

VIEWPOINTS ON SUSTAINABLE ENERGY IN THE EAST MIDLANDS

A Study of Current Energy
Projects & Future Prospects



EXECUTIVE SUMMARY

By
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EXECUTIVE SUMMARY

1. In October 2000, the East Midlands Regional Assembly commissioned a *Study of Current Energy Projects and Future Prospects in the East Midlands*. The Study was undertaken by Land Use Consultants and IT Power and culminated in a Report, entitled *Viewpoints on Sustainable Energy in the East Midlands*.

THE BACKGROUND

2. Human induced climate change, caused primarily by emissions of CO₂ from combustion of fossil fuels, is posing a significant threat to the world's environment. The UK Government's response to climate change includes objectives to:
 - Reduce the UK's CO₂ emissions by 20% (below 1990 levels) by 2010.
 - Increase energy efficiency in domestic sector housing by 30% over a 10-year period.
 - Increase installed capacity of Combined Heat and Power (CHP) from 4 GigaWatts to 10 GigaWatts by 2010.
 - Meet 5% of electricity requirements from renewable energy sources by 2003, rising to 10% by 2010.
3. These are challenging objectives. In 2000, only about 2.6% of electricity consumption was derived from renewables in the UK; in the East Midlands renewable energy sources accounted for only 1.6% of consumption.
4. The Government is promoting a regional approach to help translate the national targets for renewables into developments on the ground. This involves setting targets for renewable energy, based on an assessment of each Region's capacity to generate electricity from all potential renewable energy sources. It is intended that these targets will be included in the Regional Sustainable Development Frameworks, which in turn will inform Regional Planning Guidance.

THE EAST MIDLANDS APPROACH

5. In responding to this challenge, the East Midlands Regional Assembly sought to build on the Region's experience and reputation for innovation in the sustainable energy field. It established a Regional Energy Steering Group, including representatives of the Region's key stakeholders, to guide this Study and, in the light of this, to develop a Regional Energy Strategy.
6. 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.
7. The Study's consideration of energy efficiency and CHP, as well as renewables, sets it apart from parallel studies undertaken in other Regions. It reflects the 'energy hierarchy', which gives emphasis in descending order to: reducing the need for energy; using energy more efficiently; using renewable energy; and making clean and efficient use of fossil fuels.
8. Stakeholder participation formed a key part of the Study – with a view to achieving consensus over the targets and the methodology on which they were based. Two successful stakeholder workshops were convened, involving representatives from a wide range of organisations, including local authorities, universities and trade

associations. The first workshop focused on the preliminary targets, while the second addressed the actions required to meet the targets.

KEY STUDY FINDINGS

9. The following key points were identified:

Impacts of Climate Change

- Climate change could result in adverse local environmental effects in the East Midlands, including: a reduction in water available for domestic, industrial and agricultural purposes; increased winter flooding; and loss of plant and animal species.

East Midlands' Energy Supply and Demand Profile

- Energy production in the East Midlands comes primarily from coal, with production in Derbyshire, Leicestershire and Nottinghamshire amounting to 5.7 million tonnes in 1999.
- Coal mine methane is being extracted from several abandoned coal mines in the East Midlands, the largest of which is the 9MW plant at Shirebrook, which supplies electricity to approximately 10,000 homes.
- The Region is a major exporter of electricity.
- Energy consumption in the domestic, commercial, industrial and transport sectors is predicted to increase by almost 20% over the next 25 years. The increasing demand for oil (38%) and gas (33%) is mainly offset by a 39% reduction in the demand for coal in the power sector, such that overall demand for energy in the Region is forecast to increase by 6% by 2025.
- In 2000, landfill gas provided the bulk of supply of renewable energy within the East Midlands; the majority of schemes were brought forward through the Non-Fossil Fuel Obligation.

Policy and Institutional Framework

- The UK's Climate Change Programme, driven by international and European policy commitments, describes a variety of measures aimed at addressing CO₂ emissions.
- The planning policy framework in the East Midlands is generally supportive of sustainable energy developments. All structure plans include policies favouring renewables and a few plans also address energy efficiency.
- The Local Government Act 2000 gives new powers for local authorities to promote the social, economic and environmental well being of their area. The implementation of these powers is backed by new resources and could greatly assist local authorities in promoting energy efficiency and renewable energy.
- There are a wide range of organisations in the Region that are actively involved in progressing the development of sustainable energy initiatives, and many existing schemes are viewed as national exemplars.

