

# UK POWER GIANTS

**GENERATING  
CLIMATE  
CHANGE**

**AN ANALYSIS  
OF THE MAJOR  
UK POWER  
COMPANIES**

A report for WWF-UK by  
Innovest *July 2005*



**Innovest**  
STRATEGIC VALUE ADVISORS

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# 1. Executive Summary

## Introduction

### Background

This study presents a detailed qualitative and benchmarking analysis of major UK power sector companies and their performance relating to carbon dioxide (CO<sub>2</sub>) emissions, the primary cause of climate change.

The research compares the 'carbon risk profile' of six power companies in their efforts to manage and reduce their emissions and combat climate change. Analysis was done on how their CO<sub>2</sub> emissions have changed over time, as well as their energy efficiency and renewable energy policies, actions and investments in terms of both voluntary commitments and current government regulations.

The research was carried out for the WWF-UK Stop Climate Chaos! Campaign by Innovest Strategic Value Advisors (Innovest) a global research provider assessing non-traditional sources of financial risk and opportunity.

### Companies in the survey

Innovest reviewed the corporate policies, investments, regulatory compliance and energy generation profiles of seven UK power companies:

- British Energy (BE)<sup>1</sup>,
- EDF / London Electricity / Seeboard (now EDF Energy),
- Innogy (now RWE-npower),
- Powergen (now E.ON-UK),
- Scottish Power (SP),
- Scottish & Southern Energy (SSE) and
- Centrica.

(NB. this report uses the familiar UK names for the following companies – EDF, Innogy, Powergen, British Energy, Scottish Power and Scottish & Southern Energy are abbreviated to BE, SP and SSE in some cases to avoid repetition of the full company names).

## **Innovest**

### About Innovest

Innovest is an internationally recognized investment research and advisory firm specializing in analysing companies' performance on environmental, social, and strategic governance issues, with a particular focus on their impact on competitiveness, profitability, and share price performance.

Innovest is dedicated solely to the production of high-quality, value-added research and advisory services in the field of sustainability and finance. Due to the to the potential financial implications of climate change and the cross-sector nature of this risk, Innovest leveraged its expertise in sustainability and finance and founded a specialised Carbon Finance Practice, with the objective of obtaining a detailed understanding of the financial and other implications of climate change.

Innovest has undertaken a large body of work in the dual areas of (i) carbon finance and climate-related risks and opportunities, and (ii) the power sector. Clients in these areas of Innovest work have included UNEP FI, the Carbon Disclosure Project (three years running), the US Environmental Protection Agency, EDF (France) and Duke Energy. Further details can be found on the Innovest website at [www.innovestgroup.com](http://www.innovestgroup.com)

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<sup>1</sup> Covered briefly in the Executive Summary and in full in Appendix II only

## **Study Objectives**

### Report aims

Stop Climate Chaos! aims to engage with and encourage all energy sector stakeholders - power companies, financial institutions, the UK government and consumers - to make the switch from fossil fuels to clean power, by using more renewable technologies and supporting greater energy conservation. WWF-UK is calling upon power companies and the UK government to achieve 60% reductions in CO<sub>2</sub> emissions from the UK's power sector by 2020.

The aim of this report is to provide a clear understanding of how the major UK power companies rank in relation to each other, in terms of achieving these objectives and assessing their contribution to climate change efforts by reducing their emissions. This will help WWF-UK identify the areas where it would be most important for each power company to change practices and the areas where it would be easiest to bring about any necessary changes.

## **Methodology**

### Research Process

The first stage of detailed data research was based on publicly disclosed information by the UK power companies. This included the review of all corporate greenhouse gas emissions data, governmental databases covering emissions reduction compliance, anecdotal evidence obtained from various media and a variety of business search engines and, on occasion, research by NGOs.

The second stage involved interviews with senior company executives to supplement publicly disclosed information. Innovest used standard interviewing protocols supported by questionnaires, agreed with WWF.

The benchmarking results presented in this report assess individual company performance according to three main areas of analysis, termed research 'clusters', as well as to a number of individual variables/criteria contained within these overall clusters:

- CO<sub>2</sub> policy and emissions reductions improvements<sup>2</sup>;
- Renewable energy programmes, capacity procurement for new renewables, ongoing renewable asset construction and present output; and
- Energy efficiency/demand-side management measures implemented under the UK Energy Efficiency program (energy services inclusive).

Each of these clusters comprises a number of criteria/variables, as described in more detail in Appendix I. In summary, all companies except British Energy are ranked with respect to their carbon risk profile and performance. Rankings were based on:

- CO<sub>2</sub> emissions per unit of electricity production
- Total CO<sub>2</sub> emissions output
- Improvements in CO<sub>2</sub> emissions reductions over time
- Progress on complying with the UK's Energy Efficiency (EE) targets for the residential customer sector (including provision of energy services)
- Progress on developing/selling renewable energy (RE) to their customers (where Innovest looked at procured renewables capacity)
- Compliance with the national Renewables Obligation (RO)
- Consistency of corporate renewable energy policy
- Implementation of green energy tariffs (where applicable)

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<sup>2</sup> For the purposes of this report the terms greenhouse gas and CO<sub>2</sub> are used interchangeably

Innovest did not rank British Energy due to insufficient information disseminated by that company and because of the incompatibility of nuclear energy assets with the generation base of other companies surveyed. A detailed qualitative review of British Energy's carbon profile is presented in Appendix II to this report.

### Ranking system

Innovest has developed a carbon-profiling database which enables comparisons of management strategy and emissions profiles to be made among companies on a consistent, systematic basis using the proprietary Carbon Value '21TM platform. The database contains a series of variables to assess climate change performance. These variables are weighted according to their importance within particular sectors and they are scored to provide ranking data. Scores range from 0-10 for each company for each variable. A score of 10 represents the best score a company could obtain relative to the performance of its peers (please refer to Appendix I to this report for a detailed discussion of the methodology employed by Innovest, as well as a list of the variables, weightings used and rationale behind them).

All variables and weights were reviewed externally to provide an independent level of assurance for the ranking process. In addition, using qualitative management information in tandem with estimated actual and projected emissions performance data, Innovest's carbon ranking methodology was specifically adjusted to meet WWF-UK information requests to offer a complete assessment of corporate greenhouse gas risk management and performance. Innovest also analysed and ranked any information that was reported in a highly compatible manner, such as RO compliance, EE target compliance, volume of renewable energy investments, etc.

### Eliminating bias

The qualitative and quantitative data sets were analysed separately to ensure that like for like variables were assessed. In other words, rankings for emissions, for example, are based solely on *quantitative data* and would not include any Innovest evaluations of *greenhouse gas policies*. Ranking of policy approaches would, similarly, be based solely on qualitative assessments of policy and related statements. Innovest used data that was publicly available and comparable across companies to generate the sector rankings.

Due to differing use of key performance indicators (KPIs) and a lack of disclosure by some companies, together with a mixed level of company responses to the WWF campaign - in terms of number of interviews granted - Innovest has provided rankings based exclusively on data that could be verified through external governmental agencies, such as DEFRA and Ofgem. This approach ensures consistency and comparability of results.

In terms of differentiating between companies that are suppliers and generators, all companies in the sample have power generating assets: for instance, Centrica does have some generating facilities; these are listed in the company's profile.

Further, the large range of variables Innovest considered in the course of ranking ensures a balanced review of the company's carbon risk exposure irrespective of whether it is primarily a generator or a supplier. For instance, we looked at a variety of renewable energy development indicators, including RO performance and green tariffs, which could be implemented by both types of the companies.

If Innovest had differentiated between suppliers and generators, we would not have had a basis for comparison because only Centrica is not primarily a generator - all other companies in this small sample are.

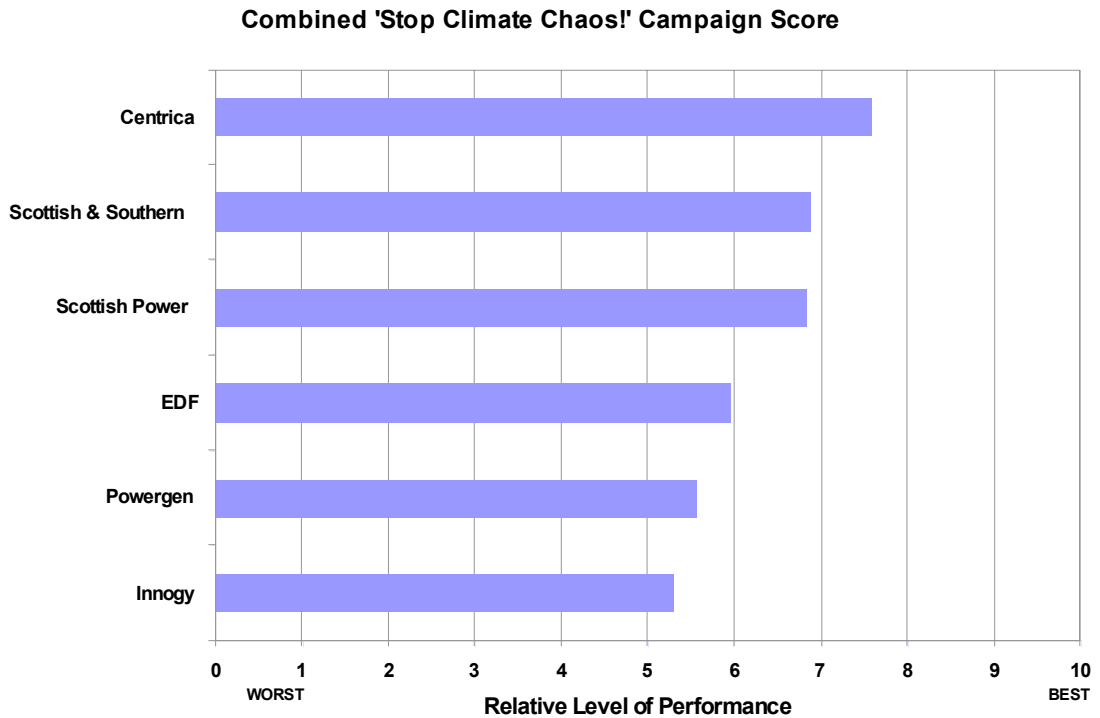
## **Survey Results**

### Overall Findings

Centrica stood out as the overall leader in terms of its CO<sub>2</sub> emissions profile and emissions reduction achievements, energy efficiency target compliance and development of renewable energy assets. Scottish & Southern Energy (SSE) and Scottish Power (SP) were also found to be above average performers. Innogy

(currently RWE-npower), Powergen (currently E.ON-UK) and EDF (currently EDF Energy) were found to fall below the average score with respect to their carbon risk management performance.

In summary (Figure 1) while a few companies are doing better than others, all power companies could do more to improve their CO<sub>2</sub> emissions performance.



**Figure 1: Cumulative Ranking**

Centrica, Scottish & Southern Energy and Scottish Power demonstrate an above-average performance, but this barely exceeded the average score. Innovest observed low variance in corporate performance because all power producer actions are regulated in all domains of renewable energy production, consumer energy efficiency initiatives and/or direct CO<sub>2</sub> emissions reduction protocols.

Innovest observed that recent changes in power company ownership – as applied to Powergen, Innogy and EDF – correspond to lower-than-average CO<sub>2</sub> risk management performance. The lower-than-average performance may be partially explained by the fact that the ownership change did not permit these companies to fully develop and integrate their carbon risk strategies across the spectrum of renewable energy, energy efficiency and emissions trading obligations.

The 2000-2004 CO<sub>2</sub> risk management performance<sup>3</sup> is highly mixed for all power generators (except Centrica), depending on whether research considers their renewable energy investment profile, energy efficiency achievements or specific greenhouse gas programs. For example, SP and SSE both have highly

<sup>3</sup>The term 'CO<sub>2</sub> risk' denotes the probability of losing a percentage of corporate revenue due to the failure to reduce carbon dioxide emissions in accordance with existing regulations. The UK electricity producers are subject to such risks because of regulatory penalties. Since such penalties have a linear (i.e., direct) relationship with the volume of carbon emissions released by every given power generator, Innovest assumed that several proxies of carbon dioxide emissions would constitute the carbon risk. We evaluate three of these proxies below and rank the companies correspondingly. An alternative definition of the 'CO<sub>2</sub> risk' includes direct operating losses from 'weather events' disrupting distribution of electricity, which may include hurricanes, thunderstorms and floods leading to physical damage to electricity transmission systems. Innovest uses the term 'CO<sub>2</sub> risk' in accordance with the *first* definition.

competitive positions with regard to renewable energy generation / new asset procurement, but SSE showed better performance with respect to the long-term reduction (2000-2004) in its CO<sub>2</sub> emissions. At the same time, SP demonstrated significant progress in alleviating persistent problems with its two coal power plants - previously deemed the most CO<sub>2</sub>-intensive in the nation.

The following summary table classifies all UK companies investigated in this research according to each company's performance in relation to each of the assessment criteria used. Centrica, Scottish Power and Scottish & Southern Energy occupy top tier positions (i.e. received the highest scores in the sample) for many of the variables, hence their top half rankings overall (see figure 1 above).

	EDF	Centrica	Innogy	Powergen	Scottish & Southern Energy	Scottish Power
Historic carbon intensity of production and operations	☹	☺	☹	☺	☹	☹
Total GHG emissions (time-series)	☹	☺	☹	☺	☹	☹
Carbon emissions improvements	☹	☺	☹	☹	☺	☺
<b>GREENHOUSE GAS CLUSTER</b>	☹	☺	☹	☹	☹	☹
Consumer EE training (demand management training) and customer incentives	☺	☺	☹	☹	☹	☹
EE improvement	☺	☹	☹	☹	☺	☺
<b>ENERGY EFFICIENCY CLUSTER</b>	☺	☹	☹	☹	☹	☹
Total renewable energy investments procured	☹	☺	☹	☹	☺	☹
ROC/RPS obligation	☹	☺	☹	☹	☹	☺
Non-ROC/RPS tariffs obligation, if any	☹	☹	☺	☹	☹	☺
RE planned investments	☹	☹	☺	☹	☹	☺
RE improvement	☹	☺	☹	☹	☺	☺
<b>RENEWABLE ENERGY CLUSTER</b>	☹	☺	☹	☹	☺	☺

Figure 2 - Assessment matrix

- ☺ Top tier
- ☹ Middle Tier
- ☹ Bottom tier

To fully assess the intricacies of individual corporate performance more detailed company profiles are contained in Appendix II.



## Individual company performance

### **Top overall ranking**

Centrica was the only clear-cut CO<sub>2</sub> risk management leader. Following Centrica, ranked first, the relative performance of the other companies in our sample is ranked as follows:

### **Second overall**

Scottish & Southern Energy exhibited long-term improvement in reducing CO<sub>2</sub> emissions from power generation as well as in managing the carbon emissions related to its electricity production. The company has also earned high marks for the significant scale of development of new renewable energy projects and the structure of its renewable energy policy.

This ranking should be viewed in the context of the relatively weak performance of SSE with regard to the overall 1998-2004 volume of CO<sub>2</sub> emissions from power generation (SSE was classed as 'worst in the sample'). SSE appears to be on the right-track with regard to managing this risk.

However, due to the company's decision not to participate in the Stop Climate Chaos! interview, Innovest cannot fully assess the potential of specific carbon emissions reduction policies planned / implemented by SSE.

### **Third overall**

Scottish Power has also shown significant improvement in CO<sub>2</sub> emissions, where the company assumes the second place (after Centrica) in our ranking of corporate ability to improve the power generation emissions profile. The company still ranks at the bottom of the sample in terms of the carbon intensity of electricity generation and therefore, the current level of progress in reducing emissions needs to be accelerated.

Scottish Power also received high scores for its energy efficiency programs (relative to the UK government's Energy Efficiency Commitment (EEC) target), for its progress on the Renewables Obligation, green-tariff implementation and renewable energy policy. Similar to SSE, Scottish Power has made this progress relative to the comparatively high carbon intensity of its power generation business and large volumes of long-term, historic CO<sub>2</sub> emissions.

