

## **The UK Energy Policy Accident: Driving into a Wall?**

In this article, John Bower\* examines the impact of current UK energy policy on investment decisions in the power generation sector. The confluence of a politically constrained national energy policy, lower than expected CO<sub>2</sub> allowance prices in the EU Emissions Trading Scheme, potential mandatory coal plant closures under the Large Combustion Plant Directive, the decline of North Sea gas and current very high energy prices have created a situation in which there is severe political and economic uncertainty. This has already driven up the rates of return on capital required by power generators and the outcome is that they will delay making significant incremental investments in flue gas desulphurisation equipment on existing coal plant and or in new CCGT capacity until 2008. A very sharp rise in electricity prices is therefore likely to occur as a result of a severe supply demand imbalance by 2010. To avoid this, the UK Government must provide far clearer policy signals to bring forward the necessary power generation capacity investment and simultaneously shift energy policy away from relying almost exclusively on the electricity sector to deliver all of its CO<sub>2</sub> emission reduction objectives.

### **Introduction**

Suppose you were about to drive a car on a long journey over dangerous mountain roads but at the outset you sought to reassure your passengers by telling them they would be quite safe because you were only planning to use one gear, never touch the brakes or ever turn the steering wheel. That more or less sums up the way that the UK Government set out its energy policy in its Energy White Paper of February 2003. Though containing the praiseworthy aims of ensuring reliable and affordable energy supplies while reducing UK CO<sub>2</sub> emissions by 60% by 2050, an implied goal of a 30% cut by 2020, mechanisms for achieving these objectives were hemmed in by multiple political constraints.

Less than two years later it is now obvious that the policy as set out in the White Paper is untenable – because it relies almost entirely on the electricity sector to deliver it. As Figure 1 shows the level of CO<sub>2</sub> emissions in the UK economy have begun to rise again after falling in the mid 1990s during the so called ‘dash for gas’ when new combined cycle gas turbines (CCGT) began to displace coal-fired plants. Unfortunately, in April 2004, the UK Government was forced to admit that expected efficiency gains in the household sector had not appeared as hoped and that emission of CO<sub>2</sub> in that sector as well as the transport sector had continued to rise unabated. With votes at stake few measures have been proposed to curtail energy use in these fastest growing sectors. If it had not been for the continued decline of UK manufacturing and raw materials processing industries such as steel and chemicals the picture would have been far worse.

