



# Renewable Energy Policy Review

## United Kingdom

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## 1. General information

### Population and geography

Total surface area is 244,820 sq km, of which 241,590 sq km is land and 3,230 sq km is water. It has a coastline of 12,429 km and borders Ireland. The temperate is moderated by prevailing southwest winds over the North Atlantic Current. The terrain is mostly rugged hills and low mountains; level to rolling plains in east and southeast. The lowest point is the Fenland at -4 m and the highest point is Ben Nevis at 1,343 m. The UK's natural resources are: coal, petroleum, natural gas, tin, limestone, iron ore, salt, clay, chalk, gypsum, lead, silica, arable land.

The United Kingdom (official name: United Kingdom of Great Britain and Northern Ireland, abbreviated: UK) is a major political power, and also the world's fourth-largest economy (according to 2003 nominal gross domestic product). The country joined the European Union (EU) in 1973 (confirmed by referendum in 1975), but has yet to decide whether to adopt the European Monetary Union's single currency

The United Kingdom is a parliamentary democracy, based on universal suffrage. It is also a constitutional monarchy in which ministers of the Crown govern in the name of the Sovereign, who is both Head of State and Head of the Government. There is no 'written constitution'; instead, the relationship between the State and the people relies on statute law, common law and conventions. The UK Parliament makes primary legislation (other than for matters devolved to the Scottish Parliament and the Northern Ireland Assembly) and is the highest authority in the land. It continues to have the supreme authority for government and law-making in the UK as a whole. The executive comprises the Government (members of the Cabinet and other ministers responsible for policies); government departments and agencies; local authorities; public corporations; independent regulatory bodies; and certain other organisations subject to ministerial control. The judiciary determines common law and interprets statutes.

In her role as Monarch, the Queen is head of the executive and plays an integral part in the legislature. She heads the judiciary and is both the commander-in-chief of all the armed forces of the Crown and 'supreme governor' of the established Church of England. Following devolution, the responsibilities of the Secretaries of State for Scotland, Wales and Northern Ireland changed considerably, although they retain their positions in the UK Cabinet. They ensure that the 'reserved interests' of the countries they represent are properly considered in central government and they lead the presentation of government policy in their parts of the UK. They are also responsible for safeguarding and promoting the devolution settlements of their respective countries.

The main functions of Parliament are:

To pass laws

To provide (by voting for taxation) the means of carrying out the work of government

To scrutinise government policy and administration, including proposals for expenditure

To debate the major issues of the day

Her Majesty's Government consists of those ministers responsible for the conduct of national affairs. The Queen alone appoints the Prime Minister, and all other ministers are appointed by her on the Prime Minister's recommendation. Most ministers are members of the Commons, although the Government is also fully represented by ministers in the Lords. The Lord Chancellor is always a member of the House of Lords.

(source [www.ukonline.gov.uk](http://www.ukonline.gov.uk) <http://www.ukonline.gov.uk/CitizenSpace/GuidetoGovernment/fs/en>)

The UK's economy grew faster than expected in 2003, with real gross domestic product (GDP) expanding 2.3%, above the 2.1% goal that the UK government had set in its 2002 pre-budget statement. This economic expansion was considerably higher than in the overall Eurozone (the 12 EU members which have the Euro as an official currency), which grew a combined 0.4% in 2003. According the government's recently issued 2004 budget (March 17, 2004), the UK's economy is expected to remain relatively robust in 2004, with initial forecasts ranging between 3.0% and 3.5%.

The service sector has become increasingly prominent in recent decades, accounting for some 70% of gross value-added in the UK during 1999. Manufacturing activities contributed a further 19%, with the difference made up by other production industries (5%), construction (5%) and agriculture, hunting, forestry and fishing (1%). International trade plays a key role in the UK economy, with exports accounting for 27% of GDP during 2000. Some 52% of UK goods and services exports went to the EU, and around 18% to the United States. The EU supplied 52% of goods and services imports to the UK, with a further 16% coming from the United States.

## 2. Renewable energy policy

### Renewable energy country profile

In energy resource terms, the UK has large reserves of underground coal and a significant share of the oil and gas on the Continental Shelf surrounding the British Isles. In addition, a large proportion of the national electricity requirement is currently derived from nuclear plants. Fossil fuels provide the majority of energy produced and consumed in the UK, although nuclear power generates a significant proportion of electricity.

