

Summary

BACKGROUND TO THE STUDY

1. The government has proposed that 5 % of the UK's electricity requirements should be met from renewable energy by the end of 2003 and 10 % by 2010, subject to the costs to consumers being acceptable. In the light of these aspirations, the government is promoting a strategic, regional, approach to renewable energy, with regional renewable energy targets set out in new Regional Sustainable Development Frameworks.
2. The Government Office for the South West (GOSW) appointed Terence O'Rourke plc and ETSU to provide an overview of the region's renewable energy resources and advise on potential targets for their use, having regard to technical, economic, planning, environmental, commercial considerations. The study embraced all forms of renewable energy considered to offer potential in the foreseeable future, including solar, hydro, tidal and wind power, energy from waste and biomass.
3. The work programme embraced three distinct categories of work considered necessary to fulfil the requirements of GOSW's brief:
 - renewable energy data collection and resource assessment;
 - planning and environmental analysis;
 - extensive consultation with stakeholders.
4. An effective consultation strategy was recognised as a precondition for project success and lay at the heart of the work programme. The strategy included stakeholder seminars with a wide range of representatives from the renewable energy industry, environmental groups, government agencies, local authorities and energy agencies, farming and financial interests and academia. It also embraced community workshops and county planning seminars.

THE STUDY CONTEXT

5. The combustion of the fossil fuels - principally coal, oil and natural gas - releases large volumes of carbon dioxide and other gases to the atmosphere. This process has been increasing since the industrial revolution and has led to a build up of atmospheric CO₂. This has altered the composition of the atmosphere to an extent that the surplus solar radiation which the Earth would normally reflect back into space is increasingly being retained, leading to the so-called greenhouse effect and to global warming.
6. The consequences of global warming for the UK have been anticipated by a Climate Change Impacts Review Group, which reported to the government in March 1996. Amongst other things, the Review Group predicted the following effects:

- more hot, dry, summers and increased winter precipitation;
 - higher average windspeeds and increased storminess and storm damage;
 - greater seasonal variation in river flows;
 - increased public and agricultural demand for water;
 - sea levels rising at around five centimetres every decade;
 - increased flooding and erosion in coastal zones;
 - an increase in timber yields in the north of the UK;
 - lower crop yields in the south-east of the UK;
 - a northward shift of natural habitats of 50-80 km every decade;
 - enhanced potential for tourism and recreation;
 - increased incidence of certain infectious diseases.
7. There is no simple solution to the challenge of climate change. However, it has been acknowledged that a reduction in CO₂ levels is a prerequisite for containing the harmful impacts of global warming. With much of the industrial world's greenhouse gas emissions arising from energy production, there is new interest in the ability of renewable sources of energy to provide electricity and heat with little or no emissions of CO₂.

EXPERIENCE TO DATE OF RENEWABLE ENERGY IN THE SOUTH WEST

8. Most recent renewable energy development in the South West has been brought forward as a consequence of the Non-Fossil Fuel Obligation (NFFO). NFFO contracts were awarded in five tranches between 1990 and 1998. Projects contracted through NFFO receive a premium price for the electricity generated for a defined period of up to 15 years.
9. A total of 98 NFFO contracts were awarded to renewable energy projects in South West region, representing 12.34% of the total number of NFFO contracted schemes in England and Wales. The total contracted electricity generation capacity of NFFO schemes in the South West region is 226.01 megawatts (MW - as a rule of thumb, 1 MW of generation capacity is roughly adequate to supply 1,000 homes). This represents 6.99% of the total contracted capacity for England and Wales. The total capacity of contracted NFFO schemes in England and Wales 3229.214 MW. Of this 731.754 MW is operational, representing 22.5% of contracted capacity. Of the 98 schemes in the region 39 are operational. The total operational capacity of these schemes is 51.749 MW, representing 22.90% of the contracted regional capacity.
10. Existing coverage of renewable energy development in the structure and local plans prepared by local authorities was also reviewed using a series of policy quality indicators. The particular importance of development plans arises from a statutory requirement, introduced by the Planning and Compensation Act 1991, that the determination of individual planning applications should be in accordance with the development plan unless material considerations indicate otherwise. Overall, approximately 70 % of plans were rated as 'good' or better in their policy coverage. However, almost a quarter were of poor quality. The main areas of weakness are the lack of was technology-specific policy (e.g. for biomass) and the widespread absence of cross-referencing to other plan areas (e.g. rural economic regeneration).

