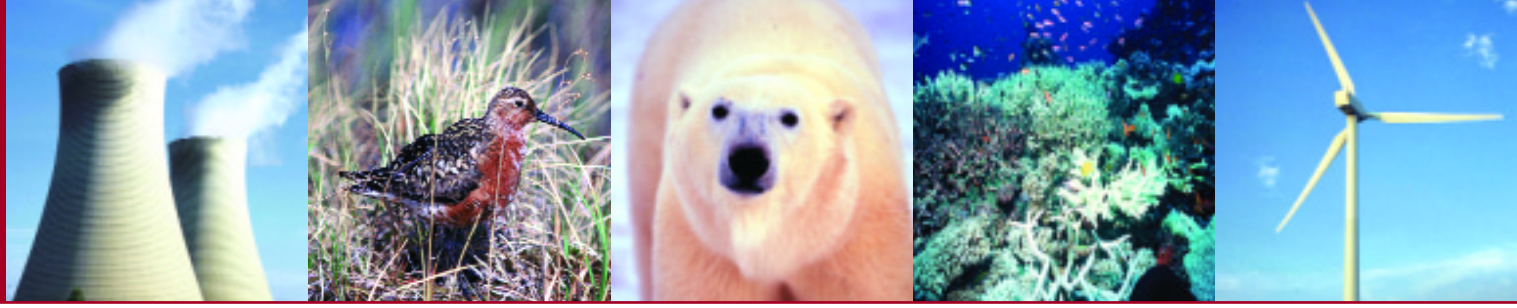
THE POWER TO SAVE OUR CLIMATE

WWF-UK CALLS FOR ACTION

Reducing CO_2 emissions in the UK power sector

A WWF-UK summary of the report by Ilex Energy Consulting November 2004

PowerSwitch!
WWF's Climate Change Campaign



INTRODUCTION

Climate change is the most serious environmental threat facing the world today

In the words of Sir David King, chief scientific adviser to the UK government, climate change poses a greater threat to global security than international terrorism. Not surprisingly, the Prime Minister stated in April 2004 that climate change was long-term the single most important issue that we face as a global community .

In order to avoid the worst effects of climate change, future global greenhouse gas emissions will need to be reduced substantially and immediately from current levels.

Through its international *PowerSwitch* climate change campaign, WWF is challenging the power sector — the biggest global carbon dioxide (CO_2) emitter — to become CO_2 free by 2050 in developed countries. As part of this campaign, WWF-UK is calling upon power companies and the UK government to achieve 60 per cent reductions of CO_2 emissions from the country s power sector by 2020.

To test the reality of our goal, WWF commissioned ILEX, a leading independent energy market consultancy, to undertake research. This has culminated in a hard hitting report, *The Power to Save Our Climate*, published in November 2004. The report provides the backdrop for a powerful case to pursue this goal, and of the need for urgent action on the part of government and industry.

The findings are hugely significant. Large cuts to power sector emissions are easily achievable, and could save the government billions of pounds.

The ILEX report shows that with minor extensions to current policies, and by incorporating additional aspirations from the Energy White Paper (EWP), the UK power sector could cut its CO_2 emissions by 60 per cent from 1990 levels between now and 2020. Moreover, these reductions can be achieved:

- at low cost, and in many cases lower than the costs of continuing business as usual ;
- with an estimated saving from reduced investment in new plant of more than £1.9bn in 2010, and £4bn in 2020;
- with potential savings on electricity bills totalling close to £0.9bn in 2010, and £1bn in 2020, delivered through implementation of energy efficiency measures;
- with existing technologies as opposed to radical policy shifts; and
- without resorting to new nuclear power (and with closure of all nuclear reactors by 2020).

In other words, if it acts now, the UK can meet its international environmental responsibilities and maintain leadership on climate change solutions with relative ease and major savings.

In making these emissions reductions, the UK will meaningfully address the problem of global warming, and provide an example to other countries on how best to achieve such reductions in a way that is beneficial for the overall economy. Furthermore, developing such policies will address wider security concerns regarding unpredictable weather events such as floods and extreme heat waves, the risk that massive weather disruptions in other parts of the world can have in the UK, and the reliability and independence of our energy sources.