Sustainable Energy Solutions – Benefits and Barriers

10. Significant benefits will accrue from the development of sustainable energy technologies, including:
 - Environmental: Reducing pollution, including greenhouse gases which are a major contributor to climate change. If the proposed targets are met, this would equate to a reduction of 8.7% of the Region's 1990 CO₂ emissions.
 - Supply: Helping to provide secure, diverse, sustainable and competitive energy supplies.
 - Social: Reduction of fuel poverty; improving health; increasing social equity; raising public awareness of sustainable development.
 - Economic: Approximately 175 new FTE operation and maintenance jobs could be created in the East Midlands by 2003, and

approximately 550 jobs by 2010 if the proposed targets for renewable energy are reached. The manufacture and installation of renewable energy systems and the energy efficiency industry would bring further new jobs.

- Commercial: Energy efficiency and use of renewables can create commercial advantages for businesses and increase eligibility for grant aid.

11. Key barriers to the implementation of sustainable energy technologies include:

- Negative perceptions due to the 'shock of the new'.
- Lack of public understanding: Few people consider the impact of their activities in terms of the need for generating capacity and fewer still in terms of the carbon dioxide emissions associated with their household or workplace.
- Concern about local environmental impacts: Local planning authorities do not have a remit or a decision-making framework that allows them to weigh global benefits with local environmental impacts.
- Funding: Securing adequate levels of funding is not only problematic for the commercial developers of sustainable energy technologies. Local authorities, Local Agenda 21 and community groups are also facing difficulties obtaining funds for small-scale demonstration projects.
- Capacity of the electricity network to accommodate new sources of embedded generation.

ENERGY EFFICIENCY AND CHP TARGETS

Energy Efficiency

12. Improvements in energy efficiency are central to the delivery of the UK's climate change and energy related policy commitments.

13. A regional target for energy savings of 20% of current energy consumption (5,600 GWh/year) by 2010 is proposed for the industrial sector. For the commercial sector, the proposed target is 9.5% of current energy consumption (1,270 GWh/year) by 2010.
14. For the domestic sector, the proposed target is savings of 8% of energy consumption (3,000 GWh/year) by 2010.

Combined Heat and Power (CHP)

15. CHP systems involve the simultaneous generation of heat and power to achieve high overall efficiencies and to utilise the heat that would otherwise be wasted in other electricity generation schemes. It has been estimated that primary energy savings of 25%-35% are achieved when CHP is used. In 2000, there were 292MW of CHP electricity generation capacity in the East Midlands, with the Derwent Power Station accounting for 75% of this capacity.
16. The proposed target for CHP in the industrial/commercial sector, given the existing industrial structure in the Region, is approximately 683 MW_e, which would result in almost a doubling of capacity in the Region. For the domestic sector the proposed target is 25.6MW_e by 2010. This represents an increase of 8.6 MW_e (34%) in the domestic sector.

RENEWABLE ENERGY TARGETS

17. The following sources of renewable energy are considered in the Report:
 - Wind : Onshore.
 - Wind : Offshore.
 - Marine: Wave/Tidal.
 - Biomass: Wet Agricultural Wastes; Poultry Litter; Energy Crops & Forestry Residues.
 - Hydropower.
 - Solar: Photovoltaics; Active solar; Passive solar.

- Municipal and Industrial Waste.
- Landfill Gas.
- Anaerobic Digestion.

18. For each resource, the Report describes:

- 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 for 2003 and 2010 (for each County, and the Region as a whole).