RESOURCE ASSESSMENT

11. The project team developed a picture of available regional resources using the methods outlined in appendix X. The key points emerging from the resource analysis are 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 inclusion 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 region's 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 are 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.
- The prospects for deployment of photovoltaics in the South West to 2010 are strongly dependent upon economic factors.
- Conventional “deep drill” geothermal technologies have limited prospects in the region.
- Tidal barrage, tidal current and wave energy technologies may hold some prospects for limited deployment by 2010.

12. 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 A below.

Indicative Renewable Energy Generation Type/Size	Potential Regional Target Range		
	Schemes	MW	GWh/yr
<i>Offshore Wind Farms (50 MW; 20-30 Turbines)</i>	0-1	0-50	0-160
<i>Medium-Scale Wind Farms (25MW; 10-20 Turbines)</i>	2-6	50-150	302-627
<i>Small Wind Clusters (6 MW; 4-10 Turbines)</i>	8-13	48-78	
<i>Single Large Wind Turbines (1.5 MW)</i>	15	22.5	
<i>Single Small Wind Turbines/Chargers (0.03 MW)</i>	50 + Off-grid	1.65-2.5	3.5-5.3
<i>Large CHP or Electricity Plants Fuelled by the Combustion of Energy Crops and/or Agricultural & Forestry Wastes (AfW) (20+ MW)</i>	2-3 Wood	55-75	412.5-562.5
	0-1 Straw	0-15	0-112.5
	0-1 Ch. Litter	0-15	0-112.5
<i>Medium CHP Plants Fuelled by the Combustion of Energy Crops and/or AfW (5 MW)</i>	0-7 Wood	0-35	0-262.5
<i>Anaerobic Digestion Plants Fuelled by Farm Biogas (0.5 MW)</i>	5	2.5	21.2
<i>Anaerobic Digestion Plants Fuelled by Sewage Gas (0.5 MW)</i>	2	1	8.5
<i>CHP or Electricity Plants Fuelled by Municipal or Industrial Solid Wastes (10 MW)</i>	0-2	0-20	0-150
<i>CHP or Electricity Plants partly fuelled by Green Waste</i>	3-6	1.5-7.5	11.3-56.3
<i>CHP or Electricity Plants Fuelled by Landfill Gas</i>	8	11.2	84.1
<i>Small-Scale Hydro Power (0.1 MW)</i>	10-30	1-3	4.4-13.2
<i>Domestic PV Installations (1.5-3kW_p)</i>	2680	8	6.4
<i>Commercial PV Installations (50kW_p)</i>	53	2.65	2.1
<i>Motorway PV Installations (160kW_p/km)</i>	16	1.6	1.3
<i>Tidal Current installations (7.5MW)</i>	1-3	0.3-15.3	0.7-33.5
<i>Tidal Barrage installations</i>	0-1	0-28	0-55
<i>Shoreline Wave</i>	0-1	0-0.5	0-1
Total	103-149 + PV	207-545	855-2275

Table A: Renewable energy resources in the South West region

13. In order to understand how the resources estimates might translate into a viable regional renewable energy target, a series of development scenarios were produced as a basis for consultations with planning authorities, the renewables industry and other stakeholders. The scenarios were refined in the light of the stakeholders' feedback to form a basis for the regional target recommendations proposed in this report.

TOWARDS A REGIONAL RENEWABLE ENERGY TARGET

14. In defining a feasible target for renewable energy use in the South West region in 2010, the following considerations are relevant.
- 52 MW of the electricity generation capacity contracted through NFFO had been commissioned by autumn 2000. This capacity must be added to the potential new capacity identified in table 4.2 in order to identify the renewable energy South West's practicable target range. The identified range of 207-545 MW generation capacity thus increases to 259-597 MW.
 - In proposing a target, it is important also to acknowledge that municipal and industrial waste may no longer be regarded as a renewable form of energy in future European and national policy. The implications of including and excluding waste thus need to be made transparent.
 - As the preceding section explained, the South West region's existing power stations provide 3,950 MW of electricity generating capacity. This capacity will continue to evolve as old plant is decommissioned and new capacity comes on-stream. The introduction of a proposed combined-cycle gas turbine power station at Langage near Plymouth will add a further 1,349 MW to regional capacity by 2010, with significant implications for any target based on the region's electricity generating capacity.
15. With these considerations in mind, table B defines the parameters within which the South West's regional renewable energy target for 2010 should be set.

