Foundation were commissioned by a partnership of authorities in North Yorkshire (the County Council, District Councils, National Park Authorities and City of York Council) to undertake a sub-regional renewable energy study.

The study built upon previous and current work undertaken at regional and sub-regional levels (e.g. regional and sub-regional renewable energy assessment and targets studies; and the work of Yorkshire Renewable Energy Network and York & North Yorkshire Energy Efficiency Advice Centre). It sought to answer the following questions:

- How can renewable energy targets be delivered?
- What provision can local planning authorities make through their local development frameworks?
- What can local authorities do to deliver sustainable energy development?

The three main outputs of the study were:

- North Yorkshire sustainable energy planning guidance – This sets out guidance on the preparation of sustainable energy planning policies. The guidance also includes the findings of the landscape sensitivity study which assessed the sensitivity of the landscape within North Yorkshire to accommodate different forms of renewable energy development
- North Yorkshire energy action plan guidance – This provides guidance for the local authorities within North Yorkshire on developing local energy strategies and energy action plans
- GIS information point – This is a web-based information point which includes a series of maps showing the key renewable energy resource opportunities and constraints within North Yorkshire

J1.2.6 Energy and the regional spatial strategy, 2005

Overview

This report considers four key energy issues and recommends how those issues may be addressed by and integrated into the emerging regional spatial strategy (RSS) for the Yorkshire and the Humber region to ensure that national and regional priorities for energy are supported.

The key issues were:

- encouraging diversification on energy supply and production, including bio-fuels, bio-mass, CHP, hydrogen and community renewables

- ensuring adequate storage and distribution facilities and networks for gas, bio-fuels and hydrogen

- capacity within the existing electricity supply network, adaptation/expansion of this network to accommodate growth and changing energy supply and production and

- opportunities to promote energy efficiency, in homes and businesses, through land use planning that are not addressed in national and local-level planning guidance and development control

Having considered the issues, the report concludes by making some recommendations to the regional assembly.

Methodology

In terms of its consideration of the AEAT 2002 study, the report makes the following observations:

- the study's recommendations were based on estimates of what the authors termed the "practicable resource potential" of various renewable energy technologies within the region. This was a measure of their technical merits, accessibility of land suitable for these technologies and various environmental, economic and societal constraints. Only limited attention was given to economic factors in the estimates of practicable resource potential

- given the difficulty in forecasting market conditions in which renewables will need to compete over the next two decades, the authors devoted the majority of their analysis to technical evaluations of the resources available for development

- the methodology and content of REAT is based on delivering what is required for RPG. In addressing what is required for RSS the regional targets will need to be re considered to take account of sustainable development objectives (RSDF)

- building upon the findings of the REAT, policymakers in the region now need to consider what is technically and economically viable for the private sector to deliver as well as environmental constraints and opportunities. In effect this means policy makers in the region must consider energy within the sustainable development framework

With its observations regarding the 2002 study in mind, this report examines issues which govern the regional energy technology mix and mechanisms which encourage diversification of energy production and supply. Following this it goes on to consider what range of technologies may play a part in the energy mix across different parts of the region and what the potential implications of them are likely to be. Technologies and opportunities associated with biofuel, biomass, CHP, hydrogen and community renewables are covered. The report recognizes that new energy production methods are emerging and that these new technologies are applicable in a variety of geographical locations at different scales and at different times, with corresponding policy implications.

Recommendations/ targets

The report considers opportunities to encourage the diversification of energy production and supply. Infrastructure requirements are also identified for gas, hydrogen and biofuels and current and future grid capacity is considered. The report also discusses the role of energy efficiency, and concludes by identifying policy issues and recommendations for the RSS, summarised below:

	Energy Issue	Recommended Policy Action	RSS Topic/Chapter or Other Mechanism
Overall	Consideration of regional sustainable development objectives within overall energy policy	(1) Ensure that all policy and locational criteria within RSS is in accordance with RSDF objectives	(1) Sustainability appraisal/SEA

J1.2.7 Yorkshire and Humber Vision for Biomass, 2007

This report provides a vision for biomass for the Yorkshire and Humber region and an action plan to achieve this vision. The *Vision for Biomass* was produced in response to a number of regional targets, developments and aspirations that are driving bio-energy in the region.

The following definition of biomass was used:

*Biomass derived from plant or animal matter, including residue materials from agricultural and forestry practice and co-products from sawmills, but **not** biomass derived from mixed or municipal wastes. This is because the Region is currently developing a waste strategy and inclusion of biomass from mixed wastes in this Vision for Biomass would pre-empt that strategy.*

The application of biomass fuels considered within the vision for biomass is: Heat and power generated from biomass, but not transport fuels.