### **Fourth overall**

EDF is a laggard with respect to CO<sub>2</sub> emissions improvements, but the company earned top ranking for its energy efficiency achievements relative to Ofgem's Energy Efficiency Targets and energy service provision to customers. EDF also runs a large-scale 'green tariff' program with 13,000 subscriptions reported for 2003, which enhanced the company's performance with respect to its renewable energy profile, where EDF is positioned in the middle to upper ranking tier.

### **Fifth overall**

Powergen has shown very little long-term (1998-2004) improvement in its CO<sub>2</sub> emissions, although, considering the large size of its generation business, Powergen does not emit a large, absolute volume of carbon dioxide emissions. Powergen is ranked in the medium tier both in terms of its efforts to procure, construct and operate new renewable energy facilities, while the company is ranked the 'worst in class' with respect to progress against energy efficiency commitments.

This begs the question about the need for more aggressive integration of all renewable energy, energy efficiency and CO<sub>2</sub> emissions reduction programs. Powergen disclosed a number of progressive, carbon project implementation initiatives. However, since these programs are designed in Germany, the UK management could not publish specific information that would permit Innovest to upgrade the company ranking and/or better assess Powergen's UK policies.

As this report went to press E.ON launched its first corporate social responsibility (CSR) report at group level. E.ON has almost completed its transformation into a clearly focused energy group and can now address a central issue, which was previously dealt with separately in various markets and business units: the design of a comprehensive strategy for E.ON's sustainable development. The first step towards this objective is the report "Energy - Efficiency - Engagement", which provides a snapshot of the status quo within the group and documents specifically where it stands now, while at the same time exploring future opportunities and directions.

The E.ON vision of corporate responsibility encompasses activities to protect the environment, which include the development of new technologies for large-scale or distributed generation as well as for renewable-source electricity. E.ON is also an active company in the regions where it does business and plays a role in the economic development and in structural change in the communities where facilities are located. Support for youth initiatives, education programs, non-profit organizations, foundations, culture, and the arts is a part of its corporate culture.

The efficiency of the generating facilities has consistently been improved. Since 1990 E.ON has reduced the specific CO<sub>2</sub> emissions of its generating fleet by 22%. In Europe the figure is an even more impressive 32%.

Any campaign work undertaken by WWF following publication of this survey of UK power companies will take into account relevant disclosures in the E.ON report, it should be noted that the company declined to participate in an interview or give notice that its CSR report was due to be published.

#### **Bottom overall ranking**

Innogy has a medium-to-low performance with respect to reducing its carbon emissions. Innogy is ranked 'worst in class' with regards to the historical carbon emissions related to its electricity generation. This represents a serious carbon management risk, which the company has to address rather aggressively.

At the same time, with respect to renewable energy development, Innogy stands out for a large-scale green tariff program (the largest and most encompassing in the nation), where the company is ranked 'best in class'.

Innogy also ranked low on performance against renewable and energy efficiency policies and programs. At the same time, as for Powergen, the company has changed ownership and meaningful analysis of its carbon risk management is not feasible until the completion of the first short-term investment cycle under the new owner in 2005-2006.

The remainder of RE and EEC policies and programs placed in the middle- to lower-middle tier, where Innogy consistently earned the 'first below average rank' (or the 'third worst') on four indicators measuring its performance.

#### **British Energy**

British Energy Group's main activities are electricity generation, sales and trading. The company has the following subsidiaries:

- British Energy Generation Limited (England and Wales);
- British Energy Generation Limited (Scotland);
- Eggborough Power Limited.

These three subsidiaries are focused on the generation and sale of electricity. In addition there is British Energy Power & Energy Trading Limited. This subsidiary is responsible for energy trading and managing exposure to energy prices. The company holds an interest of more than 10% in United Kingdom Nirex Limited which is focused on the disposal of nuclear waste.

British Energy generates around 20% of the electricity in the UK at present. The total output produced by British Energy's power stations during the year ending March 31, 2004 was 72.6 TWh. Approximately 89.5% of this output (65.0 TWh) was produced by nuclear power stations and 10.5% (7.6 TWh) by the coal-fired power station at Eggborough.

As the majority of British Energy Group's assets are comprised of nuclear energy, the company does not have a compatible position with regard to a GHG emissions profile and/or renewable energy targets. The only meaningful environmental liability disclosed by British Energy Group relates to radiological discharges and radioactive waste material which, according to the company's publications, remained well within required public norms.

British Energy Group does implement a comprehensive environmental management system. All power plants are certified ISO 14001. In addition, the company implements initiatives related to biodiversity, land use and safeguarding resources. According to the company's website, British Energy Group is committed to continuous.

With regard to the company's involvement in greenhouse gas emissions management, as with all British utility companies, British Energy Group has chosen to engage in renewable asset development. In a joint venture with AMEC, a 234 turbine wind farm with a capacity of 702 MW is planned.

British Energy Group's nuclear power stations have not been subject to prosecution for exceeding authorized discharge limits for the disposal of radioactive waste; however, the company was prosecuted in January 2003 due to unauthorized discharges in October 2001 at Torness and there was a leak from Thorpe plant in Cumbria reported in May 2005. Whilst a fine of £15,000 was imposed following the incident at Torness, this appears to be an isolated event and is not considered indicative of systematic weaknesses.

Furthermore, in 2002, British Energy (BE), the publicly listed UK nuclear generator, was given a huge state subsidy handout of at least £3 billion (US\$4.6 billion) from the UK government to help with their financial crisis with subsidies spreading over the next ten years.

## 2. Introduction

### 2.1 WWF and Stop Climate Chaos!

WWF is a leading international conservation organisation, working for the protection of the natural environment. Climate change, which could have devastating impacts on people and wildlife, forms one of the key areas of WWF's work. As well as helping vulnerable communities around the world adapt to climate change, WWF aims to tackle the cause of climate change - by campaigning to significantly reduce greenhouse gas emissions.

The power sector is the largest single source of CO<sub>2</sub> emissions globally as well as in the UK, where it is responsible for a third of emissions. WWF considers that significant reductions in emissions are necessary if the UK is going to meet current domestic targets and aspirations for combating climate change. It is this industry upon which much of WWF's policy and campaign work will focus with regard to climate change mitigation.

WWF-UK has launched a major new campaign called Stop Climate Chaos! which is lobbying power companies and the UK government to achieve 60% reductions in CO<sub>2</sub> emissions from the country's power sector by 2020. Through the campaign WWF aims to engage with and encourage all stakeholders - energy utilities (i.e. power companies), financial institutions, the government and consumers - to make the switch from fossil fuel to clean power, by using more renewable technologies and supporting greater energy conservation. WWF is calling upon power companies to become 'Pioneers' (please refer to the Glossary in Appendix I to this report for a description of Pioneer companies).

### 2.2 Purpose of this report

In order to engage with and negotiate with the UK power sector successfully and effectively as a way to achieve emissions reductions, WWF-UK has commissioned this report to obtain detailed information on the policies and performance of all the main UK power companies, and on the UK power sector as a whole.

The aim of this report is to provide a clear understanding of how the different UK power companies rank in relation to each other and to assess their contribution to climate change mitigation. The results of this research will enable WWF-UK to better understand each company's energy generation and supply mix, investment decisions, policies and activities - now and in future - in the context of their contributions to greenhouse gas emissions in the UK, and to climate change.

Hence, this report will help WWF-UK identify the area(s) where it would be most important for each power company to change practices and the area(s) where it would be easiest to bring about necessary changes.

### 2.3 UK Power Sector and the UK Climate Change Programme (CCP) and Review (CCPR)

#### 2.3.1 Overview

The UK power sector contributes between 1-2% of the UK's gross domestic product (GDP), producing and supplying electricity to over 26 million customers. However, the UK power sector is responsible for a staggering ~30% (almost one third) of UK CO<sub>2</sub> emissions in total. Its development since privatisation in 1990 has been extensive due to the introduction of a competitive, liberalised market. The monopoly transmission and distribution businesses (in England & Wales) are now separate from generators and suppliers.

The development of the competitive market means that there are now about 40 'major' producers, which has led to a reduction in market share held by the formerly dominant Innogy. The switch in fuel sources used for power generation has been mirrored by changes in plant ownership and new companies joining the market. Under the wholesale trading arrangements introduced in 2001, bulk electricity is bought and sold between generators and suppliers through bilateral contracts and on power exchanges.

This growth in the number of power companies has coincided with the expansion of gas-fired generation. This has resulted in a more balanced spread between coal-fired, gas and nuclear capacity and offered a small but significant role for other types of generation, including renewables, particularly given the political support

for the former Non-fossil Fuel Obligation, now the Renewables Obligation (see below – ‘Environmental Regulations’).

Under its Environmental Action Plan (EAP), Ofgem is seeking to play an effective role in informing the wider debate and decisions on how to meet environmental targets. The plan also sets out Ofgem's programme of work on meeting its environmental commitments. This includes its delivery of a number of schemes on behalf of government to help promote renewable energy and energy efficiency (see below). Ofgem has several executive functions in relation to electricity generated from renewable sources. Ofgem is also working on encouraging electricity distribution companies to strengthen their networks to allow for more distributed generation. The development of distributed generation has an important part to play in meeting the government's long-term environmental targets.

### 2.3.2 Generation

Gas-fired power stations are cheaper and quicker to build than their coal-fired predecessors and produce relatively fewer pollutants (gas-fired power stations emit much less CO<sub>2</sub> for the same amount of electricity produced). Even compared to the cleanest coal power station, gas power stations produce half of the emissions and large renewables such as wind and biomass produce virtually no emissions.

From a 2% share in 1992, by the end of the 1990s gas-burning generation had overtaken coal as the major fuel source, known as the ‘Dash for Gas’. Gas, coal and nuclear are the main sources of fuel used in power stations across the UK. The table below shows the breakdown of the fuels used to generate electricity in the UK in 2003.

Fuel Used	Output (2003)
Coal	35%
Nuclear	22%
Gas	38%
Oil	1%
Imports	1%
Other fuels	3%
Hydro	1%

**Figure 3 - Fuel-use in electricity generation, 2003**

Source: Digest of UK Energy Statistics, DTI, 2004

Existing hydro-electric capacity, much of it dating from the 1950s, represents the largest contribution from renewable resources, although UK and EU environmental targets require an expansion in 'green' power including wind and other zero-carbon forms of renewable energy as well as carbon-neutral energy such as biomass. There is a new and rapidly growing market for renewable energy technologies and services in Europe and beyond. There are over 700 UK companies involved in renewable energy, from research bodies and consultants to manufacturers and developers. The majority are SMEs and they face considerable barriers to developing their market, in terms of staff and financial resources. British renewable energy exports have risen from an historic level of £10-15 million in the early 90s to around £80-100 million per annum in the last two years.

There are in excess of 2,000 generating stations in the UK. The table below shows the technologies and fuels used in these different types of power stations. The majority of the generating capacity is derived from coal, gas and nuclear energy. A large number of generating stations use renewable fuels such as hydro, wind, landfill gas, wastes and biomass and combined heat and power stations. But these stations tend to be much smaller than conventional thermal plants so although their total number is greater than that of conventional thermal stations their combined capacity is much smaller.



Technology	Number of stations (2003)
Coal	16*
Gas (CCGT)	32
Nuclear	13
Coal and oil/ kerosene, oil gas	41
Hydro	68
CHP	1506
Renewable	411
Total	2085

**Figure 4 - Total of UK power stations by fuel-type**

Source: Digest of UK Energy Statistics, 2004, Ofgem, \*FoE figures

The table below gives an indication of the carbon dioxide emitted when producing 12 TWh of electricity. This is about the average annual production of a 200 Mw power station when operating on base load.

Type of power station	Tonnes carbon dioxide emitted
Coal-fired	11,000,000
Oil-fired	9,000,000
Gas (CCGT)	9,000,000
Nuclear	Nil
Hydro	Nil
Wind turbine	Nil
Wave	Nil

**Figure 5 - Power Station Emissions**

Source: Institute of Electrical Engineers, 2003

Combined heat and power (CHP) schemes also have targets for expansion because of their efficient conversion of fuel (usually gas) into electricity and useful heat. Many renewable and CHP schemes are 'embedded' in regional distribution networks rather than exporting their power into the grid.

Distributed generation (also known as embedded or dispersed generation) is electricity generation connected to a distribution network rather than the high voltage transmission network. Distributed generators are mainly, though not exclusively, those generating power from renewable energy sources (including small hydro, wind and solar power) or from combined heat and power (CHP) plants.

The government has set several targets to meet its obligations under the Kyoto Protocol. The UK aims to generate 15% of UK electricity supplies from renewable sources by 2015 (i.e. the UK Renewables Obligation) and to develop 10,000MWe of installed good quality CHP capacity, by 2010 and now 15.4% by 2015. Meeting these targets will involve adding some 8000MW of renewable capacity; and 5,500MWe of CHP capacity to the network.

However, it appears the government is unlikely to meet targets to tackle climate change, following publication of new provisional data showing that carbon dioxide emissions have again increased in 2004. The effect of two consecutive increases means the UK is now close to exceeding its Kyoto target for carbon dioxide emissions and a long way short of meeting its domestic target of reducing emissions of carbon dioxide by 20% below 1990 levels by 2010.

The increase of 1.5% is as a result from increasing emissions from industry, the domestic sector and transport. The UK's legally binding Kyoto target is to reduce emissions of the six greenhouse gases to 12.5% below 1990 levels by 2008-12. The UK achieved this in 1999 and has been comfortably below it since, but latest projections now show UK emissions for 2004 are estimated to be only 12.6% below 1990 levels. In 2002 they were 14.4% below 1990 levels.

The government may now need to introduce a radical new climate change programme to reverse this trend and achieve a 16% reduction in carbon dioxide emissions between now and 2010 to meet both its targets.

### 2.3.3 Supply

Supply is the term used to describe the retail activity where providers compete for customers. Domestic customers account for over 90% of the UK market in terms of number of accounts. Where sales volumes are concerned the division between the domestic and other sectors is more evenly split. In 2000, the domestic sector accounted for 36% of electricity sales, the industrial sector for 32% and the service sector for 31%. Agriculture accounted for the remaining 1%.

The introduction of competition in supply was phased in over eight years because of the size of the task and the technical complexities involved. The last and by far the largest transition phase comprised about 26 million domestic and small business customers, and the market was progressively opened between September 1998 and May 1999. Nearly 40% of these customers switched supplier at least once in the following two years. Switching currently takes place at a rate of about 100,000 per week equating to over 5 million customers per year.

As the competitive market matures, so does familiarity with different suppliers, although nearly 20% of customers questioned are still only able to name a single supplier (source: Electricity Association). Nearly 30 suppliers are licensed to operate in the domestic/small business market, although not all are active.

Mergers and restructuring have created branding confusion in some areas, and marketing alliances with well known organisations outside the electricity industry have proved less successful than expected. Product bundling and the marketing of home services is one way companies are aiming to retain customer loyalty and reduce 'churn' rates (rate of customer loss).

Price remains the main reason for switching supply, despite the fact that UK electricity prices have been consistently among the lowest in the EU, and the ability to receive electricity and gas from the same source rates as the second in priority. The UK Regulatory body Ofgem has estimated that 30% of all electricity customers are now on dual-fuel deals. Against this scenario educating consumers about switching or receiving supply on the basis of environmental benefits is a challenge.

### 2.3.4 Distribution losses

Distribution losses are the amount of electricity that is lost (as heat) on the distribution networks as it travels down wires and transformers. Around 7% of electricity distributed in Great Britain is lost in this way. CO<sub>2</sub> emissions from UK electricity generation amount to 147 million tonnes per year.

By reducing losses from 7% to 6%, carbon dioxide emissions could be cut by 750,000 tonnes of carbon; equivalent to the emissions from a medium sized gas powered (CCGT) generator. This would contribute 4% of the reduction in carbon emissions required by the Kyoto protocol.

## 2.4 Environmental Regulations

### 2.4.1 UK Climate Change Programme

This programme comprises a range of measures that affect the UK power sector along with other energy-related sectors such as oil production and refining, gas production and transmission, the production of coal and other solid fuels, as well as many other industries.