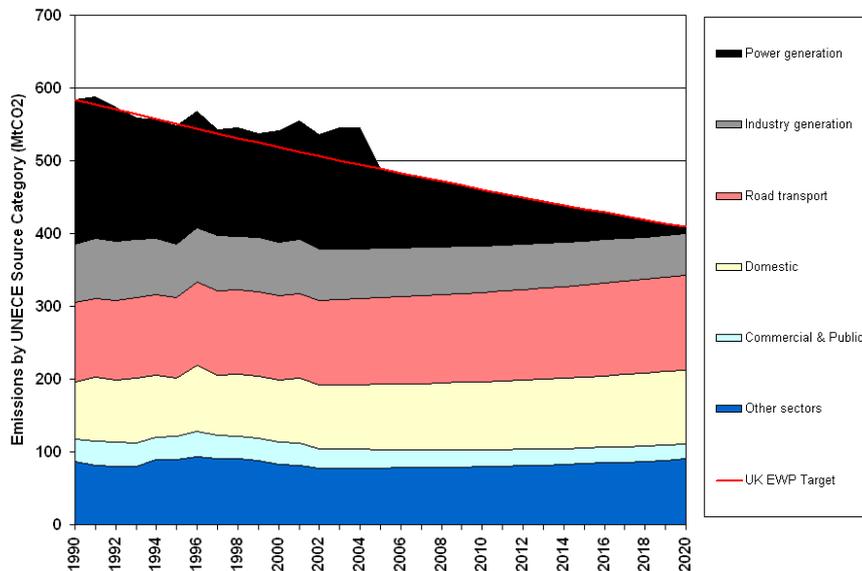
### **Business as Usual**

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By default, the electricity sector has therefore been left with the task of delivering almost all of the planned CO2 emission reduction over the first phase (2005 – 2007) and second phase (2008-12) of the EU Emissions Trading Scheme (EU ETS). However, as Figure 1 shows, the 2020 emissions reduction target of 30% has already become unattainable if the remaining sectors of the economy continued at their ‘business as usual’ (BAU) growth rates established over the period 1990 – 2003. By 2020, the electricity sector would have to be emitting almost no CO2 at all for the UK economy to remain on track to reach the White Paper target. The implication of current UK Energy policy emissions targets, assuming demand for electricity continues to grow at about the current rate of 1.5% per annum, is that all generation would have to be from nuclear and or renewable sources with only small amounts of peaking, balancing, reserve and other ancillary services being provided by high efficiency CCGT plant.

**Figure 1. UK actual and forecast future emissions of CO2 by sector on a BAU basis**



Source: Author's own calculations and forecasts based on emissions data supplied by DEFRA

There is nothing wrong with the UK energy policy emission target and it is still technically possible to achieve it but only with a massive programme of new investment in nuclear and renewable generation capacity – beginning immediately. However, the White Paper specifically avoided any discussion of future nuclear build or safe disposal of existing waste stockpiles even though only one of the currently existing UK nuclear plants will remain open by 2020. As far as renewable capacity is concerned, the UK has few unexploited hydro resources, little solar or geothermal capacity and onshore wind power has increasingly suffered opposition from local planning authorities on environmental grounds and the Ministry of Defence who argue it interferes with their radar. That has left UK energy policy with little else but offshore wind as the only available option to deliver future CO2 emission reductions. However, financing has proved very difficult to arrange and the UK Government has recently been forced to extend the existing

Renewable Obligation Certificate scheme out from 2010 to 2015, make more publicly funded capital subsidies available and begun actively discussing special exemptions from some transmission and balancing charges for offshore (and onshore) wind.

### **Inevitable Failure**

The special assistance to offshore wind produces an implied equivalent power price of around €145/MWh that makes it difficult to see how a large-scale offshore wind investment programme could ever be regarded as economically affordable or politically feasible mechanism to deliver UK energy policy. Forcing wholesale electricity prices to rise to a level some 3 times that required to sustain new entry CCGT would impose such a cost burden on the economy that a dramatic reduction in UK competitiveness and losses of millions of jobs would inevitably ensue. The net result, clear from Figure 1, is that UK energy policy objectives are simply impossible to achieve given the very narrow set of options that the UK government is pursuing in delivering the desired outcome. In sum, the UK energy policy is fatally undermined by its excessive and unrealistic reliance on the power generation sector to deliver its objectives with a technology (offshore wind) that is not yet economically viable and could potentially undermine energy security because of its inherent intermittency.

The UK power generation industry knows all of this of course and has therefore rightly assumed that, by default, UK energy policy will gradually drift, to one that closely mirrors broader EU energy policy. However, the future is no clearer in Europe than in the UK as two major planks of EU energy policy effectively collapsed in early 2004. First, the European Commission admitted that it was futile to continue setting a target of 22% of electricity generated to be generated from renewables, as it was most unlikely to ever be reached. Then the publication of National Allocation Plans (NAPs) under the EU ETS caused prices for CO<sub>2</sub> allowances for the first phase to fall sharply to around €8 per tonne of CO<sub>2</sub> (tCO<sub>2</sub>). Though the UK initially adopted an aggressive draft NAP which was designed to put it on track to reach its objective of a 20% reduction under the EU bubble by 2008-12 but was forced to back-track, in the face of very weak NAPs elsewhere, so as to avoid placing UK energy intensive industries (except power generation) at a competitive disadvantage.