Total UK oil production (including condensates, natural gas liquids (NGLs) and refinery gain) in 2003 – 2.38 million barrels per day (bbl/d) – was 20% lower than the record level seen in 1999 and 7.5% lower than in 2002. Oil production in the UK is expected to continue to decline. One reason for this decline has been the overall maturity of the country's oil fields. Other reasons include smaller fields being brought into production and the application of new crude oil extraction technologies, resulting in a particular field being exhausted at a quicker rate. These fields are also becoming costlier to extract, as more of the oil deposits are located in more remote regions and found in smaller quantities. In 2002, the UK exported 22.6% of its crude oil production to the United States, followed by The Netherlands (18.4%), France (9.3%), Germany (7.5%), and a combined 12.3% to other destinations. The UK's refineries took the remaining 29.9% of the country's total crude oil production. In 2002, most of the UK's oil imports came from Norway, with 73% (628,000 bbl/d), followed by Russia (9%), Algeria (5%), the Middle East (3%) – mainly Saudi Arabia, and Mexico (2%). The UK has a national target of reducing carbon dioxide emissions by 20% per cent by 2010, compared with their 1990 levels. In the context of the EU's burden sharing arrangements, The UK has committed itself to reducing its average emissions of greenhouse gases by 12.5 per cent between 2008 and 2012 compared with their 1990 levels.

Renewable energy contributed 1.1% of the UK's total energy supply and 2.5% of total electricity supply in 2001 compared to EU averages of 5.8% and 15.5% respectively. (IEA Renewables Information 2003)

The UK's total final consumption (TFC) of energy was 161.5 million tonnes of oil equivalent (Mtoe) in 2000. Oil and gas shared the bulk of this with 45.6% and 34%, respectively.

Electricity generation from renewable energy (outside large hydropower) and waste was 5.5 TWh in 1996, 12 TWh in 2001. This twofold increase in RES electricity generation, is mainly due to the commissioning of numerous projects under NFFO-3 and NFFO-4. Biofuels and wastes accounted for 86% of renewable energy sources with most of the remainder from large-scale hydro electricity production. 2.5 % was contributed by wind power. Of the 3.1 m tonnes of oil equivalent from renewables, 2.4 m tonnes was used to generate electricity and 0.7 m tonnes to generate heat.

Renewable energy accounted for 3% of electricity generated in the UK in 2003. More renewable energy installations have been achieved in 2002 particularly in new and innovative technology areas continuing the expansion of renewable energy in the UK. The perspectives for the development of renewable energy are very promising in particular for wind energy.

### Hydro

The estimated UK accessible resource for new small-scale hydro power is 3.9 TWh/yr of which 3.4 TWh/yr is within Scotland. The resource likely to be commercially attractive is however much smaller than this. Generation from small-scale plants in the UK was estimated at 159 GWh in 1997. Small Hydropower development in UK took place as from 1995. The statistics show an instable trend regarding SHP installed capacity. Figures fluctuate from 154 MW in 1995 to 175 MW in 1998 and down to 68 MW in 2001. In 2001, SHP contributed to 0.09% of the country's electrical installed capacity. SHP electricity generation had small significance between 1990 and 2001 as Hydropower represented only 2% of the total electricity generation during this time. SHP electricity generation was 210 GWh in 2001, which represented about 3% of the Hydropower generation. In fact, electricity generation from Hydropower has decreased by 10% over this reference period. (source Report on Small Hydropower Statistics: General Overview of the last decade 1990-2001 ESHA) In the UK, however, opportunities to deploy the technology have been limited. This is because the good quality, most commercially attractive sites have already been utilised. In addition, environmental constraints limit the development of the remaining resource in sensitive areas such as Snowdonia and parts of the Scottish Highlands. Future opportunities for the UK will therefore be export-related, in countries where there is a demand for power and a good hydro resource. However, indications from the industry are there remain many opportunities in the domestic market that can be utilized (e.g. for smaller sites, disused mills sites, retrofit to water storage and water supply facilities) and for small-scale pumped storage offering potential as a means to balance intermittent supply from other sources such as wind generation. The DTI Renewable Energy Programme currently supports research and development aimed at addressing environmental barriers to this form of generalisation. (source DTI Renewable Energy, Hydro [http://www.dti.gov.uk/energy/renewables/technologies/hydro\\_power.shtml](http://www.dti.gov.uk/energy/renewables/technologies/hydro_power.shtml))

Tidal projects in the UK have been studied extensively. The UK shoreline wave energy resource may become economic under some future scenarios but the estimated accessible resource is no more than 0.4 TWh/yr assuming a cost less than 10 p/kWh at an 8% discount rate.