19. The proposed regional targets are summarised in **Table 1**, overleaf:

Table 1: Summary of targets for electricity generation from renewables

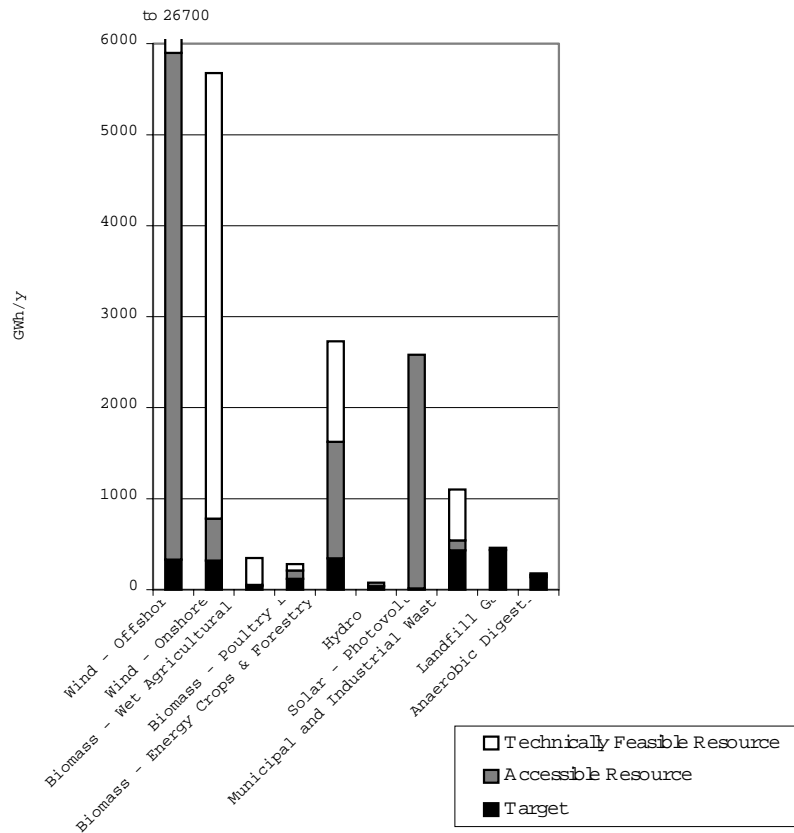
Renewable energy technology type	Existing schemes		Target for 2003		Target for 2010	
	Capacity (MW _e)	Electricity (GWh/y)	Capacity (MW _e)	Electricity (GWh/y)	Capacity (MW _e)	Electricity (GWh/y)
Wind: Offshore	0	0	0	0	125	330
Wind: Onshore	0.05	0.045	12	31	122	319
Marine: Wave/Tidal	0	0	0	0	0	0
Biomass: Wet 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
Hydropower	2.5	11.5	3.8	16.8	10.6	39
Solar* - Photovoltaics	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 targets.

20. **Figure 1** below provides a graphic illustration of the potential of the different renewable energy sources and shows the proposed targets in relation to the technically feasible resource and the accessible resource.

Figure 1: Technically feasible and accessible resource estimates with



recommended targets for 2010

21. **Table 2** below puts the proposed renewable energy targets in the context of the East Midlands' overall electricity consumption. It shows that the target, of 9.4% of projected electricity demand by 2010, is below the national 10% target.

Table 2: Information on the East Midlands Renewables Target.

	2003	2010
Recommended East Midlands target (GWh/y)	749	2,212
Percentage of UK renewables target*	4.2%	5.8%
Percentage of East Midlands electricity consumption (including MIW)	3.3%	9.4%
Percentage of East Midlands electricity consumption (excluding MIW)	3.1%	7.4%

*As reference, the East Midlands has 6.8% of the UK population and 6.2% of the landmass.

NATURE AND PURPOSE OF THE TARGETS

22. The targets are intended to 'set the sights' for the Regional Energy Strategy. They are based on technical assessment and consultation with key stakeholders. In the opinion of the consultants, the targets represent 'achievable objectives' in the timescale envisaged, subject to the implementation of a strategy that addresses the recommendations outlined below.
23. The consultation undertaken as part of the Study revealed a significant level of consensus over the targets amongst key stakeholders. Some stakeholders, however, considered that the Region needs to be more ambitious and set its sights higher, particularly if it is to build on a strong reputation in the sustainable energy field and contribute significantly to a national reduction in CO₂ emissions.
23. In contrast, a significant number of stakeholders, considered that the targets were too high. They took this view on the basis of past experience and a concern that current support mechanisms are inadequate to overcome the barriers. Underlying this view is a concern that central Government should be made aware of the difficulty that the Region will face in seeking to achieve the targets being set.

RECOMMENDATIONS

How the Targets should be Used

Incorporation of targets into key regional policy documents

24. The targets should be adopted by two key regional policy documents:
 - Regional Sustainable Development Framework (RSDF).
 - Regional Planning Guidance (RPG).