Above (from left): Coal fired power station, Australia. Curlew sandpiper (migratory bird), North Siberian tundra. Polar bear, Canada. Coral bleaching, Fiji. Wind turbine, Australia.

BACKGROUND

Human-induced global warming is a reality. Over the past century, the global average surface temperature of the Earth has increased by about 0.6¡C. As a result, ocean temperatures and sea levels have risen, the frequency and severity of El Ni o-type events has increased and there has been an overall reduction in the extent and thickness of sea ice in polar regions.

To avoid the most serious impact of climate change, we need to ensure that, as agreed by the UK government at the European Council conclusions of May 2003, global mean temperature is limited to a 2¡C increase above pre-industrial levels, and that warming is reduced as fast as possible from that peak. To exceed such levels would have tragic implications for people, ecosystems and species — jeopardising food security, with up to hundreds of millions more people at risk of hunger and poverty; significantly damaging or disrupting arctic ecosystems, boreal forests and mountain ecosystems; and endangering species such as the polar bear and migratory bird species[1].

To limit global warming to a 2¡C peak, all countries need to cut down their emissions of greenhouse gases, which are responsible for trapping heat in the atmosphere and lead to an increase in overall temperatures. More specifically, industrialised countries need to reduce their emissions by at least 60-80 per cent over the next few decades[2].

The UK government is committed to such reductions: we have a domestic target of reducing our emissions of CO_2, the main greenhouse gas, by 20 per cent by 2010 (from 1990 levels), and the UK Energy White Paper (EWP) pledges to reduce emissions by 60 per cent by 2050. However, we are not on track to meet these targets. In fact, the UK s CO_2 emissions actually rose by 1.5 per cent during 2003[3].

The power sector is currently the biggest single source of CO_2 emissions both in the UK and worldwide. Electricity generators are responsible for approximately a third of total UK emissions. To meet the government s aim of reducing CO_2 emissions by 60 per cent by 2050, it is therefore essential that the power sector makes a significant contribution to such reductions. Electricity generation needs to be virtually carbon-free by the middle of the century. This will only be possible through urgent action.

[1] See www.metoffice.com/research/hadleycentre/obsdata/globaltemperature.html; www.ipcc.ch/pub/SYRspm.pdf

[2] Decision by the UNFCCC in Bonn in 2001 (decision 5/CP.6)

[3] See www.defra.gov.uk/news/latest/2004/emissionsstats-250304.htm

THE POWER TO SAVE OUR CLIMATE

The Ilex Report

The ILEX report aims to provide a realistic assessment of the potential to achieve CO_2 emissions reductions in the UK power sector by 2010 and 2020, and the associated cost implications.

In its modelling, **ILEX compared three scenarios:**

- **Business as usual:** incorporating the impact of government policies adopted to date.
- **Policy extension:** exploring the implications of taking current government policies and targets slightly further, without changing their underlying structure or essence.
- **Policy evolution:** incorporating additional government aspirations from the Energy White Paper (EWP) and further evolution of existing government policies, as well as phasing out nuclear power by 2020.

It is important to note that these scenarios do not rely on the emergence of significant technological advances or radical policy shifts. Instead, they focus on achieving emissions reductions through conventional means — through energy efficiency measures, additional encouragement of renewable and Combined Heat and Power (CHP) generation, and through a rising price of carbon in the European Emissions Trading Scheme (EU ETS). Starting on 1 January 2005, the EU ETS is a cap and trade trading scheme designed to help EU member states meet their Kyoto targets to 2012, and reduce CO_2 emissions across the power and industry sectors[4].

The report draws upon the combined expertise of an influential peer review group who analysed the scenario input assumptions and the conclusions of the final report. This group included representatives from five of the six major UK power companies, government departments, non-governmental organisations (NGOs), academic institutions and a renowned climate change (Intergovernmental Panel on Climate Change) expert.