This does not bode well for the future implementation of the large Combustion Plant Directive (LCPD) in 2008 and beyond and indeed at the end of March 2004 the UK Government quietly slipped out a press release that allowed coal fired generators the option of indicating their coal plant would close under the 'limited hours derogation' by the June 2004 deadline but retain the option to change their mind and opt back in anytime before 1 January 2008. Assuming that coal plant will continue to get free CO<sub>2</sub> allowance allocations under EU ETS sufficient to run at a 50% utilisation rate until end of 2007 it makes supreme economic sense for UK power generators to ask for this option and as anyone trading in financial markets knows its always better to hold on to an option or sell it on to someone else rather than exercise it before expiry date. Given this concession, UK power generators will now wait until the last possible moment before committing capital to either upgrade old coal plant with flue gas desulphurisation (FGD)

equipment or build new CCGT. However, though this delay may make sense for power generators, it could pose an extreme and unforeseen policy risk to the UK economy because it makes investment decision making in new power generation capacity highly dependent on the politics of EU ETS allowance allocations and the potential future renegotiations of LCPD.

The UK therefore has been left with an energy policy, as far as the electricity sector is concerned, which is an accidental consequence of constraints that are designed to avoid political difficulties at home, unexpected recent fuel price rises, ongoing short term and long term security of supply fears as North Sea oil and gas deplete and the simultaneous introduction of the EU ETS and LCPD that have on the one hand provided a very weak signal to make new investment in new CCGT capacity and on the other little incentive to upgrade existing coal plant with the necessary FGD equipment before 2008.

### **A pragmatic solution**

The danger is that if the current UK energy policy continues as it is, in the face of increasingly obvious and inevitable signs that it will fail, power generators will simply delay making investment decisions until continuing economic growth pushes electricity demand up the point that plant margin falls and prices rise to reflect scarcity rents. Only then will the returns on offer be sufficient to offset the political and economic risk that investors face. In effect UK energy policy will hit an investment wall in around 2008 as the first compliance period for EU ETS ends and LCPD derogation begins to bite.

The only way the UK Government can ensure that its energy policy does not drive the power generation industry into the 'investment wall' is to change direction now by providing a sharper investment signal to begin a shift in power generation capacity and output mix by 2020. A pragmatic and feasible outcome is shown in Figure 2 and Figure 3 and is based on the assumption that large existing nuclear plants will have their lives extended beyond 2020, wherever safe to do so and continue to serve existing baseload demand along with current existing CCGT plant. Meanwhile new CCGT capacity build will be the most economic way to meet incremental but uncertain future baseload demand growth. Coal plant situated in Scotland and North of England will close as the local industrial base (and population) declines and locational power prices<sup>1</sup> fall in regions of generation capacity surplus to make these plants too uneconomic to fit FGD. Renewables will never exceed 10% of total generation output and wind capacity will always have to be backed up by existing coal plant situated close to loads with FGD retro-fitted and co-firing biomass and waste to reduce CO<sub>2</sub> emissions. Combined heat and power plants will become economic again at these prices and industrial and commercial users will find operating existing plant and building new capacity more attractive once users see a sustained rise in prices. The wholesale price of electricity required to deliver this outcome would

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<sup>1</sup> Introduction of the British Electricity Trading Arrangements (BETTA) will produce locational power prices (and possibly charges for transmission losses) that will penalise power plants located in the Scotland and North of England where generation capacity is in surplus but pay a premium to those located in the South of England where rapid demand growth a power generation capacity deficit.

be around €45/MWh – approximately the long run marginal cost for new entry CCGT at currently available forward gas prices and EU ETS CO<sub>2</sub> allowances at €10/tCO<sub>2</sub>.