The primary aim of a *Vision for Biomass* is to *enable the Region to realise the benefits of reduced GHG gas emissions; increased security of energy supplies for heat, power and transport; and regional environmental improvements through the development of a strong and sustainable biomass industry.* Objectives for delivering that vision are as follows;

- enable biomass to make a contribution to the region's target to reduce GHG emissions by 20-25% by 2016
- ensure that increased biomass production and use enhances the region's biodiversity and contributes positively to other environmental targets (e.g. air quality)
- help deliver biomass for co-firing 15-20% biomass at the three coal-fired power stations in the region by facilitating expansion of the region's capacity to supply biomass fuel by 2020
- facilitate and support initiatives to encourage the use of biomass-based local heat and power supply
- support initiatives that will encourage owners of under managed woods to maximise their economic potential and social benefits, while enhancing their biodiversity value through sustainable woodland management. This should include appropriate support for biomass supply chains and the parallel development of generation technology for biomass, in line with the Forestry Commission's Wood Fuel Strategy
- contribute to economic regeneration, particularly in rural areas
- facilitate skills growth in biomass energy technology and in the development of local supply chains

The report considers the regional context for the production of biomass, including:

- factors that will influence development of biomass energy in the region
- potential biomass supply in the region
- biomass resource
- potential for energy crops
- current bio-energy use
- biomass fuel supply

J1.2.8 Regional Energy Infrastructure Strategy, 2007

The strategy sets out what the region needs to do on energy generation and supply to achieve regional energy targets and maintain affordable energy supplies. It has not been updated since the adoption of the RSS in 2008.

J1.2.9 Low Carbon Energy Capacity Review, 2007

Overview

This report analysed the current supply of low carbon energy in Yorkshire and Humber 2007, compared that to the region's renewable energy targets and anticipated consumption to identify implications for statutory bodies, including Yorkshire Futures and the Environment Agency.

Methodology

The report reviews the following technologies:

- biomass
- energy from waste (landfill and sewage sludge)
- small scale hydro power
- photovoltaics
- onshore wind

It considers:

- progress towards the draft RSS targets at a regional and sub-regional level, comparing current installed capacity against RSS targets
- current consumption, indentifying the current renewable energy component of that consumption
- comparison between electricity demand forecasts and renewable energy production
- patterns of demand and supply

The report does not undertake any comprehensive technical/ primary research in terms of any specific renewable energy technologies. It does however identify some technology specific considerations that will impact on the achievement of the RSS targets.

Recommendations/ targets

The report concludes that in terms of installed renewable energy capacity, the region is unlikely to meet its 2010 target. Current capacity at the time of writing was 168.6MW, compared to an RSS target of 708MW. The draft RSS anticipated that wind power would make the largest contribution to the 2010 targets. However, the report finds that progress has been relatively slow. Contrastingly, biomass is identified as having a considerable role to play, whilst landfill gas accounts for another major renewable energy source (this was not included in the draft RSS list of renewable technologies). In terms of the spatial distribution of renewable energy, this is not evenly spread across the four sub-regions.

The report also finds that the draft RSS 2021 target is close to the report's own estimate for 2020, and therefore achievable.

J1.2.10 The Status of Biofuels in Yorkshire and Humber, 2008

This work was commissioned by the Yorkshire and Humber Assembly - acting on behalf of the regional energy forum - to evaluate the current situation on biofuels in the Yorkshire and Humber region and to assess the potential opportunities to further develop the biofuels industry and market in the region.

The study finds that Yorkshire and Humber has a number of attributes that make it attractive to potential biofuels developers and for bio-refineries:

- local feedstock supplies - wheat and oil seed rape (OSR), also experience of perennial energy crops
- the Humber ports - experience of handling biomass, grain, oils - capacity to expand biofuels imports
- land available around the ports at reasonable cost, with transport connections
- two local oil refineries - already interested in purchasing biofuels and taking output from operating plant
- local chemical industry interested in opportunities from biofuels
- skilled workforce available in area

The report also identifies constraints and threats to bio-energy production in the region, such as the amount of land available, environmental considerations and regional funding. In terms of realising the region's potential, the report sets out some recommendations for action.

J1.3 Monitoring activity

The regional assembly collects information relating to renewable energy development on an annual basis. As well as monitoring progress against renewable energy targets as part of the AMR, Yorkshire Futures (the regional intelligence network for Yorkshire and Humber) produce an annual report entitled *Progress in the Region* and live tables which provide analysis of economic and policy drivers affecting the region; the percentage of renewable generated electricity is monitored as one of 35 high level indicators. The regional assembly also work with Natural England and Future Energy Yorkshire to monitor progress.

Sources of information used to monitor progress include:

- installed grid-connected renewable energy capacity (generally good quality)
- number (%) of new developments using on site renewable energy sources and number and % of these developments generating 10% or more renewable energy on site (considered difficult to collect)
- renewable energy capacity in extant planning permissions (MW) (considered difficult to collect)
- installed good quality CHP capacity (MWE)
- percentage of new publicly funded housing meeting at least level 3 of code for sustainable homes
- percentage of new Yorkshire Forward funded development meeting at least BREEAM 'very good' standard

In terms of policy implementation, data collected for monitoring purposes links directly to implementation activities for the following year, as well as providing evidence on particular issues requiring follow up.

J1.4 Further work

There are no current plans to review existing renewable energy policies and targets contained within the Yorkshire and Humber plan, as existing polices are considered to be in line with national guidance. The regional assembly is however currently working with Faber Maunsell to prepare a *Local Authority Renewable Energy Toolkit* to help deliver carbon savings and decentralised energy.