Preparation of Regional Energy Strategy

25. To take forward the strategic framework provided by the RSDF and RPG, the Regional Energy Steering Group is committed to preparing a Regional Energy Strategy. The Regional Energy Strategy should use the targets and the findings of this Study to:

- Publicise the environmental, social and economic benefits of energy efficiency, CHP and renewable energy development.
- Build on and publicise the East Midlands' strong reputation for innovation and good practice in relation to sustainable energy solutions.
- Encourage local authorities, businesses and households to sign up to a green electricity tariff by means of a publicity campaign.

Monitoring

Energy efficiency

26. In the absence of data on the Region's energy consumption, it is not possible to monitor energy savings and efficiency improvements. As a first step the Regional Assembly and other key regional players should lobby the Government to require the electricity supply companies to publish supply figures on a regular basis.

Renewable energy

27. County Councils and Unitary Authorities should monitor progress in relation to the targets, based on information supplied by the District Councils and taking account of, and cross-checking with the DTI national database of renewable energy projects. In view of the short timescale set for the achievement of the targets, it is recommended that monitoring is undertaken annually by the County Councils and Unitary Authorities, and that the findings are reported to the District Councils and others as appropriate.
28. To ensure the benefits of sustainable energy production are acknowledged, the following indicators should be used:
- Reduction in the production of greenhouse gases, and particularly CO₂ by 2010.
 - The number of new jobs generated from energy efficiency and renewable energy schemes, year on year.

Energy Efficiency and CHP Targets

Realising the potential

Land use planning

29. Local planning authorities provide information and guidance about energy efficiency in development plans. Where possible, authorities should also include reference to energy efficiency in Supplementary Planning Guidance (SPG). Planning decision letters should also include 'informatives', outlining the benefits of energy efficiency and potential sources of advice.

Stakeholder involvement

30. Key stakeholders can also play a significant role in realising the potential for improved energy efficiency. The Environment Agency, for example, should make best use of its powers under the Integrated Pollution Prevention and Control (IPPC) legislation to require developers to demonstrate efficient use of energy in key processes. Similarly, emda should insist on high energy efficiency standards in development which it funds.
31. Local government and statutory bodies should adopt high energy efficiency standards in their own existing buildings and new buildings.

Information for developers

32. Developers of new build should be encouraged to construct low or zero CO₂ emission developments. The Regional Energy Steering Group should disseminate information about existing developments in the Region, such as at the Hockerton Housing Project, to help raise awareness about the practical measures that can be taken by developers.

Fuel poverty targets

33. The Regional Energy Strategy should include targets for eradicating fuel poverty in line with current Government thinking (i.e. 10 year period). This could involve linking local authority and emda spending with Home Energy Efficiency Scheme /EU initiatives, to ensure a comprehensive energy advice service across the Region.

Overcoming the barriers to improved energy efficiency and CHP

Lack of public knowledge and support

34. The Regional Energy Steering Group and the Energy Efficiency Advice Centres should find ways to provide individual consumers, communities or companies with information about the way in which their electricity is generated and the CO₂ emissions that result. It should be possible, for example, to provide consumers with a 'ready reckoner', enabling them to calculate the CO₂ emissions from their electricity meter or bill. An alternative would be to encourage Electricity Companies to provide such information on electricity bills.
35. The media should be used by the Regional Energy Steering Group to help provide information about ways in which consumers can reduce CO₂ emissions (i.e. through energy efficient equipment, insulation etc).

Shortage of skills and expertise

36. The emda Environmental Industries Pathfinder Group should undertake a comprehensive review of existing shortfalls in skills and expertise associated with the implementation of energy efficiency, CHP and renewable energy technologies.
37. Depending on the outcome of this review, emda should implement a series of training programmes designed to overcome any identified skill shortages in conjunction with regional business groups, Energy Agencies, Energy Efficiency Advice Centres, Universities, and the Learning and Skills Councils. As part of this work, emda should seek to improve communication between businesses in the environmental sector.

Renewable Energy Targets

38. If business-as-usual conditions persist, the East Midlands may well only be generating a few percent of its electricity from renewable energy by 2010. Concerted action, as recommended below, will therefore be required from key regional stakeholders.