#### 2.4.1.1 Timeline of the UK CCP

*November 2000* – UK government announcement of the UK Climate Change Programme (CCP) as a package of measures to deliver the Kyoto target. The CCP detailed how the UK plans to deliver its Kyoto target to cut its greenhouse gas emissions by 12.5%, and move towards its domestic goal to cut carbon dioxide emissions by 20% below 1990 levels by 2010. The first CCP published in 2000 measures included:

- promotion of energy efficiency projects (EEC);
- promotion of combined heat and power (CHP);
- Climate Change Levy (CCL);

- renewable energy provision – RO (to meet 15% of electricity demand by 2015);
- UK emissions trading scheme.

Renewables Obligation (RO) - The Utilities Act 2000 introduced new powers to promote generation of electricity from renewable sources, known as the Renewables Obligation. The Renewables Obligation is an obligation on licensed electricity suppliers to provide a specified proportion of electricity from renewable sources. Suppliers can meet their obligation through producing Renewables Obligation Certificates (ROCs) and/or by paying buy-out. Ofgem's responsibilities include the accreditation of eligible renewable generating stations, the issue of ROCs and assessing supplier compliance. The Electricity Act provides for the Non Fossil Fuel Obligation (NFFO) and the Scottish Renewable Obligation (SRO) which were used to promote the development of renewable energy technologies before the introduction of the Renewables Obligation, and will continue until 2018.

Climate Change Levy (CCL) exemption for renewables - The Finance Act 2000 provides for electricity from renewable sources to be exempt from the Climate Change Levy.

REGOs - EU Directive 2001/77/EC aims to promote an increase in the contribution of renewable energy sources to electricity production in Member States. Article 5 of the Directive requires that Member States ensure that a Guarantee of Origin is issued, on request, in respect of electricity produced from renewable energy sources.

*April 2002* – UK Emissions Trading Scheme (UK ETS) established. This is a voluntary scheme with emissions reductions measured against a 1998-2000 base-line. Emissions or energy targets can be set through Climate Change Agreements (CCAs). While the power generation sector made an important contribution to formulating the UK ETS, generators were excluded from the scheme.

*February 2003* – the UK government published an Energy White Paper (EWP) setting out four main goals, including a longer term target to reduce CO<sub>2</sub> emissions by 60% by 2050 (in line with figures put forward by the Royal Commission for Environmental Pollution (RCEP)).

*December 2003* – the UK government announced that it intends to increase targets in the Renewables Obligation to 15% by 2015. The Renewables Obligation (effective April 2002, with amendment effective April 2004) is the main instrument for reaching the 10% target by 2010. The Energy White Paper set out the ambition of doubling the share of electricity generation from renewables provided for in the 2010 target by 2020.

*December 2004* – the government launched a consultation on the review of the CCP. The new CCP (due to be published in Autumn 2005) will set out the approach the UK is taking to reduce GHG (including CO<sub>2</sub>) emissions across six broad sectors of the UK economy, including energy supply/power sector).

#### **2.4.2 Energy Efficiency**

The UK government's proposals for the next stage of the Energy Efficiency Commitment (EEC) were put before Parliament in November 2004 to allow for the scheme to begin in Spring 2005. The government proposes that the next phase of the EEC – to run from April 2005 to 2008 and then 2008 to 2011 – should be at about twice the level of the current EEC. Use of cavity wall and loft insulation, energy efficient boilers, appliances and light bulbs form part of the EEC. The EEC Order sets the target for the period 2005-08 and is expected to deliver about 0.7MtC in cuts per annum by 2010. The target for the second period, 2008-11, will be set in 2007.

The draft Order now before Parliament also includes incentives for energy services and supports the development of innovative products, such as micro CHP. The UK EEC is a legal obligation upon energy suppliers and the costs fall upon them. Suppliers may pass some of these costs onto their customers, but the impact on energy prices should be outweighed by the benefits of the EEC.

## **2.5 The EU ETS and the UK National Allocation Plan (NAP)**

The EU Emissions Trading Scheme (EU ETS) is one of the policies being introduced across Europe to tackle emissions of carbon dioxide and other greenhouse gases, to combat the threats posed by climate change. The scheme commenced on 1 January 2005. The first phase runs from 2005-2007 and the second phase will run from 2008-2012.

The scheme will work on a 'Cap and Trade' basis. Each EU Member State government has to set an emissions cap for all installations covered by the scheme. Each installation is then to be allocated allowances for the relevant commitment period. The number of allowances allocated to each installation for any given period (the number of tradable allowances each installation will receive) is set down in each Member State's NAP. The UK CCPR includes both EU ETS installations and sources which are not covered by the EU ETS.

### **2.5.1 EU-ETS Phase 1**

The government has published a revised timetable to the Final Allocation Decision following discussions with the Commission on the amendments to the UK NAP proposed in November 2004. Member states must allocate allowances to installations by 28 February each year.

In October 2004, the UK government proposed to the Commission an amendment to the agreed July NAP increasing the total number of UK allowances for the first phase by 19.8 million allowances from 736.3 million to 756.1 million allowances (1 allowance is equivalent to 1 ton of CO<sub>2</sub>). This was an increase of less than 3% from the number in the April 2004 plan. The Commission has rejected this proposal and it is now estimated that allowances for UK installations will stand and be issued in Spring 2005. Despite this original allocation, the UK has announced it will challenge the Commission decision before the European Court of Justice.

### **2.5.2 EU ETS Phase 2**

In the CCPR (2005), the UK government says it is committed to its domestic goal of moving towards a 20% reduction in CO<sub>2</sub> emissions below 1990 levels by 2010. The original goal was to achieve this target, but this is now considered to be very unlikely, if not impossible on the basis of current policies and emissions trends. In determining the total quantity of allowances to be issued for the second phase from 2008 to 2012, the government will ensure that installations covered by the scheme make an appropriate contribution to that goal. This issue will be considered further in the review of the CCP.

#### **2.5.2.1 Determination of allowances**

Power stations are likely to be required to deliver additional emissions trading savings because this sector faces limited international competition and is thought to have a fairly good potential for low cost abatement opportunities. There will be opportunities for changing the relative utilisation of existing gas fired and coal fired power stations. Over time, the continued introduction of new gas-fired plant and retirement of older coal-fired plant could help reduce emissions.

The UK is applying to exclude some installations that are covered by the UK ETS from the first phase of the EU ETS, or by CCAs. Separate applications are being made for installations covered by these domestic schemes, reflecting the difference between the two schemes. The applications detail the basis on which equivalence of environmental effect, monitoring, reporting and verification requirements and the penalties for non-compliance can be demonstrated.

## **2.6 Role of the Financial Sector**

Given the now mature and widely accepted, large body of evidence demonstrating a trend towards human-induced climate change, it is becoming clear that there are related business risks and opportunities with implications for the value of investments in companies worldwide.

Financial impacts from climate change include changes in weather patterns, political and regulatory momentum moving against significant carbon emitters; the development of emissions-sensitive technologies, products and services superseding those existing today; and shifts in consumer sentiment linked to a corporation's stance on climate change.

This makes it necessary for investors to improve their understanding of climate change risks and opportunities. In response to these risks, a number of initiatives have been launched by financial sector. In February 2005 for example, a group of 143 institutional investors with assets of US\$20 trillion under management wrote to the 500 largest quoted companies in the world by market capitalisation, asking for the disclosure of investment-relevant information concerning their greenhouse gas emissions. This is the third time such a request has been made (see [www.cdproject.net](http://www.cdproject.net)).

Similar initiatives include the UK-based Institutional Investor Group on Climate Change. Members consist of both mainstream and SRI investors. This group has commissioned research into the financial impact of climate change across a range of sectors, particularly aviation and power Generation (late 2003) and co-hosted the Institutional Investor Conference on Climate Change in November 2003 which was sponsored by the Carbon Trust. The Carbon Trust is an independent company funded by government. Its role is to help the UK move to a low carbon economy by helping business and the public sector reduce carbon emissions and capture the commercial opportunities of low carbon technologies.

So far as the investment banks are concerned, mainstream research coverage of climate change, and more specifically the EU ETS implications for the utilities industry, has been featured more prominently in the last one to two years. EU ETS impacts on individual utilities companies and power prices are generally understood. The EU ETS brings implications for a much wider portfolio of companies than just those in the utilities sector and it is likely that climate change will lead to financial implications for companies and investors through a broad assortment of sources than from the EU ETS and other existing/imminent trading schemes alone.

Beyond the utilities sector, though, coverage of the emissions trading / climate change implications for a broader assortment of industry sectors to date remains very limited.



### 3. Ranking Results

#### 3.2.1. Greenhouse Gas Ranking Cluster

In this cluster of three variables, Innovest has chosen to rely on both corporate CO<sub>2</sub> emissions disclosures and on DEFRA's National Allocation Plan (NAP) relevant CO<sub>2</sub> emissions data for each company. The most important criterion against which the companies were assessed is the Long-Term (1998-2004)<sup>4</sup> Rate of CO<sub>2</sub> Emissions Improvement from all power generation assets, CHP inclusive, followed by the Carbon Intensity of Electricity Production and by Cumulative Long-Term CO<sub>2</sub> Emissions (1998-2004). Corporate greenhouse gas policy/strategy assessment is presented individually for each company in Appendix II to this report due to the highly qualitative nature of the information the UK utilities have chosen to disclose on this variable.

##### 3.2.1.1 CO<sub>2</sub> Emissions Improvement 1998 - 2004

Innovest has undertaken a long-term (1998-2004) review of the power generators' CO<sub>2</sub> emissions improvement to identify the companies with the heaviest carbon risk management risk, the 'risk' defined as a lack of progress in reducing CO<sub>2</sub> emissions from power generation. Looking at the long-term rate of carbon emissions improvement, Figure 3 below illustrates that since 1998 (the baseline) Centrica, Scottish Power and Scottish & Southern Energy have achieved the largest reduction in their carbon emissions from power generation. Therefore, their power generation strategies are considered less 'risky' with regard to carbon emissions:

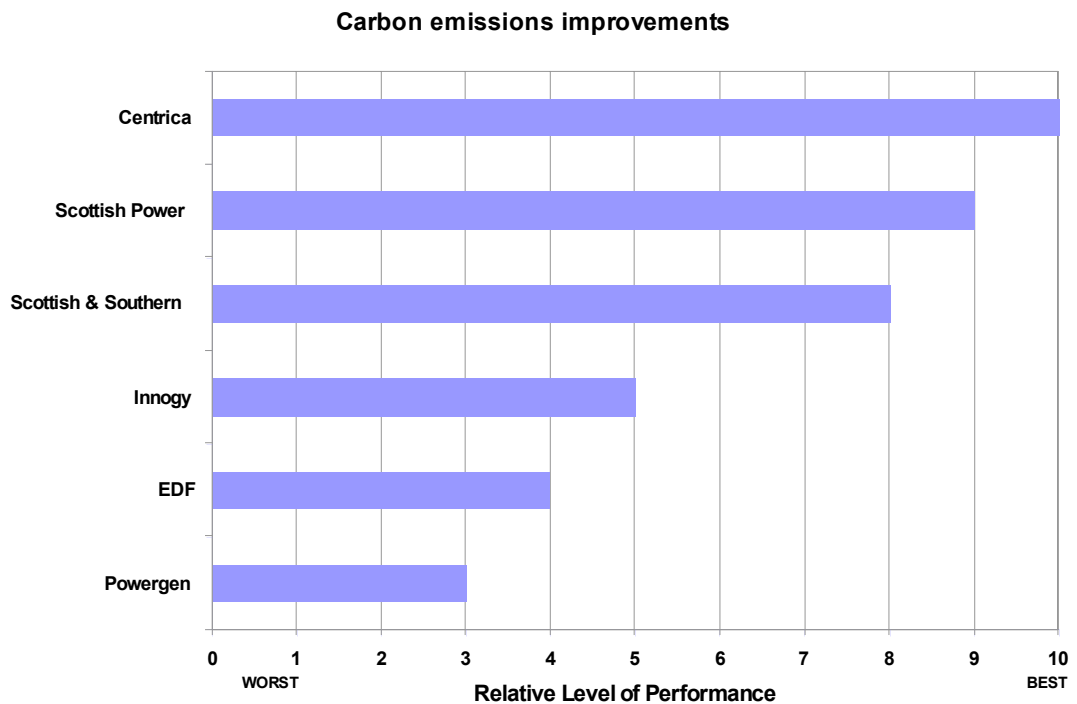


Figure 6 - Carbon Dioxide Emissions Improvement 1998 – 2004

Figure 6 demonstrates that Innogy, Powergen and EDF have the highest carbon emissions reduction *risk* using as a proxy the lower-than-average long-term capacity of these companies to reduce their carbon emissions.

<sup>4</sup> All data are recorded and analysed for 1998-2004, even when a company has chosen not to disclose the time-series data due to ownership change. By assuming that 1998 serves as a 'baseline' emissions / year for measuring the effectiveness of emissions reduction performance, Innovest has aligned its research with the existing public information and avoided assigning different emissions baselines to each company in the sample.

At the same time, it should be noted that every one of these entities has undergone ownership change in the period covered by this analysis. Therefore, lower-than-average performance may be partially attributed to the differences in owners' carbon management strategies and asset investment preferences. As a result, Innovest's ranking of these companies should be regarded as a signal for the need to either change both short-term and long-term asset investment/management priorities or to actively seek certain forms of carbon risk 'insurance' to guarantee EU ETS compliance under the UK NAP emissions limits allocated to these three companies.<sup>5</sup>

### 3.2.1.2 Carbon Intensity

This metric refers to the quantity of CO<sub>2</sub> equivalent emissions produced per unit of electricity generated.

Centrica, Powergen and Scottish and Southern Energy at the top of Innovest's ranking with respect to the carbon intensity of electricity production over the selected three-year period (in MTCO<sub>2</sub>e/TWh).

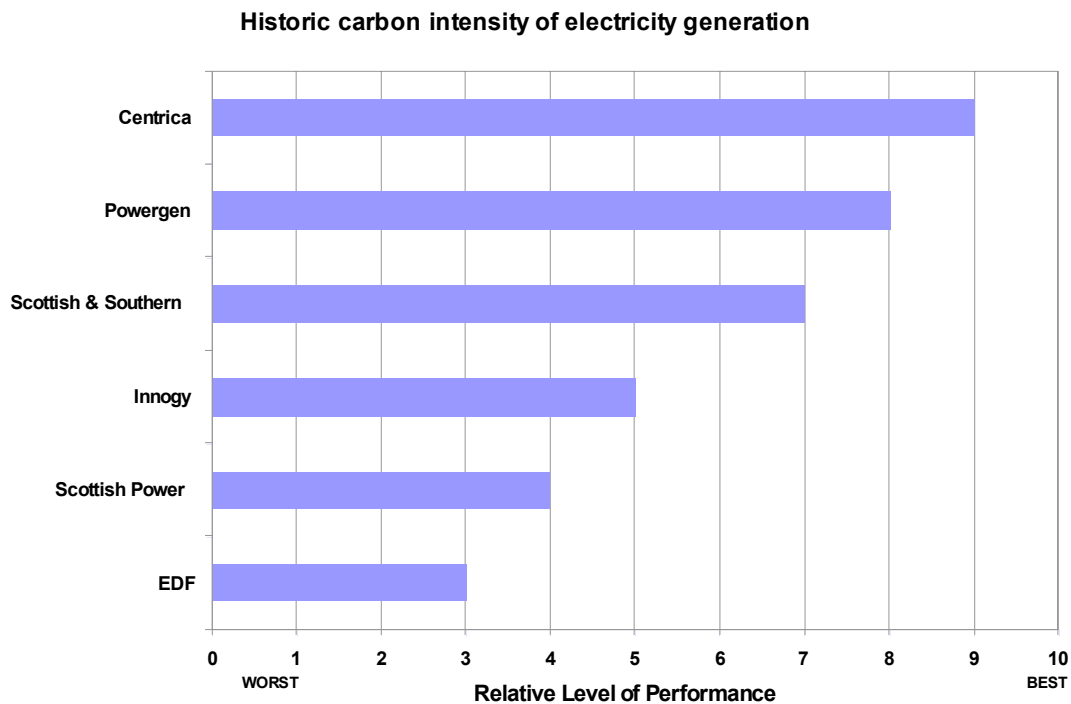


Figure 7 - Carbon Intensity of Electricity Production 2002 – 2004

Since carbon emissions intensity depends both on the fuel type and on the technology used in electricity production, the above data illustrate that it would be prudent for Innogy, Scottish Power and EDF to focus their long-term asset investment on more carbon neutral power generation technologies since companies cannot change 'at will' the regional fuel mix powering their electricity production.