Possible future avenues for work include:

- supporting local planning authorities in identifying opportunities for renewable energy through their LDF processes
- considering work on barriers to wind farm development and how these might be addressed

Appendix K
Reference Documents

K1.1.1 East Midlands

All evidence base documents are available from
http://www.emra.gov.uk/publications/regional-communities-policy/sustainable-energy

K1.1.2 East of England

Placing Renewables in the East of England
http://www.eera.gov.uk/publications-and-resources/studies/topic-based-studies/renewable-energy-studies

Making Renewable Energy a Reality – Setting a Challenging Target for the Eastern Region
www.sustainabilityeast.org.uk/pdf/Renewables%20Report.pdf

K1.1.3 London

Majority of publications can be found at
www.london.gov.uk/gla/publications/environment.jsp

Biomass for London: Wood Fuel Demand and Supply Chains, London Wind & Biomass Study Summary Report: Feasibility of the Potential for Stand Alone Wind and Biomass Plants in London and supporting reports
http://www.lep.org.uk/library.php?frm_search=wind+and+biomass

Greater London Assembly, Evidence Base: Climate Change in the Further Alterations to the London Plan
http://www.london.gov.uk/mayor/strategies/sds/further-alts/docs.jsp

Greater London Assembly, Further Alterations to the London Plan: Scenario Testing Report
http://www.london.gov.uk/mayor/strategies/sds/further-alts/docs.jsp

Greater London Assembly, Further Alterations to the London Plan – EiP Panel report,
http://www.london.gov.uk/mayor/strategies/sds/eip-report07/index.jsp

K1.1.4 North East

North East Regional Renewable Energy Strategy: Final Report, North East Regional Renewable Energy Strategy: Review, North East Regional Renewable Energy Strategy: Review
http://www.energynortheast.net/page/NorthEastRenewableEnergyGroup.cfm

Regional Spatial Strategy (RSS) for the North East – Technical Background Paper No. 7: Energy
http://www.northeastassembly.gov.uk/document.asp?id=483&pageno=6&extlink=195

The Development of a Regional GIS for the North East Renewable Energy Strategy
http://www.northeastassembly.gov.uk/document.asp?id=400

North East of England Renewable Energy Strategy – Examination of Grid Connections
http://www.northeastassembly.gov.uk/document.asp?id=398

Landscape Appraisal for Onshore Wind Development
http://www.northeastassembly.gov.uk/document.asp?id=399

A Biomass Action Plan for the North East of England
www.nuergy.com/documents/84.pdf

A Study of Future Residual Waste Treatment Capacity and the Potential for Refuse Derived Fuel Production
http://www.northeastassembly.gov.uk/document.asp?id=497

Towards a Waste Strategy for the North East of England
http://www.northeastassembly.gov.uk/document.asp?id=796&pageno=12&extlink=14

K1.1.5 North West

Renewable Energy Targets for the North West (*Technical Briefing Note*) – A Report to the North West Regional Assembly
www.nwrpb.org.uk/downloads/documents/imported/rp_4Zzd_RENEWABLE_ENERGY_TARGETS_FOR_T.pdf

Advancing Sustainable Energy in the North West: Mapping the way forward to 2020
http://www.nwrpb.org.uk/documents/?page_id=4&category_id=197

From Power to Prosperity – Advancing Renewable Energy in the North West
http://www.nwrpb.org.uk/documents/?page_id=4&category_id=198

Renewable Energy in the North West: Investigating the Potential and Developing the Targets
http://www.nwrpb.org.uk/documents/?page_id=4&category_id=199

K1.1.6 South East

All documents are downloadable from
http://www.southeast-ra.gov.uk/energy_strategy.html

K1.1.7 South West

Renewable Energy Assessment and Targets for the South West
www.oursouthwest.com/RegiSus/REmain-report.pdf

REvision 2010 – Establishing County/Sub Regional Targets for Renewable Electricity Development to 2010
http://www.oursouthwest.com/revision2010/

REvision 2020 – South West Renewable Electricity, Heat and On Site Generation Targets for 2020
http://www.oursouthwest.com/revision2020/

The Road to 2020
http://www.regensw.co.uk/

K1.1.8 West Midlands

Regional Energy Strategy
http://www.wmro.org/standardTemplate.aspx/Home/WestMidlandsStrategies

Advantage West Midlands publications
http://www.advantagewm.co.uk/documents/default.aspx

K1.1.9 Yorkshire and Humber

The majority of documents can be found at
http://www.yhassembly.gov.uk/The%20Library/Other%20Research/Energy%20and%20Microgeneration/

Low Carbon Energy Capacity Review
http://www.yorkshirefutures.com/cb.aspx?page=409CC90F-8983-4F17-AEE5-8AF93874A0F9

Yorkshire and Humber Vision for Biomass
http://www.yhassembly.gov.uk/News/2008/Yorkshire%20and%20Humber%20Vision%20for%20Biomass/

Delivering Sustainable Energy in North Yorkshire
http://www.landuse.co.uk/_archive/bristol/northyork.php

ISBN 978-1-4098-1583-9

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ISBN: 978 1 4098 1583 9