Realising the potential

Land use planning

39. In order to overcome negative perceptions and play a more positive role, local planning authorities in the East Midlands should:

Forward planning / development plan measures

1. Develop a policy framework that encourages renewable energy development, whilst ensuring that the adverse environmental effects of such development are minimised. At the very least, development plans should identify the criteria against which applications for renewable energy development will be determined. Where there is sufficient knowledge of specific renewable energy technologies, local plans should guide the location of new development by defining suitable areas of search or specific sites. Landscape assessment should also be used for defining areas of search that could then be tested against other criteria.
2. Prepare supplementary planning guidance (SPG) on renewable energy, as an adjunct to the policy framework. This kind of SPG is most appropriate at the County Council or Unitary Authority level and can be used to:
 - Describe the resource.
 - Describe the technologies. In addition to this document, information can be found in PPG 22 and is also available from ETSU.
3. If (2) is not feasible or justifiable, include reference to renewable energy in relevant SPG, for example where SPG is provided on housing developments or sustainable design and/or sustainability checklists.
4. Include consideration of renewable energy development in planning and development briefs for major sites. It may also be possible to incorporate heat or power generation, from CHP biomass, wind or hydropower schemes.

Development control measures

5. In considering planning applications, attach weight to the social, economic and environmental benefits of renewable energy.
6. Identify and promote renewable energy development as part of the development control process. For example, redevelopment of a mill for industrial or residential use could provide an opportunity for the development of a small-scale hydropower scheme.

Stakeholder involvement

40. As with energy efficiency, there is a need for all stakeholders to develop an appropriate policy response to renewable energy developments that affect their interests. Specifically, up-to-date information should be provided by:
 - emda's Pathfinder Group on the economic benefits of renewable energy development and provide inputs to the regional energy strategy.
 - The regional office of the Countryside Agency on wind farm development, hydropower, and biomass. In each case, the Agency should indicate the criteria that should be used to define areas of search and specific sites.
 - The regional office of the Environment Agency on hydropower, in terms of the balance between the sustainability benefits and concerns about impacts on flood risk and environmental impact.
 - The Regional Technical Advisory Body on the sustainability of energy from waste, in comparison with alternative waste management options.
 - The regional office of English Heritage on the installation of photovoltaic panels and solar water heating systems on Listed Buildings and in Conservation Areas.

Overcoming generic barriers to renewable energy development

Public perceptions

41. Two related measures are recommended to address the barrier of public perceptions of the adverse impacts of renewable energy schemes:
 - The Regional Energy Steering Group, in conjunction with the local authorities, should promote the development of exemplar projects in the Region. In view of the Region's significant potential for energy production from biomass, an exemplar biomass plant should be a priority.
 - The Regional Energy Steering Group should disseminate information on renewable energy technologies to local planning authorities. Although many forms of renewable energy development do not differ significantly from established industrial processes, many planners lack a working knowledge about some of the technologies.

Development issues

42. A 'lack of suitable developers' was identified by local authorities in the Region as a barrier to the development of renewable energy. To address this, it is recommended that the Regional Energy Steering Group should consider opportunities for partnerships between local authorities (including LA21 groups) and energy agencies.
43. While there may be commercial sensitivities, local authorities should encourage developers to enter into meaningful dialogue with local communities as early in the process as possible. This will provide the opportunity to set the context properly and to ensure that local concerns are reflected in the scheme design.
44. There is also considerable scope for community based renewable energy schemes. Local authorities should work with local communities through the LA21 process and the Energy Efficiency Advice Centre Network to develop local energy action plans. These could analyse current levels of electricity consumption, set targets for energy efficiency savings and renewable energy production, reflecting targets set at regional, county and district levels.

Overcoming Technology Specific Barriers to Renewable Energy Development

45. The recommendations outlined above seek to address the *generic* barriers to renewable energy development. The report also makes a number of recommendations that seek to address the key barriers to the development of *specific* renewable energy technologies.

Wind power

Coincidence of higher wind speeds with areas of highest landscape value (e.g. Peak District National Park, Lincolnshire Wolds AONB)

46. Local authorities, in consultation with developers and local communities, should identify opportunities for small-scale schemes (individual turbines, domestic scale production) in sensitive areas.
47. Local authorities, in consultation with developers and local communities, should identify opportunities for wind farms in areas of lesser landscape value, including brownfield sites, adjacent to arable farming land and at the edges of urban areas.

Public perceptions of adverse impacts

48. emda and local authorities should disseminate information about the impacts and benefits wind energy, with a view to allaying concerns.
49. Developers should establish dialogue with local communities from the start of the planning process.
50. Local authorities and Parish Councils should explore scope for community-led wind farm developments.