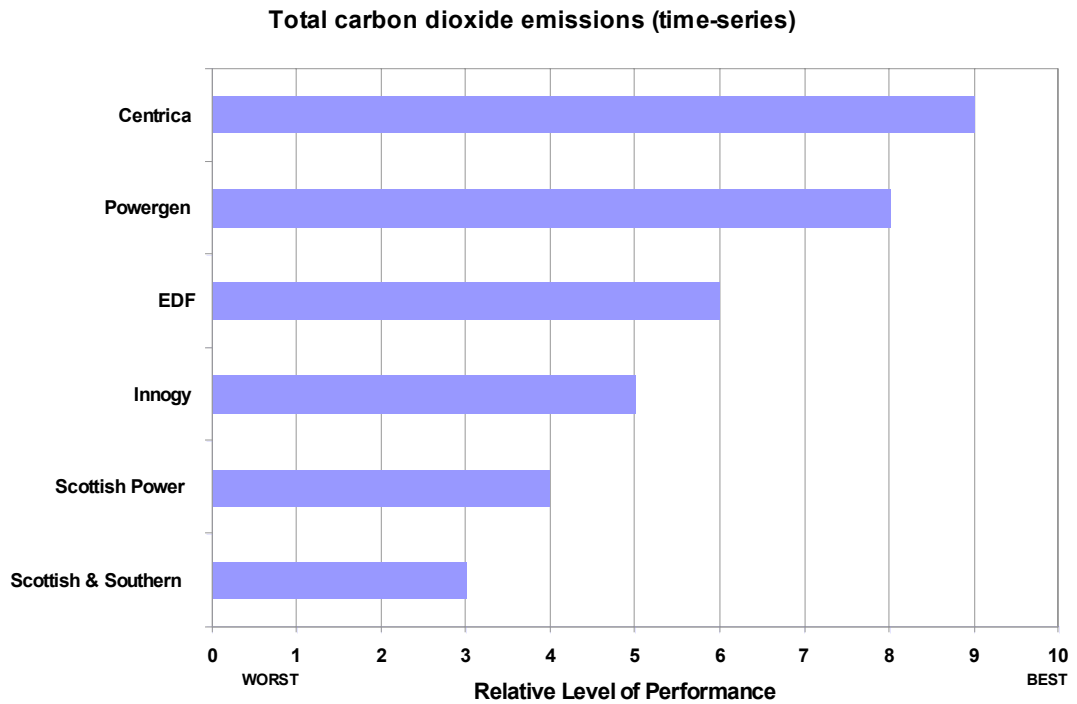
### 3.2.1.3 Cumulative Long-Term CO<sub>2</sub> Emissions (1998- 2004)

1998-2004 CO<sub>2</sub> emissions show the individual companies' aggregate emissions contribution to the total pool of national CO<sub>2</sub> emissions. This measure is reported to demonstrate the comparative political weight of each electric power producer in national GHG policy negotiation because, in the National Allocation Plan (NAP),

<sup>5</sup> Such insurance may take the form of large-scale CDM investment because CERS are recognized as tradable commodities before the First Kyoto Commitment Period.

the distribution of UK carbon allowances is determined by the ‘relevant carbon emissions’ of each respective company.

The companies with the largest volume of carbon emissions within the specified period (Scottish & Southern Energy and Scottish Power) received the lowest score, while Centrica comes out again as a top performer with the lowest amount of carbon emissions:



**Figure 8 - Cumulative Long-Term Carbon Dioxide Emissions**

As a result, Scottish & Southern Energy and Scottish Power represent the largest ‘aggregate emitters in the UK for the specified years irrespective of their power output. Both companies, however, also demonstrated significant improvements in their carbon emissions profiles.

Therefore, Scottish & Southern Energy and Scottish Power could be designated as the primary focus of the WWF Stop Climate Chaos! Campaign on the basis of the analysis of their carbon emissions profiles, while Centrica would be identified as the Campaign ‘*leader*’.

### 3.2.2 Energy Efficiency Ranking Cluster

Looking at energy efficiency criteria, Innovest has benchmarked corporate performance with respect to compliance with the UK Energy Efficiency Commitment (EEC), investment in residential energy-efficiency (demand-side management) schemes, development of new energy-efficient technologies and the extent of household energy saving service provision.

The combination of these factors is labelled Consumer EE Training (Demand Management Training) and EE Customer Incentives.

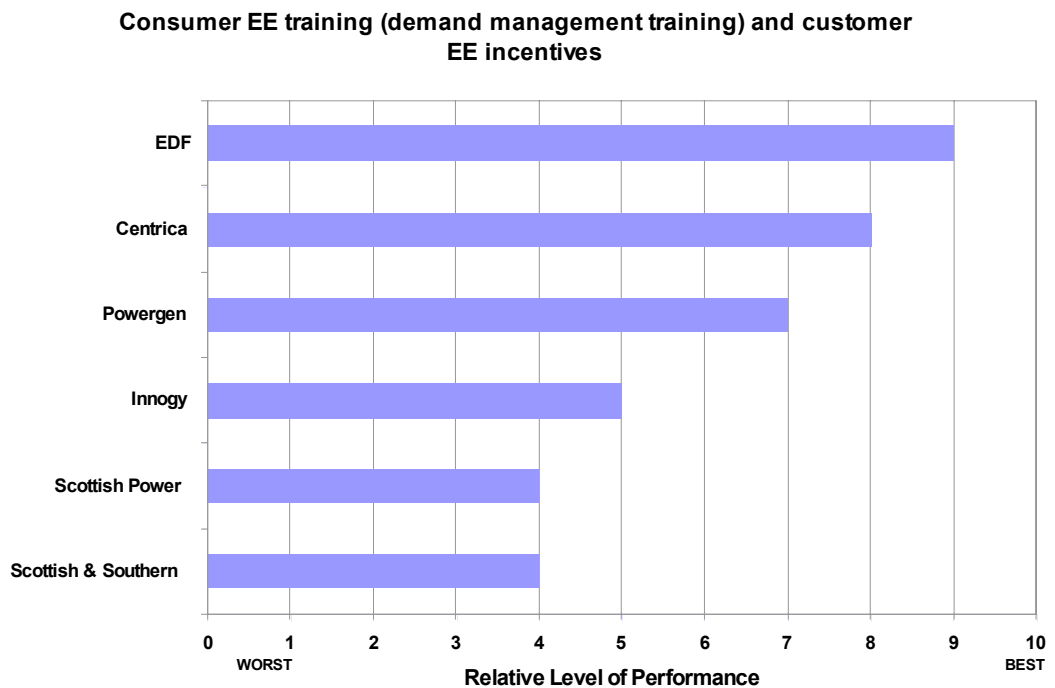
Innovest also scored overall corporate energy efficiency management improvement separately with regard to companies meeting the above-mentioned EEC targets. This variable was labelled Energy Efficiency/ Energy Services Improvement (2002-2004).

It is important to stress that the EEC targets include provision of energy services (among other initiatives). For example, actions recommended under the EEC include wall cavity insulation, delivery/installation of low-energy lamps, installation and management of various heating and appliance measures reducing energy consumption (DEFRA, July 2004).<sup>6</sup>

Hence, Innovest’s first score encompasses all corporate actions classified by DEFRA as ‘energy service provision’ whenever such actions were reported by the companies under consideration and/or by DEFRA.

**3.2.2.1 Consumer education / Electricity Demand Management (Energy Services)**

With respect to this variable, EDF and Centrica were found to be the leaders, followed by Powergen:



**Figure 9 - Consumer EE Training and Incentives and Energy Services**

Figure 9 shows that EDF and Centrica lead the UK power sector in energy service provision. Scottish Power (SP) and Scottish & Southern Energy (SSE) both received the lowest score signalling that these companies do not place a high priority in consumer energy efficiency measures (as will be discussed below, both SP and SSE scored higher on their renewable energy activities).

Given the lack of empirical studies comparing the importance of EEC relative to renewable energy measures, Innovest cannot recommend specific strategy/investment actions based on the observed EEC/energy services performance, but Centrica is again found to be in the top tier of corporate performers.

<sup>6</sup> DEFRA. 2004. “A Review of the Energy Efficiency Commitment to the End of the Second Year; A Report for the Secretary of State for Environment, Food and Rural Affairs” (July 2004, Document, 178/04), p. iii)

### 3.2.2.2 Energy Efficiency/ Energy Services Improvement (2002-2004)

Figure 10 below portrays corporate ranking with respect to power sector performance improvement on energy service provision, as documented in the 2004 DEFRA report on the Energy Efficiency Commitment of the UK electricity providers.

Energy services are included in Innovest's ranking of corporate performance related to customer training in the efficient use of energy. The highest degree of energy efficiency performance improvement for 2002-2004 was noted for Scottish & Southern Energy (SSE) and Scottish Power (SP), followed by EDF:

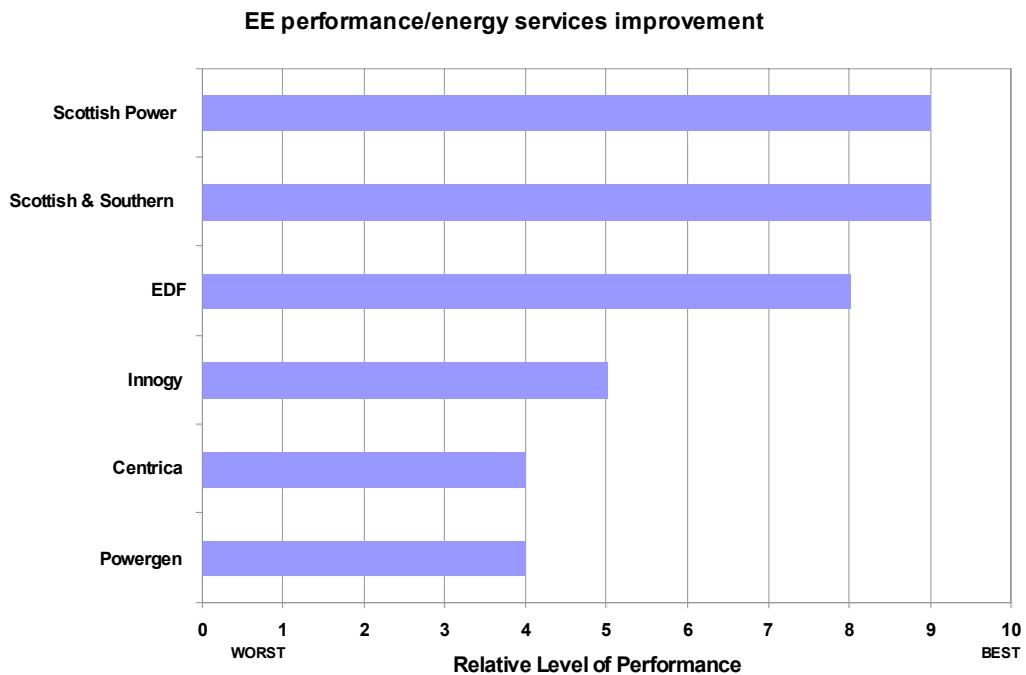


Figure 10 - Energy Efficiency/Energy Services Improvement

In assessing the overall energy efficiency improvement, Innovest looked at progress in achieving DEFRA's Energy Efficiency Commitment (EEC) targets, at the number and size of accredited energy efficiency schemes and at the type and coverage of various energy efficiency/energy service activities.

However, the company's record of achieving its EEC target is given the largest weight with regard to benchmarking companies on this particular variable.

### 3.2.3. Renewable Energy Ranking Cluster

The final of the three main areas of analysis in this study showed the largest variance with respect to company performance. This happens because of the large number of variables employed in the renewable energy benchmarking exercise.

Innovest tracked power generator performance in relation to:

- reported renewable energy investments (where disclosed);
- the size and type of planned renewable energy facilities (as well as facilities already under construction);



- diversification into non-wind renewable/alternative energy technologies (such as solar, biofuel/biomass, wave energy, landfill gas, etc.);
- percentages of Renewables Obligation (RO) compliance achieved;
- percentages of RO compliance achieved through the purchase of ROCs and/or SROCs;
- the size and activity of 'green tariffs' (if applicable); and
- the integrity of the overall renewable energy policies/strategies.

Innovest considers that a wide range of renewable energy criteria used to benchmark companies better permits the capture of variance in performance indicators across the UK power sector. In addition, relative to CO<sub>2</sub> strategy/policy disclosures and energy efficiency data - both of which were difficult to obtain from public sources without detailed interviews - all UK generators presented more detailed and more compatible information on their renewable energy activities due to the greater clarity of the national RO policies and their longer duration. This permitted Innovest to collect a greater volume of comparable and more reliable data without relying on company interviews.

### 3.2.3.1 Renewable Energy Capacity Improvement

Innovest contends that individual company performance improvement against the full spectrum of renewable energy investments, planned capacity and policies represents the most important proxy of the corporate ability to reduce its carbon emissions exposure. Innovest considered the data on RO/SRO compliance, information about planned renewable energy capacity and newly installed assets as well as investment data to create the composite 2002 'baseline' of corporate performance on the renewable energy 'cluster' of variables. The rate of change according to this cluster of indicators was taken as an indicator of the company's renewable energy capacity improvement.

On this basis Scottish Power, Scottish & Southern Energy and Centrica showed the most significant relative improvements in their renewable energy capacity, including facility planning and investments (if disclosed in corporate reports).

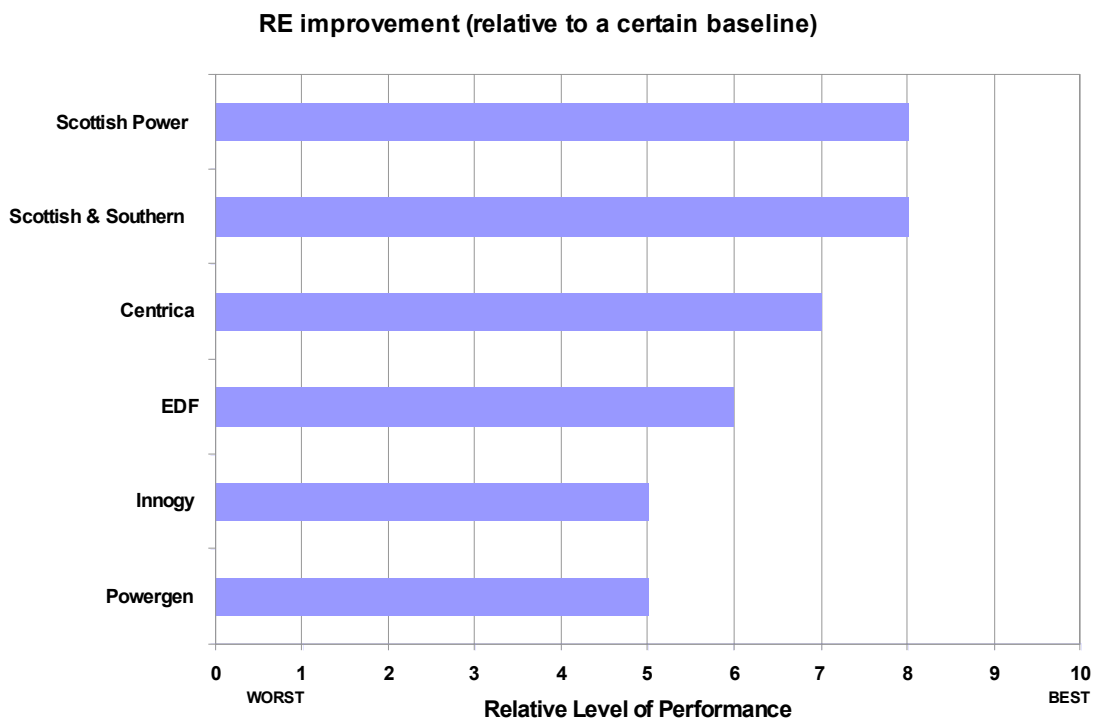


Figure 11 - Renewable Energy Capacity Improvement

A high score on the renewable energy capacity improvement is the best proxy of corporate ability to actively manage its carbon emissions risks outside ‘direct’ carbon emissions reduction programs (where CDM project investment and/or EU ETS trading would be considered ‘direct’ carbon emissions risk management programs). Therefore, EDF, Innogy and Powergen will find it more difficult to reduce their carbon emissions from power generation due to the difficulties these companies appear to be experiencing in finding and installing new renewable energy capacity. Powergen also showed a poor performance with respect to energy efficiency/energy services improvement. As a result, the company may need to seek carbon credit purchases in the EU emissions trading market and/or international markets to offset its relatively low carbon risk management capacity in the UK. The same conclusion applies to Innogy.