### **Biomass**

Presently, the number of plants deployed in the UK are limited. The most notable example is the Elean straw-fired power station in Ely, Cambs. The plant, which was commissioned in 2000, generates 36MWe and receives a premium price for its electricity under the former Non Fossil Fuel Obligation. The Government is fully committed to the development of a bioenergy industry in the UK and support is available to developers through a range of programmes. The DTI New and Renewable R and D Energy Programme provides grants to a range of research and development projects on energy crops, from improvements in crop yield to further developing advanced conversion technologies for pre-commercial demonstration. The Bioenergy Capital Grants Scheme, a joint initiative funded by DTI and the National Lottery New Opportunities Fund supports the early deployment of proven biomass-fired heat and power generation projects. The Minister for Energy and Construction, Brian Wilson, announced in January 2003 a grant package worth over £4.2 million for biomass-fired heat and small combined heat and power (CHP) projects under the Scheme. A viable bioenergy industry will not only benefit the environment by reducing carbon emissions, but also rural development through the establishment of energy crops and creation of fuel supply chain infrastructure. Support for these endeavours is available through the Energy Crops Scheme and Bioenergy Infrastructure Scheme, which are both run by the Department of Environment, Food and Rural Affairs.

## **Wind**

The UK's largest accessible renewable energy source is wind power: the accessible resource has been estimated at 340TWh/y onshore and 380TWh/y offshore. It is said that the UK possesses 15% of the EU wind resource.

Wind is expected to play a key role in assisting the UK in meeting its renewable targets. The government has already held two licensing rounds for offshore wind farm leases. In December 2003, the government announced the results of the second licensing round, approving 15 leases for companies to develop projects in three offshore areas: the Thames Estuary; the Great Wash on the east coast; and northwest coast of Scotland. Most of the proposed wind farms have installed capacities ranging from 200 MW to 500 MW, though three are larger: the 1,000-MW London Array project in the Thames Estuary; National Wind Power's 750-MW Gwynt y Mor; and 1,200-MW Triton Knoll developments, in the Northwest and Greater Wash areas, respectively.

The first licensing round took place in December 2000 and awarded 18 leases for wind farms. The first of these, North Hoyle, began operations in November 2003. The wind farm is located off the North Wales coast and has an installed capacity of 60 MW. In October 2003, the government gave the go ahead for four other wind farms to be built off the coast of Norfolk, Lincolnshire and Essex. The four projects – Lynn, Lincolnshire, Cromer, and Gunfleet Sands – will have a combined generation capacity of 456 MW. Total installed capacity in the UK was 649 MW at the end of 2003

## **Solar thermal**

The market for solar thermal in the UK has changed little in the last 20 years. With cheap fossil fuel prices and little government support, it is difficult to make an economic case for solar water heating.

Applications of solar thermal in the UK are:

- Domestic hot water production: Vast majority of systems are solar domestic hot water systems.
- Space heating: There are only few examples of this application in the UK.
- Air conditioning and industrial process heating: Very few examples of industrial and agricultural use of solar for process heating.
- Large collective solar systems as well as district heating: No examples of these applications in the UK.

## **Solar PV**

There was a significant increase in the annual installed PV generation capacity in 2002 of 70 % compared to 2001. A total of 1 390 kW was installed in the UK in 2002. The cumulative installed PV generation capacity increased by over 50 % during 2002 reaching a total of 4,14 MW. Much of this increase is due to the rapid expansion of the grid-connected market, accounting for 96 % of the 2002 installations. Government support in the form of Field Trials, together with the Major Demonstration Programme launched in 2002 accounted for approximately 51 % of the total new capacity. By 31 December 2002, the totalled installed PV capacity in the UK was 4 136 MW, of which 3 568 kW (86 %) was on-grid distributed. This represents a 50 % increase over the previous year. This is expected to increase to around 6MW by the end of 2003, due primarily to commissioning of installations under the Field Trials and Major Demonstration Programme. Solar Century, a solar solutions company has been very successful in building new business although BP Solar remains responsible for the lion's share of installations. Other significant installers are PV Facades, PV Systems, Sundog and Solar Energy Installations.