[4] For more information, visit www.defra.gov.uk/environment/climatechange/trading/eu/index.htm

[5] Visit www.defra.gov.uk/environment/airquality/lcpd/

KEY FINDINGS

The report s findings strongly demonstrate support for achieving climate goals with minimal effort, so long as current policy aspirations are met and implemented effectively. Key outcomes are summarised below.

We can reduce emissions of CO_2 from the power sector by 60 per cent by 2020

- To achieve such reductions by 2020 requires neither developing new technologies nor radical policy shifts. Instead, this can be achieved simply by extending existing policies and implementing the aspirations of the EWP.
- While measures to reduce electricity demand, as outlined in the EWP, are potentially extremely cost effective, they will be rendered meaningless unless the government ensures that the current obstacles to energy efficiency are overcome, eg incentives for cost-effective investment in energy efficiency; provision of appropriate information and active promotion of energy efficient technologies.
- Across all three scenarios, the impact of the EU ETS is crucial and a key potential driver for emissions reductions. Even with a relatively low price for carbon, introduction of the EU ETS could have a significant impact on fuel mix and emissions from power plant, especially when combined with the sulphur dioxide emissions constraints of the revised Large Combustion Plant Directive[5].
- If companies face a cost for each tonne of carbon they emit, they will treat carbon emissions as a cost in their investment decisions and explore the different options available for reducing this economic impact, including switching to less carbon-intensive forms of generation.

We can achieve reductions with low costs and big savings

- The costs of achieving reductions of 60 per cent by 2020 are generally lower than the costs incurred under business as usual .
- Generation costs could be up to around 8 per cent lower than business as usual .
- There could be a net saving of £4.2bn from reduced investment in new plant in 2020, if the EWP s aspirations regarding electricity demand are met.
- Implementing energy efficiency measures would represent a net saving rather than a cost. Total electricity bills could actually be lower as a result of increased energy efficiency, even though wholesale prices would generally be expected to rise.
- There would be systems costs to consider by 2020, but these could be partly reduced by diversifying our renewable sources beyond wind, and improving energy efficiency.

To reduce emissions of CO_2 it is not necessary to resort to nuclear energy

- We can achieve significant reductions through lessening energy demand, increasing the use of different renewable sources (including wind but also biomass, solar, wave and tidal), and through the impact of the price of carbon in the power sector.

Above (from left): Flooded River, Russian Federation. Dry lake bed showing deeply-cracked soil, Mali. Firefighters and forest fire, Lebanon. Solar panels installed on buildings, Australia. Energy efficiency logo, Energy Efficiency is an Energy Saving Trust initiative backed by the Government.

WWF-UK POLICY RECOMMENDATIONS

If the UK is to meet its overall target of reducing CO_2 emissions by 60 per cent by 2050, emissions from the CO_2-intensive power sector need to be drastically reduced. The government needs to set in place the necessary policies to cut electricity generators CO_2 emissions by 60 per cent — to 80 million tonnes — by 2020.

WWF recommends that:

- **The UK government sets challenging caps to CO_2 emissions by electricity generators and other sectors covered by the EU ETS, and presses other European countries to take similar action through their National Allocation Plans.** As the ILEX report shows, the UK power sector has the capacity to reduce its emissions significantly below a business as usual scenario, at relatively low cost.

- **The UK government prioritises further development and implementation of energy policies that underpin the achievement of EWP aspirations on energy demand.** WWF is looking to see a reduction target for energy demand of 0.2 per cent per annum. Developing proper incentives for increased energy efficiency across all sectors, and for supporting energy-efficient technologies in the context of the Energy Efficiency Action Plan, can significantly help deliver this goal, but the government also needs to set a target in relation to overall demand. This could be done in the context of the review of the UK Climate Change Programme due to begin in late 2004, which sets out the package of government climate change policies and measures covering all sectors of the UK s economy for 2005-2010[6].