**3.2.3.2 Renewable Energy Investment/Planned Renewables Capacity**

Due to competitiveness concerns, six companies out of seven did not fully disclose their investments (either current or planned) in renewable energy capacity. Only Scottish & Southern Energy reported on this, detailing a £480 million renewable energy investment for 2004. Although other companies (Powergen and Innogy) disclosed partial investments in various renewable energy programs, Innovest could not directly compare such data. With that in mind, the planned renewable energy capacity was used for benchmarking instead: Innovest considered all disclosed planned capacity weighted by the sporadically available data on renewable energy investments for Scottish & Southern Energy, Powergen and Innogy. When the data on renewable energy investments were not made available, the detailed planned capacity was used in scoring instead.

Scottish & Southern Energy and Centrica scored the highest with respect to the size of new renewable energy capacity under construction (planning) and new renewable capacity investments (where disclosed):

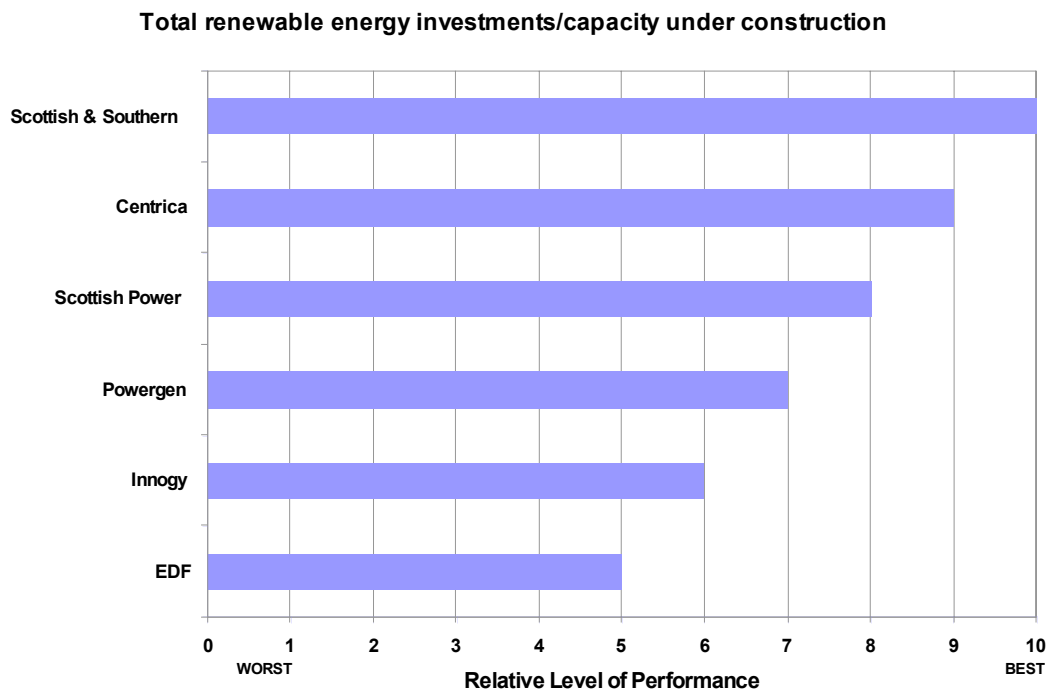


Figure 12 - New RE Capacity Investment/Renewables Capacity under Construction

### 3.2.3.3 Renewable Obligation Compliance

Scottish Power, Scottish & Southern Energy and Centrica ranked highest with respect to Renewable Obligation (RO) compliance, where Centrica was ranked highest for the *combination* of RO compliance and RO compliance through the purchase of ‘green certificates’ or Renewable Obligation Certificates (ROCs). The exact modality of estimating this score is described in Figure 11 on the preceding pages. The purchase of ROCs can be deemed important as it promotes further investment in renewables and assists in the development of the ROCs market:

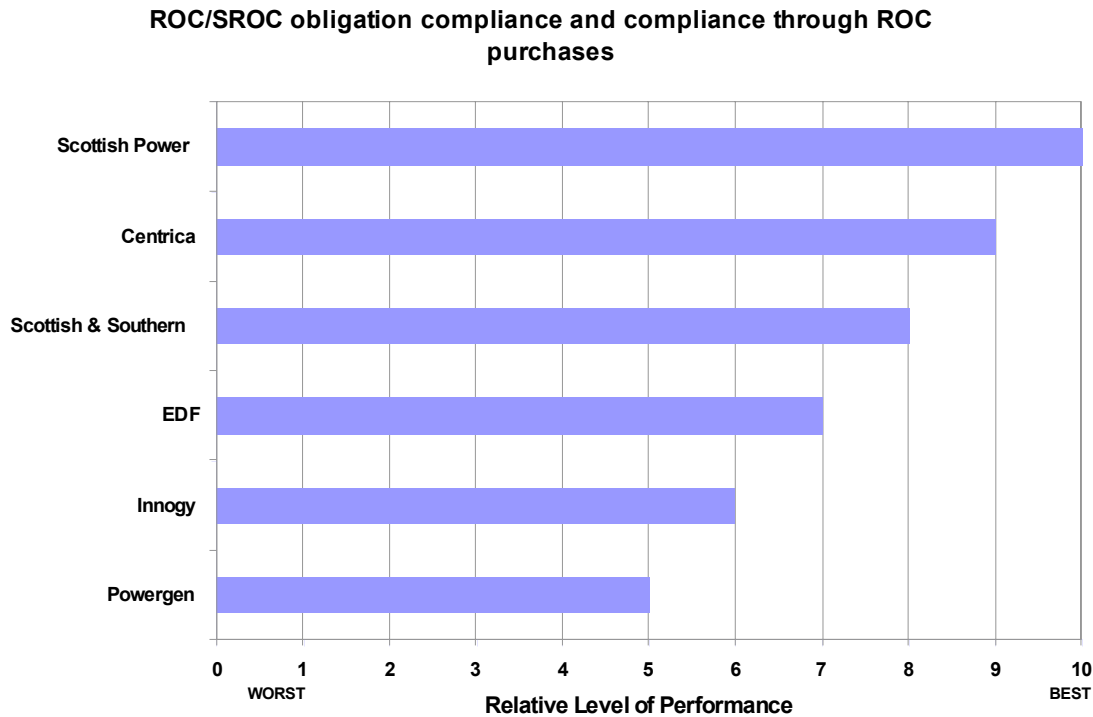


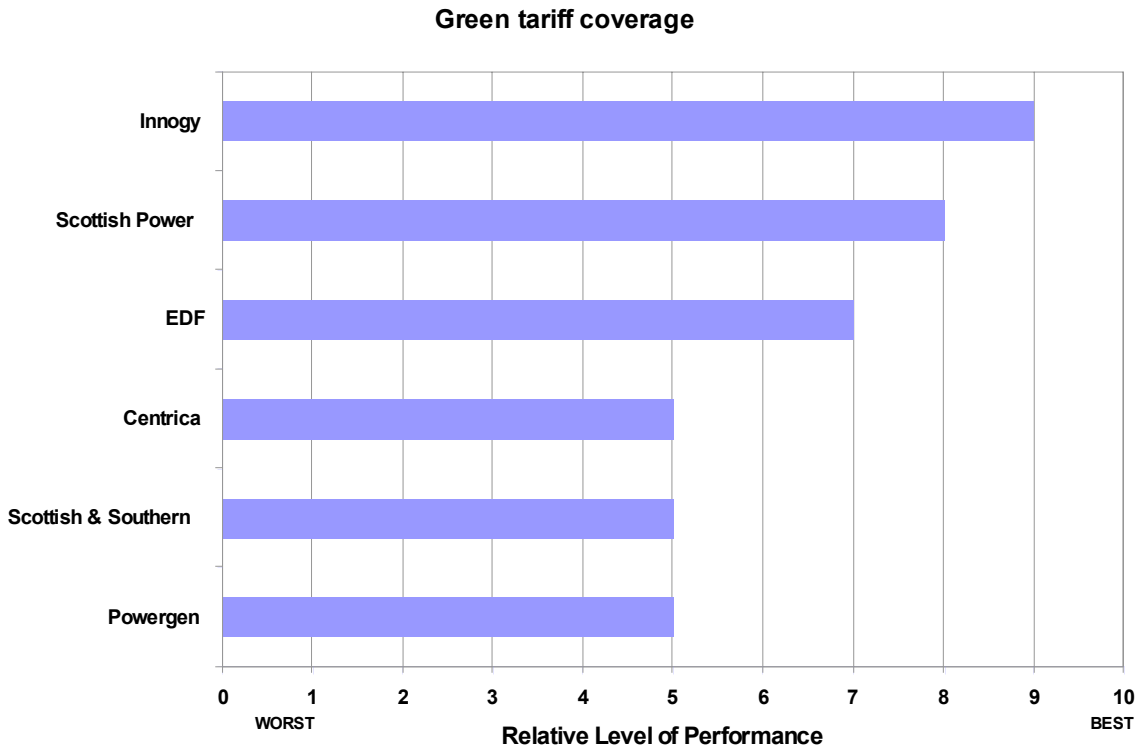
Figure 13 - Compliance with RO and Percentage of Compliance through ROCs Purchases

In this case Centrica again received the high score due to its preference for ROCs purchases. The companies contributing heavily to the RO buy-out fund are found towards the lower end of this scoring chart. The scoring here favours ROCs/SROCs purchasing as this strategy is seen conducive to the development of renewable energy independent power producers and to the creation of market liquidity.

At the same time, the cross-company variance with regard to the absolute percentages of ROCs compliance is not large, which is reflected in Innovest’s score distribution, the lowest score for Innogy to the highest score for Centrica. In sum, this means that the UK power sector appears to be making a successful and rather ‘homogenous’ (relatively equal) effort to meet its RO requirements.

### 3.2.3.4 Green Tariff Programs

Although ‘green tariff’ programs have decreased in their popularity in the recent years, they remain one of important policy instruments of attracting new electricity customers to renewable energy markets. Innogy and Scottish Power received the highest scores with respect to the size, customer coverage and environmental characteristics of their ‘green electricity tariff’ programs:

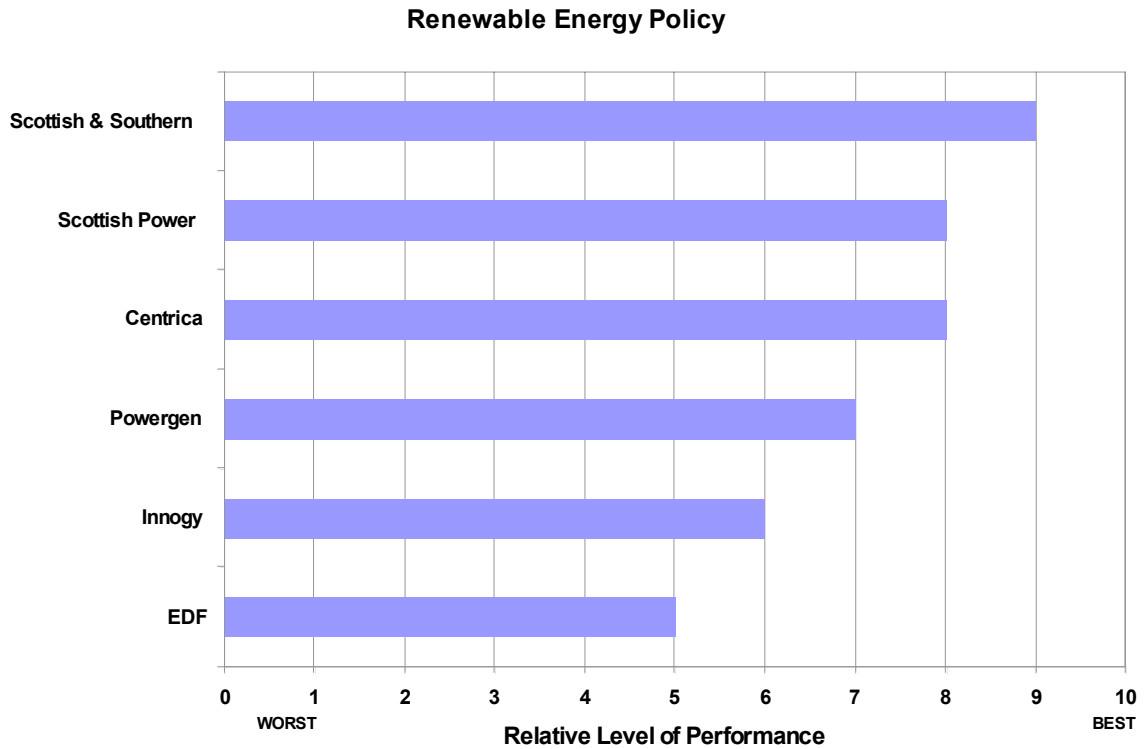


**Figure 14 - Size and Coverage of Green Tariff Programs (2002 - 2004)**

Considering that Powergen, Scottish & Southern Energy and Centrica did not report any ‘green tariff’ programs, these companies are assigned the low-neutral score. Effectively, only EDF, Scottish Power and Innogy are ranked on this variable. Innogy comes out as a clear winner due to the large number of customers it managed to attain and retain for its green tariff program managed in cooperation with Greenpeace.

**3.2.3.5 Renewable Energy Policies and Strategies**

Scottish Power, Scottish & Southern Energy and Centrica topped the list in terms of the comprehensiveness and the degree of integration (with other aspects of CO<sub>2</sub> risk management) of their renewable energy policy disclosures:



**Figure 15 - Renewable Energy Policy**

The above ranking illustrates that SSE, SP and Centrica have the most transparent and complete disclosures on their renewable energy strategies, asset development, customer coverage and linkage of all renewable energy investments to the reduction of greenhouse gas emissions.

**3.2.3.6 Combined Heat & Power (CHP) Generation**

Innovest could not rank the companies with regard to their CHP capacity (both installed and planned) because such data were not available for the whole sample and also due to the fact that current high gas prices preclude aggressive development of new CHP capacity. As a result, the existing CHP capacity was not installed to address the issue of carbon emissions. Hence, it is difficult to argue that large CHP capacity is a good proxy for corporate carbon risk management.

In order to link CHP assets to carbon emissions reductions, Innovest would need to obtain the data on the planned CHP investments and the planned CHP capacity. None of the interviewed/researched companies released/published this information. In addition, some suggestions were made by interviewees that UK power generators do not regard CHP as a carbon solution when considering their short-term investment cycle due to high gas prices (regardless of the on-going CHP obligation developed by the British government).

Appendix II presents all CHP capacity information including detailed CHP disclosure for the companies that have chosen to release this information. Figure 16 reports generic information on 2004 installed CHP capacity:

Company	UK CHP Installed Capacity by the end of 2004
British Energy	Not applicable
Centrica	Not reported
EDF	Not reported, although EDF-UK reports it owns several small-scale CHP plants: “EDF provides heat and energy solutions through collaborating with other organizations and participating in ventures.” (company website)
Innogy	Electricity generation capacity: 559.8 MWe (Megawatt of electric capacity) Thermal capacity: 1392.5 Mwth (Megawatt of thermal capacity)
Powergen	587 MWe and 1046 MWth
Scottish & Southern Energy	Not reported: the company is heavily invested in hydropower, not in CHP
Scottish Power	Not disclosed, although the companies website states that Scottish Power Generation owns a large number of CHP capacity

Figure 16 - CHP Capacity

Finally, in connection with regulatory requirements demanding improvements in household energy efficiency, and as a result of a highly-competitive deregulated market, British electric utilities have launched a number of energy service businesses. The activities of such services vary between companies due to differences in the customer characteristics, but the generic definition of energy services suggests that this term stands for:

*“...any activity taken by energy companies and/or other market actors, which results in demonstrable and sustained savings... of supplied/delivered energy in their customers’ households and which includes the option of initial investment by other than the household or property owner”<sup>7</sup>*

Innovest ranked the reviewed companies on the basis of their energy service performance in the section reviewing corporate progress on energy efficiency (the UK EE obligation). In sum, energy service activities reported by the companies in our sample are summarized as follows:

Company	Energy Services Activities
British Energy	Software tool for energy management;  Wholesale market contracts for customers with an aggregate demand over 20 MW;

<sup>7</sup> DTI Secretariat, June 2003: Energy Services Working Group – What are Energy Services?