## **Geothermal**

The UK does not possess any high enthalpy geothermal resources. Research into hot dry rocks at Rosemanowes Quarry, Cornwall, started in 1976 but was stopped in 1993 after the government transferred its efforts to a collaborative (and cheaper) project with France and Germany. A small development programme into geothermal heat has resulted in the use of this source in a district heating scheme in one town (Southampton) in the south of England.

## **RE Policy Outlook**

The UK has approximately 15% of the European onshore wind resource and half of the European tidal resource. The urban population also creates large waste volumes, which are beginning to be used for landfill gas and waste incineration. Despite the UK's considerable renewable energy resources in wind, wave and tide, the exploitation of RES in the UK remains weak compared to its European partners.

The UK's Renewable Energy policy objectives and targets are very much related to the Climate Change Programme targets of November 2000. This Programme was written to set out a strategy to achieve the UK's Kyoto targets for reducing the greenhouse gas emissions. One of the means to do so is the stimulation of production of electricity from renewable energy sources.

The key aims for the Government's policy on new and renewable energy are:  
Assisting the UK to meet national and international targets for the reduction of emissions including greenhouse gases;  
Helping to provide secure, diverse, sustainable and competitive energy supplies;  
Stimulating the development of new technologies necessary to provide the basis for continuing growth of the contribution from renewables into the longer term;  
Assisting a UK renewables industry to become competitive for home and export markets and in doing so provide employment in a rapidly growing sector;  
Contributing to rural development.

Initially, the promotion of renewable in the UK came with the Fossil Fuel Levy, introduced in the 1989 Electricity Act through the Non-Fossil Fuel Obligation (NFFO). Under NFFO, generators have been invited to tender for fixed term contracts at premium rates for electricity in selected bands. Government policy in the energy sector has been to establish open, competitive markets for energy products and services, withdrawing from public ownership. For renewables the policy objective is "to stimulate the development of new and renewable energy technologies where they have prospects of being economically attractive and environmentally acceptable" in order to contribute to:  
a diverse, secure and sustainable energy supplies  
a reduction in the emission of pollutants  
the encouragement of internationally competitive renewables industries

The NFFO has been replaced by "The renewable obligation order 2002". For instance in May 2002 the Ministry of Energy launched a Consultation Paper on Energy Policy. The market development of renewable energy in the United Kingdom is one of the key issues in this major consultation on energy policy. The objective of this consultation paper is that the responses to the consultation, running until the end of this summer (which summer 2003 or 2004?), will help to shape an Energy White Paper, by around the turn of the year. A consultation document initiates the debate; this will include a response to the Performance and Innovation Unit's Energy Review and to its emphasis on a low-carbon economy and greater energy efficiency. In this review it was stated that there should be a 20% increase in renewable energy in the UK over the next 20 years, and a 40% increase in domestic energy efficiency.

Renewables are exempted from the Climate Change Levy imposed on energy use by all businesses. This tax on the business use of energy, entered into force in April 2001. It applies to gas, electricity, liquefied petroleum gas and coal. It does not apply for fuel oils as they are already subject to the Hydrocarbon Duty Levy.

#### **Exemptions**

Very small enterprises, charities and residential end-users  
Renewable energy sources  
Good quality CHP (see CHP Quality Assurance programme)  
Gas in Northern Ireland for up to 5 years

#### **Reductions**

Energy intensive businesses can reduce Levy payments by 80% if they participate in Climate Change Agreements (CCA's) extended over a 12 year period (see section on Climate Change Agreements)

#### **Revenues**

0.3% reduction in employers national Insurance contribution  
Support for energy efficiency measures

The UK also operates an Emissions trading scheme, which complements the Climate Change Levy.

Businesses have the opportunity to take part in Climate Change Agreements. As a reward for agreeing to meet targets higher than the national minimum, energy intensive businesses can obtain an 80% discount on their Climate Change Levy payments. If a company fails to reach their newly adjusted targets, they may remain in the Climate Change Agreement but not receive the discount for 2 years. If the company manages to catch up by the next review, they may receive the discount once more.