Assumptions	Proposed generation capacity from renewables (including existing)	% of existing regional generation capacity (3,950 MW)	% of regional generation capacity including Langage CCGT (5,299 MW)
Low end of target range	259 MW	6.6 %	4.9 %
High end of target range, excluding MIW	577 MW	14.6 %	10.9 %

High end of target range, including MIW	597 MW	15.1 %	11.3 %
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Table B: South West region: parameters for the 2010 renewable energy target

16. The regional renewable energy assessment indicates that the South West region possesses diverse and substantial renewable energy resources and that it would be feasible, in principle, for the region to procure between 11 and 15 % of its electricity from renewables by 2010. The precise target selected will, for reasons already given, depend in part upon whether the proposed combined-cycle gas turbine power station at Langage near Plymouth is included in regional capacity, and whether energy from waste developments are treated as renewable energy. More fundamentally, it will depend upon the steps that are taken by regional and local government to facilitate renewable energy development, and the ability of the renewables industry to respond to the opportunity presented by the new Renewables Obligation and bring forward the requisite electricity generation capacity within the ten-year timescale. It will also be influenced by the readiness with which local communities appreciate the underlying reasons for the 'rush for renewables' and accept the development consequences at the local level.
17. One thing is immediately apparent: attainment of the target will require all parties - government, business and local communities - to approach the coming challenge *positively and with imagination*.

RECOMMENDATIONS

18. The following recommendations are made.

R1. THE REGIONAL TARGET

The region should work towards a target of procuring between 11 and 15 % of its electricity from renewable energy sources by 2010, subject to the costs to consumers being acceptable.

19. The renewable energy resource assessment has confirmed that the region possesses diverse and substantial resources. Given that the South West is considered to be better endowed with renewable energy resources than some other areas of the UK, it would be appropriate for a target in excess of the national 10 % objective to be set for the region.

R2. PLANNING INITIATIVES

To ensure that a positive, planned approach is adopted towards the renewable energy developments required to meet the regional generation target, the Government Office for the South West should:

- i). identify minimum county renewable energy targets;
 - ii). ensure that development plans in the region give appropriate consideration of renewable energy, having regard to the local availability of energy resources;
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- iii). take steps to ensure that all relevant policy-making authorities in the region are furnished with accurate information on the availability of energy resources;
 - iv). recommend that DETR undertakes an early review of *Planning Policy Guidance Note 22: Renewable Energy*, to reflect the rapid policy and technological developments of recent years;
 - v). use the next review of Regional Planning Guidance to highlight the contribution that renewable energy can make to wider regional planning objectives and to an enhanced quality of life in the region.

R3. A REGIONAL RENEWABLE ENERGY STRATEGY

The Government Office, in liaison with the South West Regional Assembly (as the Regional Planning Body) and the SWRDA, should consider the feasibility of establishing a regional renewable energy strategy for the South West region.

20. As explained in chapter 5, the strategy could realise wide-ranging benefits by:
- providing a substantiation of the regional renewable energy target;
 - promoting the diverse and practical benefits of renewable energy utilisation in the region;
 - encouraging 'flagship' projects and regional exemplars;
 - defining a coherent strategy for the development of the region's indigenous renewable energy industry and skills base and provide business support;
 - identifying the specific means by which renewables will be expected to support established economic, community and environmental initiatives, such as those in Objective 1 and 2 and the transitional areas, rural development areas and Community Forests;
 - assisting the RDA to forge stronger links with the region's farming community;
 - promoting linkages between the renewable energy industry and the universities and other research centres in the region.
21. Sub-regional renewable energy agencies could play an important part in the implementation of the strategy.

R4. THE ROLE OF LOCAL AUTHORITIES

The Government Office should highlight to local authorities the important role that they will be expected to play in the attainment of the renewable energy targets,

through positive planning, support for innovative projects and through leading by example.

R5. COMMUNITY INITIATIVES

Further consideration is given to the means by which the development of the region's renewable energy resources can be used to promote community well being.

R6. DISSEMINATION OF INFORMATION

Whether or not as a part of the regional renewable energy strategy proposed in recommendation 6.3 (above), the Government Office , in partnership with other regional bodies and local authorities, should initiate a sustained programme of awareness raising embracing:

- **climate change and its implications for the South West region;**
- **the role of renewable energy and energy efficiency;**
- **the nature, scale and disposition of renewable energy resources in the region;**
- **the environmental, economic and social opportunities that the use of these resources presents;**
- **the regional target.**

22. Support for awareness-raising measures was voiced by consultees from all quarters during the course of the study.

R7. MONITORING AND COORDINATION

Measures are taken to ensure that the region's progress towards its renewable energy target is monitored and that obstacles to target attainment can be identified at an early stage and, where appropriate, addressed through policy or other mechanisms.

23. The steering group that commissioned the current study or a similarly constituted body could be given a standing trouble-shooting brief to monitor progress and ensure that a steady drive towards the achievement of the regional target is maintained.