<p><b>Centrica</b></p>	<p>British Gas a range of home appliance installation services, including central heating and gas appliances (with maintenance and breakdown cover provided under its HomeCare range), plumbing and drains, home electrics and kitchen appliances;</p> <p>British Gas provides cavity wall and loft insulation offering large reductions on the cost of both the product and installation. Customers are provided with a free 25 year CIGA (Cavity Wall Insulation Guarantee Agency) guarantee on cavity wall insulation;</p> <p>Multi-service 'bundling' combining energy and telecommunications services;</p> <p>A number of business energy efficiency programs that follow on from the UK Climate Change Levy (CCL). Centrica contacted all business customers with details of the CCL and its implications before its introduction. The company says it cannot itself offer substantial energy efficiency programs to business customers because such programs are developed through industry-specific trade organizations.</p>
<p><b>EDF</b></p>	<p>In cooperation with Direct Assist and Home Service, EDF provides 'Gas Central Heating Service Cover'. The company also provides 'Electrical Heating Cover' and 'Electrical Emergency and Breakdown Cover';</p> <p>Home insulation to gain energy efficiency and reduce energy bills;</p> <p>London Energy Green Tariff, which allows customers to choose renewable energy;</p> <p>Meter readings for gas and/or electricity accounts;</p> <p>Opportunity to budget bills with monthly payments;</p> <p>Prepayment option at prices "aligned to quarterly credit meter tariffs";</p> <p>Priority services for special customers, such as elderly, disabled or chronically sick.</p>
<p><b>Innogy</b></p>	<p>Funding to a large number of local authorities and housing associations to reduce heat loss;</p> <p>Financial support for external and internal solid wall insulation measures as well as hot water cylinder insulation and draught-proofing to achieve warmer homes and lower fuel bills in the domestic sector;</p> <p>Discounted services in insulating loft cavities and promoting the associated fuel bill reductions;</p> <p>Customer appliance exchanges programs, such as the Savings for Life Program formed in a partnership with electrical appliance retailers and manufacturers;</p> <p>A heating scheme to encourage the installation of high efficiency condensing boilers in social housing;</p>

	<p>Finally, with respect to energy efficiency measures, Npower offers free customer consultations (both verbal and distribution of informational booklets).</p>
<b>Powergen</b>	<p>Automated customer energy efficiency consulting based on questionnaire completion;</p> <p>A number of consumer grants related to loft insulation, cavity wall insulation and installation of low-energy light bulbs;</p> <p>Powergen cooperates with the Warm Front Team is a Government funded initiative providing free grants for a package of heating and insulation measures worth up to £2,500, to help people in receipt of income or disability related benefits or credits improve their homes;</p> <p>Web-based basic consumer education related to a variety of EE projects;</p> <p>Other limited consumer training.</p>
<b>Scottish and Southern Energy</b>	<p>An interest-free repayment scheme for the customers who purchase the cavity wall or loft insulation service (although SSE reported a low demand for this service);</p> <p>A partnerships with Wickes and Focus Do It All stores to promote sales of DIY loft insulation;</p> <p>Funding for marketing and for subsidizing a 'buy two rolls get one free' offer on loft insulation</p> <p>Installation of energy-efficient boilers to prevent heat-loss in the houses: SSE entered into a partnership agreement with the major manufacturer Caradon Ideal to promote condensing boilers;</p> <p>Promotion of the installation and use of fluorescent lights in place of more energy-intensive appliances.</p>
<b>Scottish Power</b>	<p>Offer of customer-specific energy-efficiency solutions based on the assessment of the individual customer premises (no specifics disclosed).</p>

Figure 17 - ESCO Services



The following summary table shows the relative positioning of each company according to their performance against all of the variables considered in this survey.

	EDF	Centrica	Innogy	Powergen	Scottish & Southern Energy	Scottish Power
Historic carbon intensity of production and operations	☹	☺	☹	☺	☹	☹
Total GHG emissions (time-series)	☹	☺	☹	☺	☹	☹
Carbon emissions improvements	☹	☺	☹	☹	☺	☺
<b>GREENHOUSE GAS CLUSTER</b>	☹	☺	☹	☹	☹	☹
Consumer EE training (demand management training) and customer incentives	☺	☺	☹	☹	☹	☹
EE improvement	☺	☹	☹	☹	☺	☺
<b>ENERGY EFFICIENCY CLUSTER</b>	☺	☹	☹	☹	☹	☹
Total renewable energy investments procured	☹	☺	☹	☹	☺	☹
ROC/RPS obligation	☹	☺	☹	☹	☹	☺
Non-ROC/RPS tariffs obligation, if any	☹	☹	☺	☹	☹	☺
RE planned investments	☹	☹	☺	☹	☹	☺
RE improvement	☹	☺	☹	☹	☺	☺
<b>RENEWABLE ENERGY CLUSTER</b>	☹	☺	☹	☹	☺	☺

Figure 18 - Company Positioning

- ☺ Top tier
- ☹ Middle Tier
- ☹ Bottom tier

## 4. Conclusions

### 4.1 Summary of Rankings

In completing the rankings for individual variables, Innovest produced cumulative scoring for the three clusters of variables examined in our report: CO<sub>2</sub> emissions, energy efficiency/energy services performance and renewable energy performance. The cumulative scores are obtained by averaging the respective scores for each individual company across all variables falling under one 'cluster'. For instance, the cumulative energy efficiency/energy services score for each company is derived by summing the scores for the two variables in the 'energy efficiency/energy services' cluster and dividing the score by two.

Figures 19, 20 and 21 (below) present the cumulative scores for each cluster.

#### 4.1.1 UK Power Sector CO<sub>2</sub> Risk Ranking

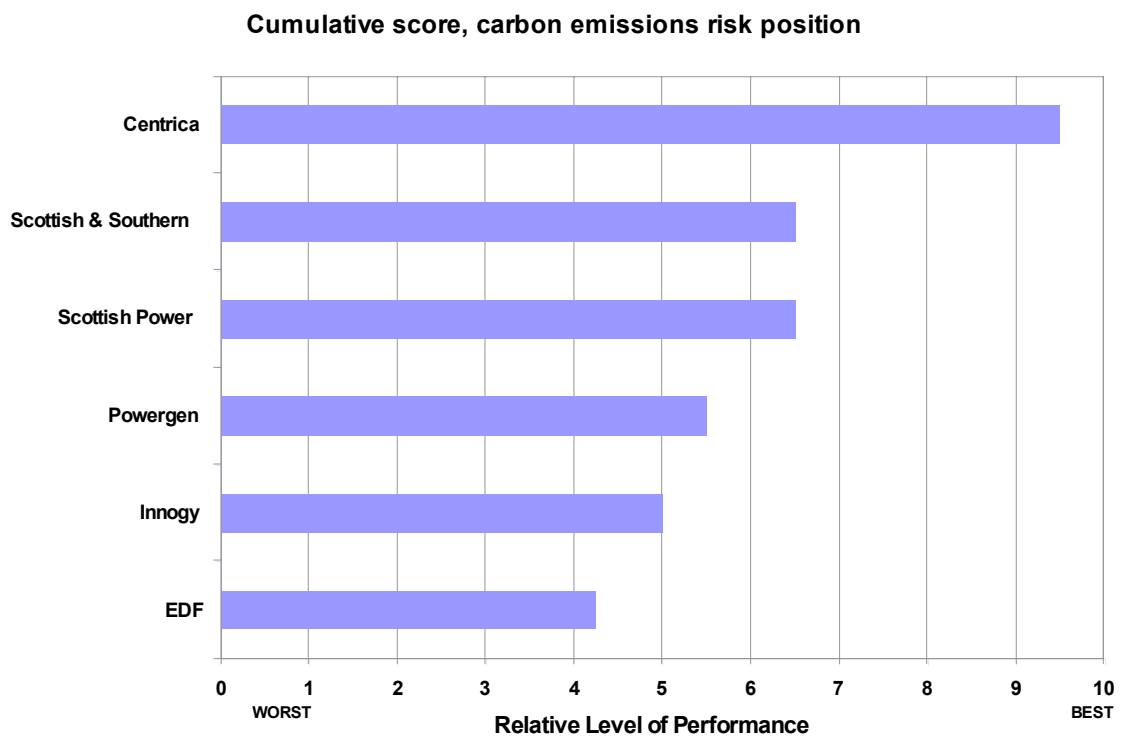
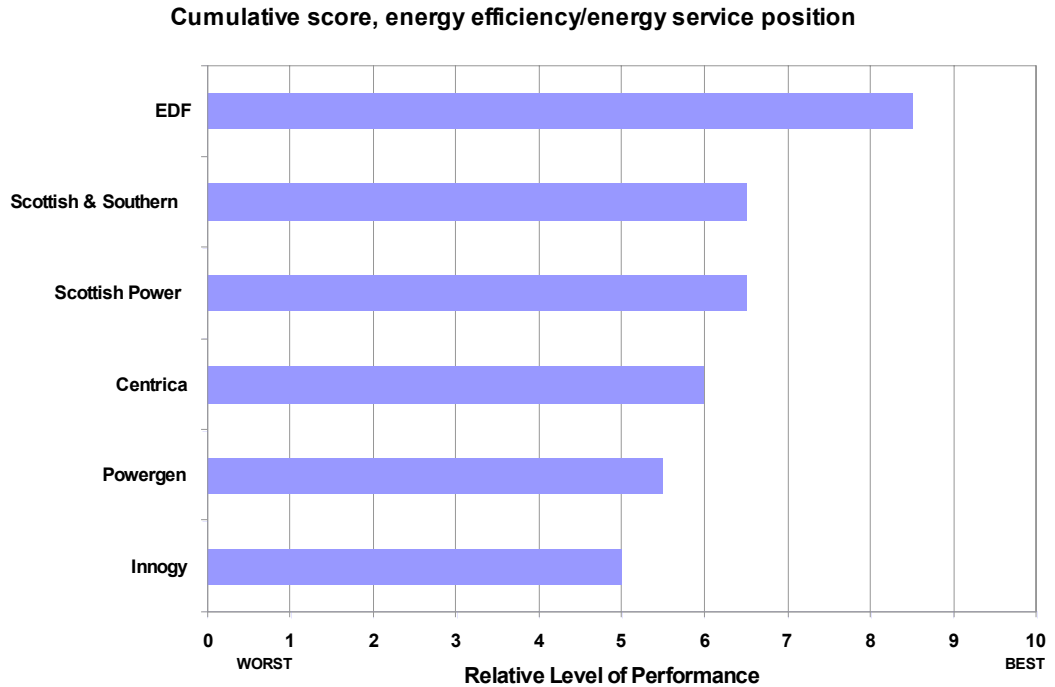


Figure 19 - UK Electricity Producers' Carbon Dioxide Risk Ranking

Centrica stands out as a clear leader with respect to the carbon emissions risk ranking, where the rest of the sample falls some way short of the Centrica score. In addition, no large difference in scores is observed across the rest of the sample and all companies are grouped around the average score, but *below* the median score of 7. This indicates that the UK power generating sector has a rather high carbon risk exposure.

#### 4.1.2 UK Power Sector Performance on Energy Efficiency/Energy Services

A different distribution of sector leaders emerges when comparing energy efficiency/energy services scores with the previous ranking on carbon risk. While Centrica obtains a below median score, EDF, Scottish & Southern Energy and Scottish Power rise to the top of the sample:

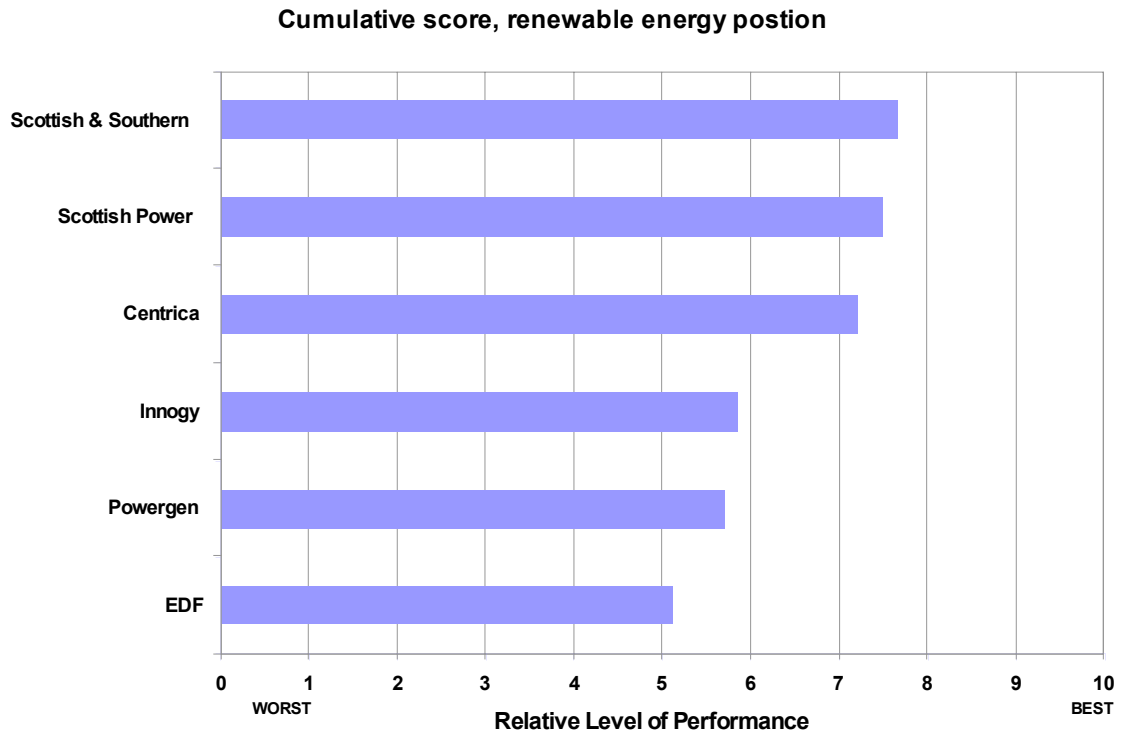


**Figure 20 - UK Electricity Producers' EE Services Programs and Progress**

Figure 20 demonstrates that a company ranked highest in terms of its carbon emissions risk (EDF) is at the top in terms of energy efficiency and energy service programs. SSE and SP, both of which are found in the upper- middle tier of the carbon risk score, also score highly with regard to their energy efficiency/energy services performance, which demonstrates that both companies focus on EE programs to reduce their carbon emissions exposure.

#### 4.1.3 UK Power Sector Performance on Renewable Energy

Scottish & Southern Energy, Scottish Power and Centrica again assume the leading role with respect to corporate renewable energy programs, planned capacity, RO compliance and overall facilitation of renewable energy markets in the United Kingdom:



**Figure 21 - UK Electricity Producers' RE Programs and Progress**

Figure 21 demonstrates surprisingly little difference between scores across the sector. Such a low variance is explained by the fact that most corporate renewable energy programs are standardized and controlled in tandem with UK government parameters. Given that companies interviewed for this report considered the existing RO to be stringent enough, it is not surprising that Innovest did not discover significant additional (i.e., above-standard) initiatives on the part of UK electricity producers.

UK power sector utilities are similarly constrained by the geographic distribution of primary renewable energy resources and by the new renewables capacity approval process. Since such constraints are relatively constant for all companies in the sample, this reduces the score variance and places all companies around the median score.

The largest difference between specific corporate policies is observed with respect to their support of 'green tariffs', which gave extra advantage in the ranking to Scottish Power and to Scottish & Southern Energy. The non-disclosure of information on renewable energy investments impeded the ability to additionally differentiate companies with regard to their renewable energy position.