The Enhanced capital Allowance scheme is managed by DEFRA – the Department for the Environment, Food and Rural Affairs and the Inland Revenue and is administered by The Carbon Trust.

Up-front tax relief for 100% of the cost of energy efficient products against a businesses taxable profit. The eligible products are listed in the Energy Technology list which can be viewed on the Enhanced Capital Allowance website. (source IEA Energy Efficiency Update 2003 United Kingdom)

In the UK, the Department of Trade and Industry (DTI) is the lead Department dealing with energy issues. Other Departments with significant interests are the Department of the Environment, Food and Rural Affairs (Defra), the Office of the Deputy Prime Minister (ODPM), the Cabinet Office and the Treasury. (source United Kingdom Photovoltaic technology status and prospects Gary Shanahan, Renewable Energy Development and Deployment Team, Department of Trade and Industry on IEA Photovoltaic Power Systems, Annual Report, 2003)

The DTI published the White Paper on 24 February 2003 and is the first comprehensive, forward-looking statement of energy policy in the UK for over 20 years. A major underlying theme of the White Paper is the need for the country to move towards a low carbon economy. To this end, the government has accepted a recommendation made in the Royal Commission on Environmental Pollution's (RCEP) 22nd report in 2000 that the UK should put itself on a path to a reduction in carbon dioxide emissions of some 60% from current levels by about 2050, with real progress by 2020.

The Carbon Trust has been established to help business and the public sector to move towards a low carbon future, exploiting opportunities and supporting innovation and new technologies. Through its Low Carbon Innovation Programme, it funds a range of projects aimed at developing low carbon technologies. Funds are available through the main stages of innovation into commercial reality.

Renewables UK has been set up recently by the DTI to support the UK renewables industry, to help it to compete more effectively in the very competitive marketplace, both at home and abroad. The programme aims to build on domestic capabilities to exploit indigenous expertise, and in particular to maximise business opportunities from some of the emerging technologies e.g. offshore fabrication, wave, tidal, also in financing, consultancy and services.

## Electricity

For the year 2002, natural gas accounted for 39% of the electricity generated in the UK, followed by coal with 32%, nuclear 22%, and hydro 1%. Other fuels and imports (2.4% from France) accounted for the remainder. Electricity consumption was 343.9 Bkwh, down 0.8% over 2001 (source Energy Policies of IEA countries United Kingdom 2002 Report)

The promotion of electricity produced from RES is realized through "The renewable obligation order 2002". This order entered into force on 1<sup>st</sup> April 2002, and extends to England and Wales only. The obligation period begins on 1<sup>st</sup> April 2002.

The Renewables Obligation is placed on all electricity suppliers to provide an increasing proportion of their electricity from eligible renewable sources, rising from 3% in 2002 to 10% by 2010. This helps renewables power to obtain a premium compared with prices for non-renewables electricity. The renewable obligation is referred to the responsibility of a supplier to obtain, before each specified day, the evidence showing of the electricity produced from RES. The authority issues a certificate, to electricity generated from eligible renewable sources. Those certificates issued under this order are referred to as « ROC's ».

Instead of producing certificates, a designated electricity supplier may discharge (in whole or in part) its renewable obligation in relation to a particular obligation period by making a payment to the authority before the specified day relating to that obligation period. "The buy out price" will be defined according to the annual retail prices index of the year. The "retail prices index" means the general index of retail prices published by the Office of National Statistics.

The amount of electricity generated by a generating station which is to be regarded as having been generated from eligible renewable sources in any month is to be calculated by multiplying the renewable output of that station in that month by a proportion which is equal to the proportion which the net output of that station in that month bears to the gross output of that station in that month.

There are several investment subsidies, such as the New Opportunities Fund, giving 40% subsidy for biomass and wind offshore.