Connecting off-shore wind farms to the National Grid

51. emda, in conjunction with Lincolnshire County Council, should highlight the opportunities for offshore wind off the Lincolnshire coast and encourage the electricity distribution company to be proactive in finding ways to accommodate off-shore wind into the network.

Hydropower

Conflict with environmental protection/planning policies

52. Local planning authorities should identify and safeguard key potential sites for hydropower development which would not conflict with planning policies.
53. The Environment Agency should develop best practice guidance to limit effects of hydropower schemes on fisheries, water resources, flood defence and flora and fauna.

Biomass: Energy Crops

Immaturity of the biomass industry and absence of schemes in the East Midlands

54. emda, in conjunction with the National Farmers Union, should organise seminars for farmers with a view to raise awareness of and stimulating interest in energy crops.
55. emda should develop a pilot, exemplar biomass project in the Region. Grant aid could be available under the Energy Crops Scheme (part of England's Rural Development Plan administered by MAFF).

Perceived adverse impact on landscape character of energy crops, storage areas and plant

56. emda, in conjunction with the National Farmers Union, biomass developers and local authorities, should commission landscape character assessments to identify suitable sites for energy crops, storage areas and plant. Priority should be given to areas of degraded landscape, where enhancement is possible.

Perceived adverse impact of energy crops on biodiversity of energy crops and storage areas

57. emda, in conjunction with the National Farmers Union, biomass developers and local authorities, should commission biodiversity assessments to identify suitable sites for energy crops and storage areas.

Biomass (poultry litter)

Limited and geographically disparate resource

58. emda, in conjunction with developer associations, should undertake a study of the poultry litter resource and the optimum locations for biomass plant (taking account of transport distances and opportunities for mixed fuel plants).

Biomass (pig and cow slurry)

Immaturity of the biomass industry and absence of schemes in the East Midlands

59. emda, in conjunction with the National Farmers Union and MAFF, should organise seminars for farmers with a view to stimulating interest in the use of pig and cow slurry for energy generation.
60. emda should develop a pilot, exemplar project in the Region. Grant aid should be available under the Energy Crops Scheme (part of England's Rural Development Plan administered by MAFF).

Solar (photovoltaics)

High cost of implementation and immaturity of the PV market in the East Midlands

61. emda should secure funding from Government and EU sources for the purposes of large scale procurement and the development of exemplars in the Region.
62. Local energy agencies should assist in the identification of target sectors for PV in the Region, e.g. social housing, schools, and help to facilitate the initiation of projects.

Solar (passive)

Lack of awareness and relevant skills

63. emda should organise a seminar with developers, the House Builders Federation and Solar Clubs to raise awareness.
64. County Councils and Unitary Authorities should organise training for town and country planners, architects and engineers on passive solar design. The report produced by De Montfort University in association with the Engineering and Physical Sciences Research Council (EPSRC), entitled *Enlightened Planning* (2001) could be used to inform the training programme.

Solar (active)

Lack of public awareness and confidence in the technology

65. Local Energy Agencies and Energy Efficiency Advice Centres should provide information to architects and decision-makers in the Region.
66. emda should explore opportunities for more advanced training of installers.

Municipal and Industrial Waste

Concern about impact of incineration and landfill (with energy recovery) on the achievement of national recycling and composting targets

67. The Regional Technical Advisory Body should undertake strategic assessment of waste management options to identify the role of incineration and landfill in the context of the most sustainable waste management strategy.

Curbing CO₂ Emissions

68. Finally, the Report draws attention to the wider, contextual issue of CO₂ emissions. The Report indicates that meeting the energy efficiency targets for 2010 would result in 7.1% less CO₂ being emitted than business-as-usual projections. Meeting the 2010 renewable energy targets would offset CO₂ emissions by 1.6%, which gives a total reduction of 8.7% of the Region's 1990 CO₂ emissions.
69. Whilst these contributions to reducing CO₂ emissions are significant, they are insufficient in themselves to meet national targets. They also need to be seen in the context of increasing energy demand.
70. The Report therefore recommends that the Regional Sustainable Development Framework takes account of this wider picture and develops a policy framework that addresses the potential for other sectors and activities to contribute to a reduction in CO₂ emissions. It is widely acknowledged that land use planning has a key role to play, for example in defining patterns of development that reduce the need for transport of people and goods. There are also major opportunities in the food retail and waste management sectors, in terms of encouraging greater regional self-sufficiency.