- **Large integrated power generators and suppliers increase their efforts to develop energy services.** The government should introduce fiscal and regulatory measures to incentivise suppliers to offer energy management services. By becoming energy service providers rather than suppliers of units of energy, power companies would ensure that business and private households had electricity at a lower cost without forfeiting comfort and lifestyle. Given that the general trend for energy policy is to increase the cost of emissions, power companies have all to gain by gearing up to a radically new business environment. They may wish to work in partnership with WWF and other NGOs to ensure that the government addresses the existing barriers to energy services.

- **More is done to support a diversified portfolio of renewable energy technologies, including biomass, solar, wave and tidal technologies.** The ILEX report bases its analysis on extending the Renewables Obligations (combined with energy efficiency aspirations) with almost exclusive regard to onshore and offshore wind. This will be sufficient to halve emissions by 2020, but if we are looking beyond this date — to the 60 per cent emissions reductions target set by the government — we need to diversify the UK s sources of energy further. This has additional important multiple benefits in terms of security of energy supply, rural development and reduction of system costs. This is particularly relevant for biomass generation, the potential capacity of which is significant but still largely untapped[7].

- **Investment in nuclear energy ceases.** It is possible to achieve our desired emissions reductions without using nuclear energy. Instead, concerns about security of energy supply can be addressed by diversifying our fuel sources, investing in a wide variety of renewable sources and, above all, reducing our energy consumption.

Above (from left): Solar panels to heat water for a building, Turkey. Wave power station, Scotland. Windfarm, Germany. Solar panels on office roof, Australia. Willow culture for biomass power, Spain.

- **The government target of 10GW of Combined Heat and Power (CHP) capacity by 2010 is met.** The reasons why the UK is not in line with this target need to be addressed and further action taken to increase capacity. For example, the government could provide incentives for power companies to promote CHP, and embedded generation benefits for industrial users that invest in CHP on-site.

- **The Renewables Obligation should be extended to 20 per cent by 2020, in line with the level identified in the EWP.** Wind is a free commodity and there is plenty of it in the UK. It should be noted that the National Grid can be operated effectively and economically with up to 20 per cent of electricity capacity being provided by wind. It has been shown that a country can have 20-30 per cent of supply from wind without needing to invest in additional backup capacity, particularly where there is proper grid management[8].

NOW IS THE TIME TO ACT

If it is to deliver its climate change programme, there is an urgent need for UK government action. To a degree this will require a different investment strategy from the one followed over the past few decades. The ILEX report shows that real progress can be made simply through the delivery of existing commitments as opposed to radical policy reversals, and in a way that is both achievable and cost-effective for the power sector. The choice that the government faces is whether to provide incentives for companies to start another round of investment in fossil fuel generation, or increase current investment in clean technologies and energy-efficient measures. The scale of the threat posed by climate change to UK and global security must dictate a firm commitment to the latter route.

WWF-UK thanks those who gave their expertise freely in reviewing the ILEX report.

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[6] For information on EWP and Climate Change Programme, see: www.defra.gov.uk/environment/climatechange/cm4913/; www.dti.gov.uk/energy/whitepaper/

[7] See WWF's report (April 2004) - Bioelectricity Vision: Achieving 15% of Electricity from Biomass in OECD Countries by 2020 (www.panda.org/downloads/europe/biomassreportfinal.pdf)

[8] Based on experiences in Germany: www.wind-energie.de/informationen/informationen.htm

WWF-UK

WWF's mission 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

www.wwf.org.uk

ILEX

ILEX Energy Consulting is a leading energy markets consultancy specialising in the electricity, gas, carbon and renewables markets, and with considerable experience in modelling the UK power sector.

www.ilexenergy.com

To download the ILEX report *The Power To Save Our Climate*
visit: www.wwf.org.uk/thepowertosaveourclimate

Above (from left): Solar power panels, Andalucia, Spain. Windgenerator, Denmark. Solar panels, The Netherlands. The Earth.

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Front cover (from left): Coal fired power station, Australia. Melting iceberg, Antarctica. Hooded cranes on migration, Russian Federation. Wave power station, Scotland.

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