The most recent statistics collected show that the percentage of UK electricity **consumption** accounted for by renewable sources included under the Renewables Directive increased from 2.51% in calendar year 1999 to 2.54% in 2000 and 2.86% in 2001. The main reason for the increase in 2001 (despite the reduction in the supply from large scale hydro schemes because of the low level of precipitation in the catchment areas, especially in the winter of 2000/01) was the inclusion of imports of renewable sourced electricity over the interconnector with France (mainly hydro). On the basis of the technologies now eligible for the Renewables Obligation, the percentage of UK electricity **sales** from eligible

## Heating

The government has set a target of 10 000 MW of CHP capacity by 2010 as an important part of the Climate Change Programme. It has introduced a number of measures to promote CHP power plants:

### [The CHP Quality Assurance \(CHPQA\) programme:](#)

A CHP Quality Assurance certificate certifies the energy efficiency and environmental performance of CHP schemes. Good Quality CHP is exempt from the Climate Change Levy (subject to State Aid clearance), eligible for Enhanced Capital Allowances (see section on ECA), and exempt from business rates of the electricity generating plant and machinery in CHP schemes.

A CHPQA Certificate supports a claim for the benefits offered to Good Quality CHP. The issue of Secretary of State (combined heat and power) exemption certificates (required for claiming Climate Change Levy exemption) and Energy Efficiency Certificates (required for claiming Enhanced Capital Allowance) is dependent on the information contained in your CHPQA certificate. To claim Enhanced Capital Allowances (ECAs), you must have a Secretary of State Energy Efficiency Certificate before claiming the allowance on your Tax Return. To claim Climate Change Levy (CCL) exemption on fuel inputs to and power outputs from, your CHP Scheme you must have a Secretary of State (combined heat and power) exemption Certificate for your CHP Scheme. (SOURCE <http://www.chpqa.com/>)

## Transport

There has been a rapid growth in total passenger and goods transport in the UK in recent decades. Transport is now the biggest energy user, accounting for 33% of final energy use in 2000. Cars registered on or after 1 March 2001 are subject to graduated Vehicle Excise Duty (VED, an annual tax on road vehicles) based upon CO<sub>2</sub> emissions. Vehicles powered solely by electricity are exempt from VED and new gas-powered vehicles benefit from a small discount of £5 to £10. Diesel cars with lower carbon dioxide emission rates than similar petrol cars pay a small supplement to compensate for the fact that diesel cars may emit higher levels of particulates and other local air pollutants such as NO<sub>x</sub>. (source Energy Policies of IEA countries United Kingdom 2002 Report)

*Transport 2010, the 10-Year Plan* designed by the Department for Environment, Transport and the Regions and published in 2000 is an investment plan for delivering the White Paper on the future of transport: *A New Deal for Transport: Better for Everyone*, July 1998, commitment to an integrated transport system. The Plan focuses on surface transport, and improvements in surface access to ports and airports. The 10-Year Plan envisages the necessary level of investments, total private and public expenditure, to be £180 billion over the next ten years. The breakdown is as follows: public investment: £64.7 billion, private investment: £56.3 billion, public resource/revenue: £58.6 billion. The Plan sets the strategic framework, and individual projects and programmes are to flow from decisions taken by a variety of agencies, the private sector, and through Regional Transport Strategies and Local Transport Plans, as well as public and private partnerships.

The European Voluntary Agreements with European, Japanese and Korean vehicle manufacturers will reduce new car CO<sub>2</sub> emissions by 25% to 140g CO<sub>2</sub>/km by 2008 (2009 for KAMA, the Korean manufacturers association). The voluntary agreements have proved a highly effective mechanism for improving the fuel efficiency and CO<sub>2</sub> performance of new cars. The UK *Powering Future Vehicles* strategy was launched in July 2002. It sets out government targets that by 10% of new cars sold in the UK by 2012 will be low-carbon vehicles, defined as 100 or less grams of CO<sub>2</sub> per km at the tailpipe (compared with the current new car average of 178gm). It also sets the target that by 2012, 600 new buses joining the fleet yearly (around 20%) will also be low-carbon.

The impact of the economic instruments is reinforced by a range of initiatives to raise public awareness and to change the behaviour of individuals and businesses. These include the Transport Energy Best Practice programme (TEBPP) Motorvate (see below) and the "Are you doing your bit?" campaign. (source IEA Energy Efficiency Update 2003 UK)

## Research and Development

The aims of R&D are to provide an assessment of technology options and potential; stimulate technology development and cost reduction with industry; monitor developments under the NFFO; remove inappropriate market barriers; and increase technology transfer. Resources are directed towards a number of 'key technologies' including hydro, landfill gas, municipal and industrial waste, wind, solar, fuel cells, energy crops and agricultural and forestry wastes. The previous government announced in 1994 that state funding for tidal, wave and geothermal energy would be halted at the end of their commitments in these areas because of the limited commercial potential in these areas, but this is being reviewed by the new Government.

