

STERN REVIEW ON THE ECONOMICS OF CLIMATE CHANGE

EVIDENCE BY E.ON UK

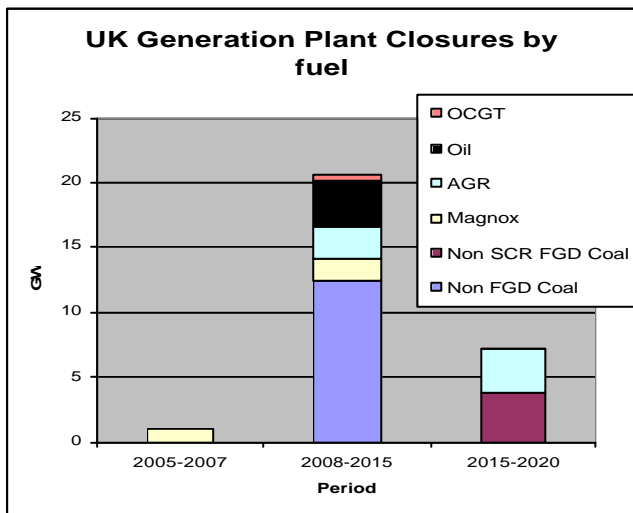
E.ON UK

1 E.ON UK is the UK's second largest retailer of electricity and gas, selling to residential and small business customers as Powergen and to larger industrial and commercial customers as E.ON Energy. We are also one of the UK's largest electricity generators by output and operate Central Networks, the distribution business covering the East and West Midlands. We are also a leading developer of renewable plant.

2 E.ON UK is part of the E.ON Group. In addition to the UK, the Group has electricity and gas interests in Germany, Central and Eastern Europe, Italy, the Netherlands, Scandinavia, the USA and Russia. E.ON also owns or has interests in 23GW of nuclear capacity, located in Germany and Sweden.

Low Carbon Investment in the UK Power Sector

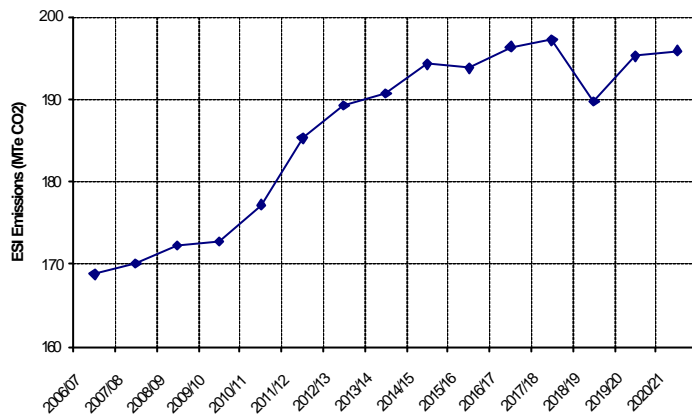
3 The UK power sector requires major investment in energy infrastructure to cut CO₂ emissions and maintain security of electricity supply in the next decade. In electricity, 8GW of existing nuclear and up to 22GW of coal and oil-fired generating plant, or about one third of total UK power plant, will need to be replaced by 2020 to maintain security of electricity supply at broadly current levels:



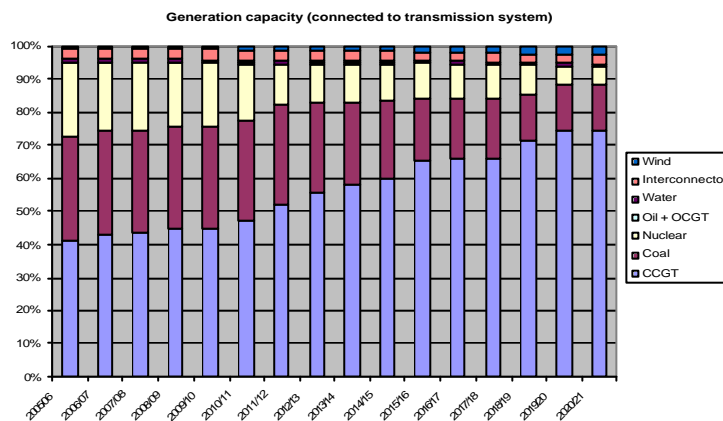
4 Much of this plant will need to be replaced with low or zero carbon generating plant if the power sector is to contribute to a continued reduction in CO₂ emissions in line with the Government's objective of reducing emissions by 60% by 2050 from 1990 levels.

5 The 'default' option for new generation capacity, on our central estimate of future fossil-fuel prices, is further gas-fired combined-cycle gas turbines (CCGTs). However, although these plants produce

significantly lower emissions than existing coal plants, they emit more CO₂ than nuclear plants and we estimate that replacement of **all** closing plant by gas-fired CCGTs would result in a significant increase in CO₂ emissions from the power sector by 2020 as follows:



In addition, it will also lead to gas-fired generation accounting for 75% of UK power generation by 2020:



The Case for a Wider Range of Low/Zero Carbon Power Plant Options

6 Such an outcome is inconsistent with the UK's long term CO₂ reduction targets and such a high proportion of gas fired generation may also leave the UK economy excessively exposed to movements in world gas prices. E.ON UK and other energy companies will need a wider range of low or zero carbon power plant investment options than are currently available politically or commercially as investment in renewables and energy efficiency on the demand side, while making an important contribution, will not be sufficient to close the gap. The wider the range of options to the power sector, the lower the potential cost of reducing CO₂ emissions and maintaining security of supply.