#### 4.1.4 Overall Ranking: Carbon Risk Management, Energy Efficiency and Renewable Energy Clusters

For each individual company in the sample (with the exception of British Energy), Figure 22 (below) exhibits the score averaged across all variables considered in this analysis.

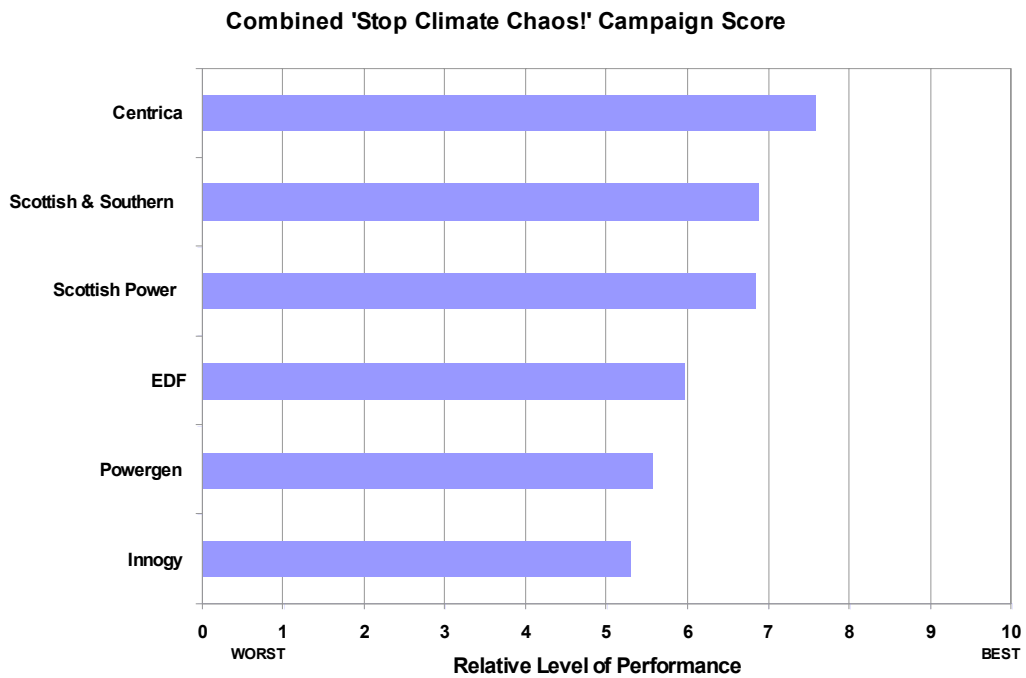


Figure 22 - Combined Company Ranking

The summary ranking places Centrica, Scottish Power and Scottish & Southern Energy above the sample average, while Innogy, Powergen and EDF fall below the average. The sample displays very little variance across all companies studied; in their policies addressing the reduction of carbon emissions, all companies consider they are complying with what they deem to be existing and stringent regulations, which precludes introduction of significant, beyond compliance initiatives. As a result, even the relative ‘laggards’ in this benchmarking exercise are ranked close to the median score, while the best performing company relative to the rest of the sector – Centrica – barely exceeds it. Although Scottish & Southern Energy was ranking second overall after Centrica, the company declined Innovest’s invitation to participate in an interview. EDF and Powergen also declined the invitation to participate.

In sum, according to the results of the benchmarking exercise, and considering corporate willingness to provide information for the Stop Climate Chaos! Campaign, Innovest recommends Centrica as the ‘leader’, with Scottish Power and SSE as possible ‘pioneers’.

## 5. Appendix I

### Methodology

Innovest has developed a carbon-profiling database which enables comparisons of management strategy and emissions profiles to be made among companies on a consistent, systematic basis using the proprietary Carbon Value '21™ platform. The database contains a series of variables to assess climate change performance. These variables are weighted according to their importance within particular sectors and they are scored to provide ranking data. Scores range from 0-10 for each company for each variable. A score of 10 represents the best score a company could obtain relative to the performance of its peers

#### Company Ranking Methodology

##### Areas of analysis

This comparative assessment of corporate greenhouse gas risk management strategy among UK utilities has considered three performance areas (clusters):

- CO<sub>2</sub> policy and emissions improvements;
- Renewable energy programmes, capacity procurement for new renewables, ongoing renewable asset construction and present output; and
- Energy efficiency/demand-side management measures implemented under the UK Energy Efficiency program (energy services inclusive).

Each of these clusters comprises a number of variables, as described in Figure 23 below.

##### Two stage process

The research methodology consisted of two stages:

- The first stage involved detailed research based on public disclosures by the UK power generators. The data search included (but was not limited to) the review of all corporate greenhouse gas emissions data, governmental databases covering emissions reduction compliance, anecdotal evidence obtained from various media and a variety of business search engines and, on occasion, research by various NGOs. By carrying out a diverse information search Innovest aimed to provide the most balanced and objective assessment of corporate carbon risk management performance.
- The second stage involved interviews with senior company executives. Innovest approached the Heads of the Environmental Affairs within each company or Corporate Responsibility Directors to request a one-hour telephone interview with such corporate executives. Innovest requested interviews with specialists of equal rank and similar responsibilities across the full sample of companies targeted by the Stop Climate Chaos Campaign.

The request for the interview was accompanied by a written questionnaire, requesting the disclosure of information not available from public sources. Individual company questionnaires ranged in length and depth because of the differences in carbon policy disclosure. Innovest requested that companies confirm their interview participation within three weeks from the original contact. Innovest further requested that any other relevant specialists be invited to participate in the interview at the discretion of the main interviewee.

Having completed the corporate interviewing process, Innovest integrated the data provided in the company interviews with publicly disclosed information to produce the cumulative ranking presented in graphic form.

### Scope of information

In attempting to carry out interviews with all these companies, Innovest obtained a corporate response rate of 28.5% (percentage of total questions responded to by way of interview). The reasons for this, in view of the companies themselves, were that due to existing public policy programmes and regulations, the UK power sector felt any additional information provision would be duplicating disclosure efforts demanded by British regulators.

Several of the power companies expressed the view that the large volume of information and in-depth level of detail requested also complicated the interview-based data collection process.

Centrica, Innogy and Scottish Power agreed to provide information interviews at Innovest's request. Considering the constraints resulting from a relatively low survey response rate, Innovest chose to limit quantitative ranking of the UK power sector performance to data that could be verified through UK government bodies (DEFRA and Ofgem) or to strictly comparable information from the power companies' public disclosures.

British Energy, a nuclear power generator, could not be ranked as the company decided not to participate in the benchmarking exercise. This adversely affected the ability to create a comparable baseline for assessing BE's progress against the other power companies. It is not possible to compare the carbon risk profile of a nuclear power generator with coal/natural gas-fired utilities without information on BE's carbon programs.

### Ranking criteria

All companies in the sample were ranked against criteria listed in Figure 23 below. For each of these criteria all information was collected from the above-mentioned sources.

Figure 23 also describes the relative importance attributed to all criteria in the overall scoring process. For example, while each criterion is important by itself with each company assessed against every individual variable, Innovest has also produced a cumulative performance ranking, whereby individual criteria are weighted according to their theoretical importance, relative to the other variables.

The 'weights' are listed under the column 'Relative Importance in Ranking'. Innovest assigned relative weights to each variable based the prevailing empirical studies and/or 'common practice' reflecting the comparative importance of these factors. Independent, external guidance was obtained on the criteria used and their weights.

Innovest does not disclose the exact weights for each factor as those are considered proprietary. Figure 23 further describes the method of collecting and computing (where necessary) all respective criteria, or 'quantifying' the qualitative data published by companies in their corporate disclosures.

Variable	Relative Importance in ranking	Measurement / Computation Method
Three-year carbon intensity of electricity production	Medium-high	<p>Data are obtained from company disclosures and Defra's revised NAP (relevant CO<sub>2</sub> emissions in tons (tCO<sub>2</sub>)). Although several companies report carbon dioxide emissions data for 1998-2004, Innovest's comparison is based on the 2002-2004 time-frame to assure the highest consistency across the sample.</p> <p>In addition, the computation is heavily reliant on 2002-2004 because in this period no company experienced ownership change.</p> <p>Total carbon dioxide emissions for any given year are divided by electricity output (TWh). The results are then compared to the corporate disclosures since the UK power producers are asked to report the carbon intensity of their electricity generation in their Environmental Reports.</p> <p>The data over the three year period are averaged and compared among the companies. The data are also examined for the two periods of carbon intensity</p>

		<p><i>change</i> to observe which company has the largest short-term <i>decline</i> in carbon intensity.</p> <p>The company with the lowest carbon intensity and the highest relative decline in carbon intensity receives the highest score exemplified by the longest bar-chart in the graphic representation.</p>
Total/absolute GHG emissions (time-series)	Medium-high	<p>Data are obtained from company disclosures and Defra's revised NAP (relevant GHG emissions in tons). CO<sub>2</sub> emissions across all facilities are summed and compared across all companies.</p> <p>No adjustment for company size is made in this case.</p> <p>Relative to the first criterion, this variable reports on the total contribution of every power generator to the overall 'pool' of British carbon dioxide power sector emissions. This scoring is carried out to demonstrate that the company with the largest share of the electricity market (Powergen) does not <i>necessarily</i> have the largest volume of greenhouse gas emissions.</p>
Absolute carbon emissions improvements over time (relative to a certain year/baseline)	High	<p>Data are obtained from company disclosures and Defra's revised NAP (relevant GHG emissions in tons).</p> <p>Rate of emissions change is computed for each facility for each year in the period 1998-2004 as follows:</p> $\_ = ( \text{emissions } t_{\text{year } 2} - \text{emissions } t_{\text{year } 1} ) / \text{emissions } t_{\text{year } 1}$ <p>Such rate of change is subsequently summed across all installations for every company and averaged across seven years. These averaged rates of emissions changes are then compared across the companies.</p> <p>The company with the largest negative rate of change (i.e., the largest emissions reduction) received the highest score.</p>
Consumer EE training (demand management training) and EE customer incentives	Medium-high	<p>Data on Energy Efficiency (EE) scheme accreditation/approval are obtained from Ofgem. The companies are ranked preliminarily on the basis of their submitted and approved EE schemes, whereas such schemes also reflect individual company progress on 'energy services' related to residential energy efficiency measures. The higher the percentage of submitted and approved schemes, the higher the score.</p> <p>These rankings are subsequently multiplied by the scores Innovest computed for EE investments (for those companies where this information is available). The higher the invested volume, the higher the 'multiplier'.</p> <p>Finally, this secondary score is further multiplied by one more 'weight' measuring energy-efficiency R&amp;D investment and regional consumer EE fund contributions. The higher is the volume of R&amp;D investment disclosed with respect to energy efficiency measures, the higher is the multiplier. And larger EE fund contributions (adjusted by the company size) receive higher multiplier.</p> <p>The cumulative scores obtained after this three-tier process are compared between the companies.</p>
EE improvement (relative to the Ofgem Energy Efficiency baseline year)	Medium-high	<p>Data on EE target achievement are obtained from the 2004 Ofgem report. The companies are ranked strictly on the basis of the Ofgem 'progress' data. The company with the largest improvement in energy efficiency and corresponding energy services receives the highest score.</p>



Total renewable energy investments	Medium-high	<p>2003-2004 Renewable energy investment data (in £ million) are obtained from company disclosures; where specific investment data are not available, total <i>planned</i> renewable energy capacity data (in MW, for 2004-2005-2006) are used for comparison instead. The largest investment (divided by the total generation capacity) received the highest score.</p> <p>The <i>planned</i> renewable energy capacity was not divided by the <i>existing</i> capacity as no theoretical connection exists between these two phenomena. The <i>largest planned</i> renewable capacity received the highest rank.</p> <p>Renewable energy investments are multiplied by the total planned RE capacity to obtain the final indicator of ‘renewable energy procurement’ (for cases where renewable energy investment data are disclosed).</p>
RO progress / ROC purchase	Medium-low	<p>Information is obtained from company disclosure on compliance with the Renewables Obligation (RO) and from the Ofgem RO Compliance March 2005 report. The percentages of RO compliance as well as percentages of ROC purchases relative to buy-outs are used for comparison.</p> <p>The compliance is considered both with regard to the Renewables Obligation operational in the UK (RO) and the Scottish Renewables Obligation (SRO). However, since Scotland is more abundant in renewable energy resources relative to the rest of the country (hydropower), compliance with the Scottish Renewable Obligation received smaller weight relative to the percentages of compliance with the English RO.</p> <p>Entities with the higher percentage of the first- and second year RO compliance received higher scores. Companies with the larger ROCs production/purchases also obtained a higher score. The two scores are multiplied to obtain the cumulative RO progress/ROCs purchase score.</p> <p>ROCs purchases are preferred to buy-outs because buy-out funds are distributed back to ROCs producing companies.</p>
Non-RO / RPS Obligation: ‘green tariff’	Medium-low	<p>Data on ‘green tariffs’ are collected from company Social Responsibility / Renewable energy reports. This ranking compares sizes of covered population (i.e., how many electricity consumers are subscribed to a given ‘green tariff’) and the size of the tariff payback to the regional renewable energy funds.</p> <p>The higher consumer coverage receives a higher score and higher total contribution to regional renewable support funds in the form of the ‘payback’ to secure a higher score.</p>
Renewable Energy Policy	Low	<p>Innovest compared the degree of disclosure on <i>programs</i> related to RE investments, planned renewables capacity (disclosed short-term installations), exploration of-/investment in the <i>non-wind</i> renewable potential and the disclosure about the different stages of construction / planning / operation of renewable energy assets. Such programs and associated investments (where disclosed) were labelled ‘renewable energy policies’.</p> <p>Companies were ranked with respect to the detail of their disclosure on each aspect of RE policy as well as on the number of renewable energy programs each company claimed to be implementing.</p> <p>As this method compares strictly <i>qualitative</i> data, Innovest assigned a low weight to this variable.</p>
RE improvement	Medium-high	A combination of RO/SRO compliance percentages, renewables investments

(relative to the 2002 baseline)		<p>reported for 2000-2004 (in the planning stages), ROC purchases for the two RO compliance periods and new constructed capacity for 2001-2004 were considered for the determination of the cumulative 'Renewable Energy Performance Improvement' score.</p> <p>ROC purchase percentages and RO compliance percentages are compared as reported by Ofgem in the March 2004 report; renewables investment data and information about the new operational capacity are obtained from individual company disclosures. Renewable energy investment and new operational capacity data are compared directly as reported, in £ millions and MW of new generation capacity.</p> <p>The <i>rate of change</i> for 2002-2003 and 2003-2004 is computed for all of the above variables.</p> <p>The four 'rates of change' obtained for each company are averaged in <i>absolute</i> terms (for investments and new capacity) and in <i>percentages</i> (for ROCs purchases and RO compliance percentages).</p> <p>The company with the largest change across most of these parameters is assigned highest final score. To determine the rate of change, most comparisons are made relative to 2002 (the baseline year) due to the largest data availability.</p>
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**Figure 23 - Variables and Weights used in Methodology**

Finally, one cumulative ranking encompassing the three above-mentioned clusters was derived and is presented as Figure 22 above. Cumulative ranking is derived by applying a weighted average to all other ratings in the report: all previous ranks are summed and averaged in accordance to the weights assigned to each individual factor.

### Ranking system

Innovest's company ranking is carried out as follows. Computations described in figure 23 provide measures of corporate performance that have different magnitudes and meanings. While Innovest compares such measures on a like for like basis for every variable under consideration – i.e., when researching carbon dioxide emissions, we look at tons of CO<sub>2</sub> emitted (tCO<sub>2</sub>), where the total number of tCO<sub>2</sub> discharged by one company are directly compared to tons of CO<sub>2</sub> emissions for other companies in the peer group – the final ranking charts published in the Stop Climate Chaos! Report are presented in the form of a relative score.

### Eliminating bias

The qualitative and quantitative data sets were analysed separately to ensure that like for like variables were assessed. In other words, rankings for emissions, for example, are based solely on *quantitative data* and would not include any Innovest evaluations of *greenhouse gas policies*. Ranking of policy approaches would, similarly, be based solely on qualitative assessments of policy and related statements. Innovest used data that was publicly available and comparable across companies to generate the sector rankings.