Government R&D expenditure for FY 1996/97 declined by around 20% compared with 1995/96 to 14.7 M GBP. The R&D budget for PVs has more than doubled in recent years to reach 1 M GBP in 1998/99. From late 1994 onwards the UK R&D programme has seen the creation of a task force to assist the transfer of UK new and renewable energy

expertise to overseas markets, and now employs two dedicated Renewable Energy Trade Promoters. Short-rotation coppicing and other aspects of biomass exploitation are believed to be a promising area, and over six years from FY 1990/91 to 1996/97, this R&D budget has increased from about 0.9 M GBP to 2.7 M GBP per year. Activities within the UK's biomass R&D programme area come under three main headings including: agricultural and forestry residues; crops; and advanced conversion technologies.

			TIME	1980	1985	1990	1995	1999	2000	2001	2002
COUNTRY	PRODUCT	FLOW									
United Kingdom	Million US\$ (2002 prices and exchange rates)	Solar Heating & Cooling		3,922	2,850	4,490	2,710				
		Solar Photo-Electric		0.634			1,012	2,256	2,049	2,784	8,096
		Total Solar		4,556	2,850	4,490	3,722	2,256	2,049	2,784	8,096
		Wind		3,486	16,527	11,866	4,932	1,450	1,419	2,165	3,148
		Ocean		18,858	1,425	4,704	0.596	0.000	0.631	1,547	3,748
		Biomass		3,486	1,140	4,896	6,486	3,384	2,680	2,784	4,198
		Geothermal		10,142	11,398	5,559	0.452				
		9.2 Small Hydro (<10 MW)					0.271	0.322	0.158	0.155	
		Total Hydro					0.271	0.322	0.158	0.155	
		TOTAL RENEWABLE ENERGY		40,530	33,339	31,514	16,458	7,413	6,936	9,435	19,490
		TOTAL OTHER TECH./RESEARCH		80,821	92,040	8,509	9,214	29,916	29,826	3,403	4,198
		TOTAL ENERGY R&D		892,720	816,958	356,487	95,641	68,970	75,590	46,961	57,109

(Source IEA 2003: National Budget RD&D in OECD Countries – United Kingdom 1980-2002, OECD, IEA)

### 3. RE Highlights

#### National Success Story - Regional Best Practice

Powys decided to become 100% RES supplied between the period of 2000- 2010. To achieve this target they implemented various projects and established an Energy Agency in 2000. With the calculation of approx. 49,000 homes in the County in 2000 the following targets were established: Establish an Energy Agency, 5,000 solar thermal water collectors, 100kWp PV, 20 hydro schemes, wood fuel heating projects, anaerobic digestion, Energy database for resource within the county. Other than wind power the projects are starting from a very low base. It can be seen, however, that a continuation of the work will start to make significant headway on the issues. There has already been a larger acceptance of wood fuels but the overall awareness has not increased significantly as yet.

#### Success Factors:

**Financial:** The campaign has support from many sources. There is financial aid from DG- TREN SAVE and ALTENER projects.

**Technical:** support from The Carbon Trust.

**Political:** support from the National Assembly Sustainable Energy Group.

**Legal:** support from the County Council,

**Administrative:** aid from the Welsh Development Agency. The campaign is also supported by the Forestry Commission, Utility Companies, Wales OPET Cymru, other energy agencies and many more.

There was a general lack of public awareness of Renewable Energy issues and also opposition to large wind farms as the negative aspects are more widely known than the positive. It was vital to engender confidence in the Energy Agency in order for the project to be a success but also to use best practise case studies both from the UK and elsewhere. The results of the Powys project so far constitute a 2% rise in RES share on a local level. There is already a CO2 reduction of 45,000 tonnes; an NOx reduction of 156 tonnes and a Sox reduction of 520 tonnes.(Information taken from the Campaign for Take-Off Programmes, Initiatives and Projects Showcase)