7 We see the main low carbon investment options on the supply side potentially available over the period to 2020 as:

- CCGTs: investment in CCGTS will be required in the short term to maintain supply security at the end of this decade and the early part of the next. We are seeking consents for plants for Grain and Drakelow;
- Renewables: we are already investing substantially in on and offshore wind and biomass and are evaluating tidal and wave technologies;
- Clean coal and carbon capture and storage: we are carrying out a detailed feasibility study for a project on the Lincolnshire coast;
- Nuclear power: we are carrying out preliminary work on evaluating this as an investment option in the UK.

Creating the Domestic and International Market Framework for Low Carbon Investment

8 Competitive energy markets, coupled with stable, long-term, and broad-ranging market mechanisms, such as the EU Emissions Trading Scheme, are the most efficient way of incentivising the investments needed to meet the UK's policy goals while offering the best prospect for maintaining the competitiveness of the UK economy.

9 More interventionist policy instruments or obligations which mandate investment in specific technologies as this will segment the market, reduce competition and tend to increase the costs of plant procurement as energy companies are obliged to negotiate with a limited number of plant suppliers of that technology type. This is already a feature of the renewables market where we are experiencing significant increases in plant procurement costs as a result of international demand driven by technology specific support schemes in a number of different countries, including the UK. While we support the continuation of the Renewables Obligation on the grounds of policy stability to maintain investment, we do not support a multiplicity of similar obligations, or its extension to include other technologies.

10 However, if the industry is going to commit significant investment to reduce CO₂ emissions from the power sector, energy companies have to believe that these investments will have long term value in terms of their ability to reduce emissions. The EU Emissions Trading Scheme can lead to the deployment of low carbon technologies but investors are likely to defer making investments until there are robust CO₂ reduction targets for the EU and the UK set for the period after the end of Phase 2 of the scheme (and the expiry of the Kyoto Protocol) in 2012.

11 In our view such longer term robust targets are unlikely to be sustainable unless there is an international agreement on new CO₂ targets after 2012 which shares responsibility for reducing carbon reductions across the major emitting economies. In the mean time, we will continue to develop renewable energy sources and explore new ways of engaging consumers in improving energy efficiency and work to create new options.

However we will not deploy these new options until we are confident that they will deliver a return on the capital investment.

12 Emissions trading can therefore only operate successfully within a framework of sustainable CO₂ reduction policies at national and international level. This requires a clear strategy for ensuring that CO₂ reduction is delivered at an acceptable cost to the economy. How demanding national reduction targets are reconciled with a complex international process for agreeing multinational action on climate change is the key challenge.

13 We believe that a sustainable climate change strategy has two key elements:

- Emissions caps must be derived from sound forecasts of the costs of different CO₂ trajectories and, most importantly, we must have the regulatory framework in place to ensure that the lowest cost routes are available to the market. In the UK, there has been little or no progress in the development of a regulatory framework that makes investment in nuclear power or carbon capture and sequestration a real option for the market to consider. We will work with Government in moving this agenda forward in addition to our ongoing efforts in the areas of renewable energy and energy efficiency.
- Secondly, the market instruments need to have appropriate 'safety valves' to ensure that the EU or the UK has not locked itself into the risk of a disproportionately high economic cost that may lead to a future 'knee-jerk' political intervention in the market.

14 However, evidence from Phase 1 of the EU scheme, where high gas prices have driven up CO₂ costs, illustrates that we need to ensure that sufficient economic 'safety valves' are in place. We must maximise the opportunity to generate CO₂ permits through investments outside the traded sector, the so-called JI & CDM mechanisms, since this provides a market response to high CO₂ costs. In addition, it may be necessary to impose a cash out price or long-term cap on CO₂ costs, thereby imposing a clear ceiling to the economic costs. Longer phases, or banking and borrowing between phases would also reduce the risk of shocks.

15 In the absence of a robust international agreement to underpin the long term value of carbon within an emissions trading scheme, and the UK Government remained committed to its domestic CO₂ emission reduction targets, companies would require an alternative form of assurance of the long term value of carbon.

Specific Low Carbon Technologies- Economic Issues

16 The choice of plant type will depend on their relative economics in addition to Government policy on the availability of new low carbon technologies which in turn relate particularly to the expected longer term price of gas and of carbon generated by the EU emissions trading scheme

or similar instrument. The chart attached at Appendix 1 gives an indication of our current view of the economics of different technologies were they to be available now.

17 The key point is that, *assuming* that a nuclear design and site licensing and planning regime exists which minimises plant procurement costs, new nuclear construction can be broadly competitive with CCGTs and new coal-fired plant, and could become the preferred technology with a modest cost of carbon. The cost of new nuclear developments would be substantially influenced by the uncertainties surrounding the planning and regulatory processes as these affect expected capital cost, development and construction schedule and the competitiveness of the plant supply market.

18 Commissioning large scale carbon capture and storage plant may become a real possibility in the next decade but the technology is not yet proven at large scale. It therefore would require Government financial support to demonstrate the technology and bring down costs. The legal and regulatory environment does not yet exist for off-shore storage of carbon dioxide and this would need to be settled before large scale investment was committed. Carbon capture and storage is only likely to be deployed if there were to be a belief in a significant long-term market value of avoiding carbon emissions.

19 We will be submitting more detailed evidence on these issues to the DTI energy review. However, a key objective for both technologies is to ensure the planning and licensing issues are managed in a way which reduce investment risks and project timescales and costs, consistent with ensuring that issues of public acceptability, environmental impact and safety are fully addressed.

E.ON UK
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Appendix 1

Economic choice of alternative options at different gas and carbon prices and electricity generation cost/MWh (at assumed coal price £1.4p/GJ)