Figure 2. Plant Mix

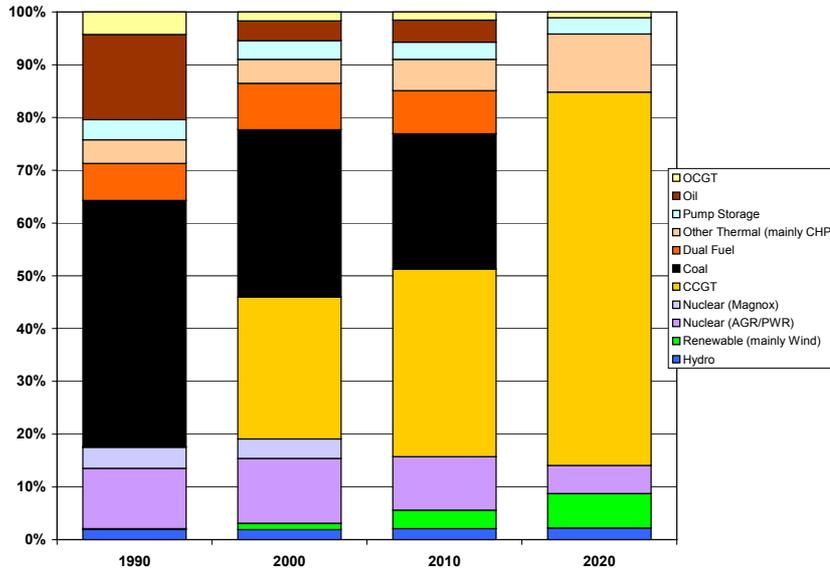
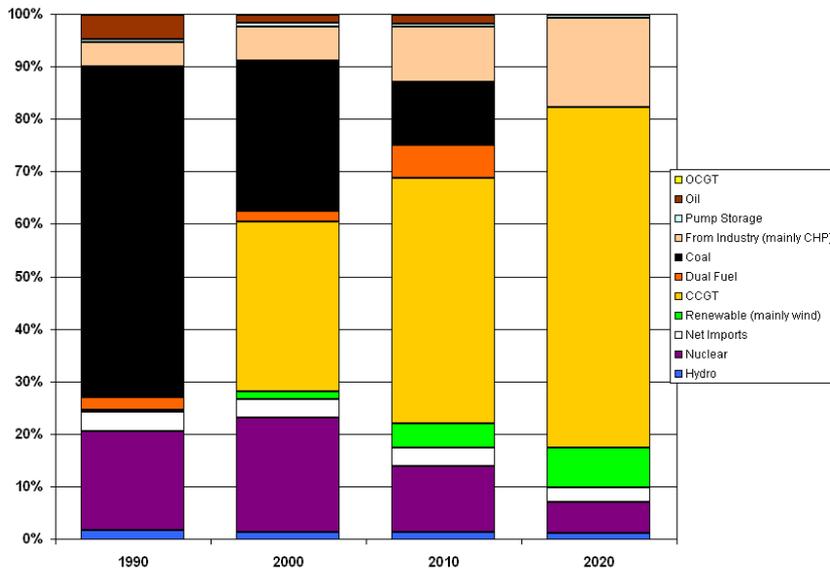


Figure 3. Output Mix



Policy changes in the power generation sector will have to be supported by the adoption of a more robust policy elsewhere particularly in domestic and transport emissions. For example a simple road fuel duty (tax) change that produced a differential price in favour of diesel versus gasoline, such as that adopted by France, combined with road congestion charging such as that adopted in London could easily cut emissions from road transport by 35 – 50% against BAU by 2020.

Figure 4 shows what a pragmatic policy in the electricity sector combined with a simple diesel – gasoline tax differential could deliver in terms of emissions reductions. Clearly, achieving the 30% reduction target will require a more radical set of policies but at €8/tCO<sub>2</sub> prices it would make more sense for UK Government to impose a carbon tax on household energy use and recycle that revenue into buying surplus CO<sub>2</sub> allowances under EU ETS or the other Kyoto flexibility mechanisms such as funding Joint Implementation or Clean Development Mechanism projects in third world countries.

**Figure 4. UK actual and forecast future emissions of CO<sub>2</sub> by sector on pragmatic basis**