Due to differing use of key performance indicators (KPIs) and a lack of disclosure by some companies, together with a mixed level of company responses in terms of number of interviews granted - Innovest has provided rankings based exclusively on data that could be verified through external governmental agencies, such as DEFRA and Ofgem. This approach ensures consistency and comparability of results.

In terms of differentiating between companies that are suppliers and generators, all companies in the sample have power generating assets: for instance, Centrica does have some generating facilities; these are listed in the company's profile. Further, the large range of variables Innovest considered in the course of ranking ensures a balanced review of the company's carbon risk exposure irrespective of whether it is primarily a generator or a supplier. For instance, we looked at a variety of renewable energy development indicators,

including Renewable Obligation (RO) performance and green tariffs, which could be implemented by both types of the companies.

If Innovest had *differentiated* between suppliers and generators by placing them in two different clusters, we would not have had a basis for comparison. This is because only Centrica is not primarily an ‘electricity generator’, while all other companies in this sample are.

Innovest emphasises that a company’s participation in the interview did not bias the final scoring of its performance on any of the criteria. For example, Innogy (RWE-npower) provided an excellent review of its carbon strategy, but Innovest could not rank the company consistently highly across the three indicators of carbon risk because Innogy has a relatively high carbon intensity of electricity production. Nevertheless, cooperation of power sector executives was noted in the individual company reviews following the ranking section because it allowed Innovest to provide a more balanced evaluation of corporate strategies and policies, which could not be captured from the publicly disclosed information.

### **Corporate disclosures limit full assessment**

Due to the lack of disclosure by some companies and mixed level of company responses to the WWF campaign in terms of number of interviews granted, Innovest had to provide the ranking based on the data that could be verified through external governmental agencies, such as DEFRA and Ofgem.

In addition, Innovest analysed and ranked any information that was reported in a highly compatible manner, such as RO compliance, EE target compliance, volume of renewable energy investments, etc.

WWF-UK sought to establish a large volume of specific, quantitative information for the purposes of the company rankings. Unless directly disclosed to Innovest by a company in an interview, such information is frequently non-compatible across utilities because companies choose to describe approaches to greenhouse gas management in a highly variable manner.

To demonstrate the difference between the final methodology and that originally envisaged, the table below lists the original list of comparative criteria and states whether Innovest retained or dropped the proposed criterion due to non-disclosure or non-response by companies to interview requests.

Where a variable is identified as ‘described in Appendix II’ or ‘retained in Appendix II’, this refers to variables commented on in the extended company profiles.

British Energy was not ranked due to the difference in the asset base between a nuclear power generator and the rest of the companies in the sample. A detailed description of British Energy’s carbon policies as well as renewable energy investments can also be found in Appendix II to this report.

<b>Variable</b>	<b>Dropped or retained?</b>
<b>GREENHOUSE GAS CLUSTER</b>	
Presence of a GHG emissions management policy (integrated with RE/EE or independent)	Dropped in ranking, but described in Appendix II
EUETS emissions reduction targets and NAP	Described in Appendix II – not to be ranked because all targets are determined by the UK government
Presence of a GHG strategy officer, special corporate expertise	Dropped both in ranking and in the Appendix: insufficient information
GHG Trading competence (trading floor, specialist credentials)	Dropped both in ranking and in the Appendix: insufficient information
Historic carbon intensity of production and operations	Retained in ranking
Total GHG emissions (time-series)	Retained in ranking
Carbon emissions improvements (relative to a certain year/baseline)	Retained in ranking
Jl, CDM involvement and \$\$ committed/planned	Dropped in ranking and in the Appendix: insufficient information

Total GHG program investments committed and planned	Dropped in ranking and in the Appendix: insufficient information
<b>ENERGY EFFICIENCY CLUSTER</b>	
Presence of energy efficiency management policy, main policy components	Dropped in ranking, but described in Appendix II
EE targets	Described in Appendix 2 – not to be ranked because the EE targets are established by Ofgem
EE strategy officer/other responsible specialist	Dropped both in ranking and in the Appendix: insufficient information
EE internal audits	Dropped in ranking, but described in Appendix II where applicable.
EE investments, gross per project, standardized by the investment size and capacity	Dropped in ranking and in the Appendix: insufficient information
Consumer EE training (demand management training) and customer incentives	Retained in ranking
Total energy consumption, by energy type	Dropped in ranking and the Appendix
EE improvement (relative to a certain baseline)	Retained in ranking
<b>RENEWABLE ENERGY CLUSTER</b>	
Total renewable energy investments procured	Retained in ranking
RE installments by the type and asset capacity	Dropped in ranking but retained in Appendix II
ROC/RPS obligation progress	Retained in ranking
RE strategy officer/other responsible specialist	Dropped in ranking and in the Appendix: insufficient information
RE trading floor, specialized development team, etc.	Dropped in ranking and in the Appendix: insufficient information
Non-RO/RPS tariffs obligation, if any	Retained in ranking
RE planned investments	Dropped in ranking and in the Appendix: insufficient information
Renewable Energy Policy	Retained in ranking
RE improvement (relative to a certain baseline)	Retained in ranking
<b>CHP</b>	
CHP assets: installed capacity, MW	Dropped in ranking, but retained in Appendix II for the companies that disclosed this information
CHP targets: RFP capacity, planned investments	Dropped in ranking and in the Appendix: insufficient information
CHP, Energy Services and RE R&D/technology development	Integrated into the ranking of energy efficiency programs
CHP policy	Dropped in ranking, but retained in Appendix II where disclosed

**Figure 24 - Variables - Dropped or Retained**

## Report Authors

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Principal author was Dr. Svetlana-Valérie Morozova, a Senior Analyst with Innovest, where her principal focus is the energy sector and carbon finance. Immediately prior to joining Innovest, Dr. Morozova worked for four years at the international environmental finance company EcoSecurities, Ltd. In that role, she identified and helped to structure and finance greenhouse gas technologies with the largest emissions reduction potential. She also participated in the development of GHG emissions reduction baseline methodologies and GHG inventorying protocols. Finally, she managed project development and financing for a number of GHG emissions reduction projects in the former Soviet Union (Russia and Ukraine). Previously, Dr. Morozova had worked as a visiting professor of international economics, law and public policy at the University of California and California State University. She holds three Master's degrees, in international relations, public policy, and world history, as well as a doctorate in international political economy from Claremont Graduate University in California, U.S.A. Dr. Morozova also has advanced methodological training in empirical analysis and mathematical research design.

## Acknowledgements

WWF and Innovest would like to thank Innogy, Scottish Power and Centrica for their participation in the detailed informational interviews. Their co-operation enabled Innovest to carry out a more balanced and informative research program. These companies did not receive any additional positive assessment in the course of their performance evaluation, as is evident in the case of Innogy.

## Glossary

**Accreditation (of renewable energy facility or an energy efficiency scheme):** Registration (by the UK power-generators) of new renewable power generation stations and/or consumer energy efficiency schemes with the UK regulatory agencies.

**Carbon emissions (absolute):** for any given producer, the total volume of greenhouse gas emissions, which is not adjusted/scaled by the manufacturing output, in this case – total volume of electricity produced.

**Carbon emissions (relative):** for any given producer, the total volume of greenhouse gas emissions divided by the unit of production, in this case TWh of energy produced (Terawatt/hours of energy).

**Carbon sequestration:** the process of capturing and storing carbon in soil, underground, ocean water or vegetation to prevent/slow down its release into the atmosphere.

**CERs (Certified Emissions Reduction Units):** credits received for investing and implementing a CDM project. The number of CERs received from a project is proportional to the number of tons of CO<sub>2</sub> equivalent prevented from being emitted in the course of project realisation.

**Clean Development Mechanism (CDM):** denotes project-based emissions reduction activities carried by various commercial entities from emissions-capped countries in developing, non-capped states. CDM emissions reduction projects cannot be carried out under the rubric of the Official Development Assistance (ODA) and they have to comply with specific requirements of host-countries.

**DEFRA:** The Department for Environment Food and Rural Affairs

**Emissions Reduction Allowance:** the unit of emissions trade in a 'capped' system, which entitles a polluter to emit a given quantity of a specific discharge.

**Emissions Reduction Credit:** An emissions reduction unit denoting discharge reduction in excess of the allowance. Credits are usually generated as a result of implementing an emissions reduction project.

**Emissions Trading:** A regulation allowing companies to buy/sell emission reductions from/to another facility/company or from/to the marketplace subject to the presence of emissions reduction price differentials between facilities or companies involved. The EU Emissions Trading Scheme (ETS) places a GHG emission ceiling on all participant sectors. Under the ceiling, each respective sector receives a quota of emissions allowances through 'grandfathering' or through competitive auctions. Emissions trading allows commercial entities with higher emissions abatement costs to stay under the 'permitted emissions ceiling' by purchasing emissions reduction allowances and/or emissions reduction credits from the entities with lower marginal emissions abatement costs.

**Energy Demand Management (demand management education):** Same as EEC (see below): measures established and financed by energy suppliers to induce more efficient energy use on the part of utility customers.

**Energy Efficiency Commitment (EEC):** the UK regulation requiring electricity/energy suppliers to achieve a certain target in domestic/residential customer energy efficiency. The regulation is aimed at reducing carbon emissions from British households. The first phase of the EEC is operational in 2002-2005, where the overall Energy Efficiency (EE) target is set at 62 TWh over three years, which corresponds to the cumulative household emissions reductions of 1%. To ensure that low-income customers can benefit from EE measures promoted by energy suppliers, at least 50% of all energy savings have to be achieved from households in the low-income group (a 'Priority Group' receiving income-related tax benefits and credits).

**Energy Services:** A combined provision of products accompanying the basic 'heating and powering' services of the UK utilities, such as metering of energy use, energy efficiency premise auditing, premise insulation, energy service billing and other products bundled into one 'service provision basket'. Energy service customers can range from individual households to large commercial entities.

**EUA:** Emissions Reduction Allowance specific to the EUETS. This emissions allowance is unique to the EUETS since AAUs allocated to countries under the Kyoto Protocol are not directly traded in the European system. The EUAs were 'separated' from Kyoto's allowances as Europeans decided that the EUETS would be implemented regardless of whether the Kyoto Protocol went into effect.

**Grandfathering:** Assigning individual company GHG emissions allowances on the basis of historical level/ intensity of GHG emissions.

**Green tariffs:** A tariff when an electricity supplier matches all energy used by its customers (or a percentage of such usage) by renewable energy. Under 'green tariffs' electricity consumers pay a premium for their electricity use, and the energy supplier invests such a premium in new renewable energy developments. Certain utilities match consumer's premiums by investing an equal share of corporate funds in new renewables capacity; others use purely the premium supplied by the customers.

**Joint Implementation (JI):** a project-based policy allowing companies from the GHG emissions-capped countries within the OECD to invest in emissions reduction in capped states in Eastern Europe and the former Soviet Union. By exercising this form of 'FDI', emissions-capped companies in the OECD can claim emissions reduction rights on the projects achieved with lower emissions abatement costs.

**National Allocation Plan:** a regulation assigning specific amounts of carbon allowances to companies falling within the EU-ETS capped sectors

**OFGEM:** The Office of Gas and Electricity Markets

**Power generation capacity:** the maximum amount of electricity production possible by a given power station or a strictly specified type of power generating technology per specified unit of time.

**Project Design Document (PDD):** a standardized report containing a feasibility study of a GHG emissions reduction project. PDDs usually include project baseline, detailed presentation of technology/processes used to reduce GHG emissions, revision of public consultation protocols, description of all 'project activities' related to installation/operation of the proposed technology and so on. Preparation of PDDs is required to gain certification and verification of CDM projects.

**Renewable Obligation:** a legislative order (came into force in April 2002), which requires licensed electricity suppliers in the United Kingdom to source at least part of their electricity from renewable generation. The Renewable Obligation (RO) starts at 3% of total electricity supplied to customers in Great Britain in 2002/2003 and reaches 10.4% in 2010/2011. Any licensed electricity supplier can meet its Obligation by producing ROCs (Renewable Obligation Certificates) or by making a ‘buy-out’ payment to the fund re-investing such a payment back into the UK renewables system.

**Renewable Obligation Certificate (ROC):** A certificate guaranteeing that a given generating station has produced a specified ‘unit’ (amount) of electricity from an approved renewable energy source and that such power station has supplied the specified amount of renewable electricity to the UK power consumers. In Scotland ROCs are called SROCs, or Scottish Renewable Obligation Certificates.

**Scottish Renewable Obligation:** Same as RO, but applied specifically to Scotland due to the abundant supplies of hydropower in Scotland and the high costs differentials of securing renewable supplies in Scotland relative to the rest of the United Kingdom.

**WWF Pioneers:** WWF is partnering with electric utilities and energy retailers across the world that take a leadership role in areas such as renewable energy, energy efficiency, a switch away from coal, and national policy. The retailers must have shown efforts in bringing their green product to as many consumers as possible in the market place. These companies are identified by WWF as ‘PowerSwitch! Pioneers’. Many Pioneers are already on the way towards a CO<sub>2</sub> -free power sector. Long term goals of the Pioneer companies differ per region, some examples are (1) no more investments into coal, (2) at least 20% renewable energy by 2020 and (3) extensive commitment to energy-efficiency and gas-CHP.

Three Power Pioneer companies are given below as an example:

**1. Stadtwerke Hannover AG  
(Germany)**

Stadtwerke Hannover is a traditional energy company. It has made a commitment to increase efficiency by 20% by 2007, and does not have plans for new coal power. The company supports the vision of its 75%-owned climate protection fund proKlima to reduce CO<sub>2</sub> emissions by 80% by 2050. The fund is part of a local alliance of regional governmental organisations (GO) and non-governmental organisations (NGO). In addition, Stadtwerke Hannover has a strong commitment to increase cogeneration of heat and power (which is a main means to achieve their efficiency goal), increase renewable energy and increase green power sales through active marketing for green power and fuel cell activities.

**2. Electra Norte (Spain)**

Electra Norte's commitment is that all electricity supplied to their clients is backed up by the production from a renewable source coming from their own power stations or of those of collaborating companies (Sistema Electra Norte). To verify this commitment, an external certifying company audits the procedures every year and emits a report certifying that they have produced at least as much renewable energy as they have sold. For each new client, Electra Norte finances the plantation of a tree.

**3. Austin Energy (US)**

Austin Energy, a municipal utility company in Texas, USA, serving more than 800,000 customers, has committed to generating 20 percent of the energy it sells from renewable resources by 2020. The company has a cutting edge “zero energyhomes” program that will build affordable homes designed with the highest level of energy efficiency and enough photovoltaic solar power to provide all of the power needs. It also supports mandatory limits on carbon dioxide.

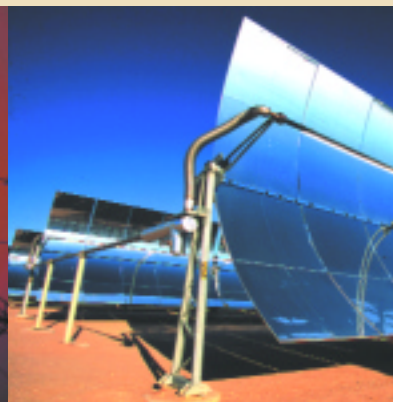
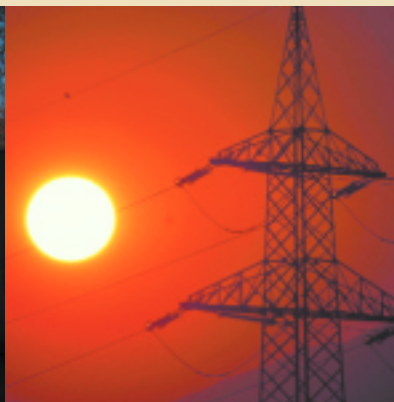


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To download the Innovest report *UK Power Giants: Generating Climate Change* visit [www.wwf.org.uk/climatechaos](http://www.wwf.org.uk/climatechaos)

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The mission of WWF is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature, by:

- conserving the world's biological diversity
- ensuring that the use of renewable resources is sustainable
- promoting the reduction of pollution and wasteful consumption



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