

Information paper – 35

# The rising cost of energy and carbon

Prepared by:  
David Clark

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## WHAT COLOUR is YOUR BUILDING?

David H. Clark



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# The rising cost of energy and carbon

This information paper discusses the rising cost of energy in the UK in 2013.

## 1. ENERGY COSTS

Energy costs are rising around the world, typically at rates above inflation. In the UK, following the privatisation of electricity and gas retail markets in the early 1990s, consumers enjoyed falling energy prices in real terms until around 2004 when prices started to rise<sup>1</sup> – refer to Figure 1. This was also the year that the UK first imported more gas than it produced itself.

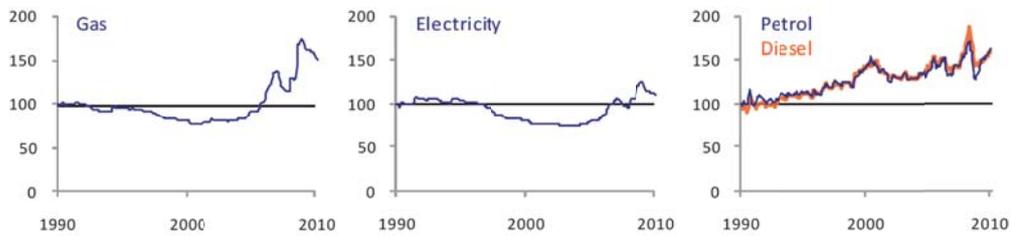


Fig 1 Indices of real domestic fuel price levels in the UK 1990 to 2010 (source: Bolton, 2010)

UK natural gas production from the North Sea has been decreasing since 2000. A report published in late 2010 described showed the UK’s increasing reliance on imported natural gas via pipelines from Norway and Continental Europe, and LPG tankers.<sup>2</sup> Figure 2 shows how the UK’s ‘business-as-usual’ annual demand (not peak demand) could be met assuming increasing pipeline gas from Europe and LPG imports. Some projections suggest that less imports will be required due to slightly higher UK production and lower demands to meet the UK’s 2020 energy targets.

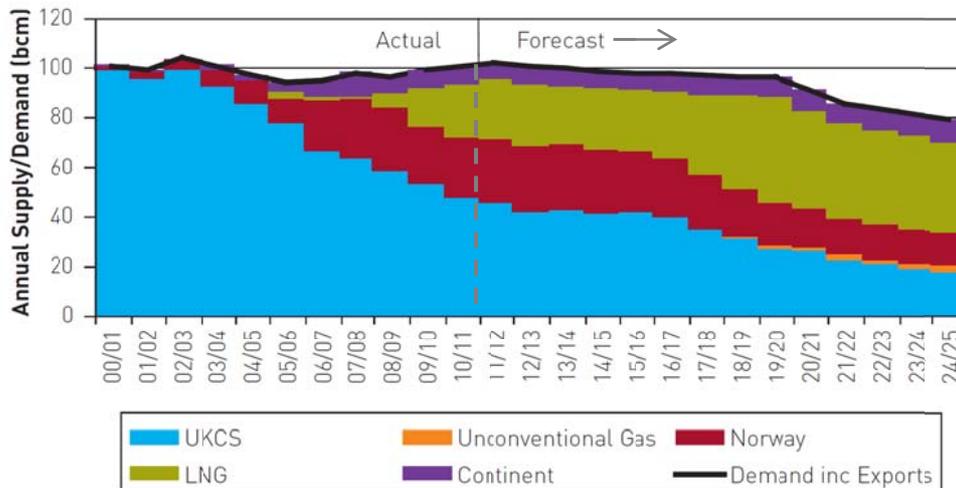


Fig 2 Predicted UK annual gas supply to meet demand (source: National Grid / DECC)

Unconventional gas (biogas, coal-bed methane and potentially shale gas) make up a very small proportion of the likely supply from 2020 onwards, however reports in 2013 suggest that shale gas reserves could be a significant contributor to the UK's energy supply.<sup>3</sup> This could lead to reduced gas prices (as it has done in the United States) although the ability to extract large volumes of gas cost effectively is yet to be proved in the UK.

The increasing reliance on imported gas means that UK gas prices are more influenced by global events, such as increased oil prices (European gas prices are strongly linked to the cost of oil), harsh European winters (increasing the peak demand for gas) and natural disasters (such as Japan's increase in LPG imports following the Fukushima nuclear incident in 2011). Higher gas prices also mean higher electricity prices as, since the 1990s, 35 to 50% of the UK's electricity is generated by natural gas power stations. About half of the cost of UK electricity is due to the cost of the fuel used.<sup>4</sup>

Despite all this, the cost of energy in the UK in 2012 was still relatively cheap compared to the rest of Europe.<sup>5</sup> UK domestic electricity typically cost 0.158 €/kWh compared to an EU average of 0.184 €/kWh, and 0.253 €/kWh in Germany. Natural gas cost 0.058 €/kWh compared to an EU average of 0.072 €/kWh.

The cost of electricity is also affected by the infrastructure needed for generation (power stations) and distribution (transmission network). Ofgem estimates that between 2012 and 2020 the UK needs to invest up to £200 billion to meet its environmental targets and to secure energy supplies. This includes £30 billion to replace aging infrastructure and connect to new supplies of gas.<sup>6</sup>

A combination of increasing reliance on imported energy, rising oil prices and the need to replace aging infrastructure means that energy prices are likely to only go in one direction in the UK. Other countries have different energy supply issues but are likely to have similar outcomes on their energy prices.

## 2. THE PRICE OF CARBON

### Regulatory Mechanisms

Carbon taxes or levies are often added directly to the purchase price of fuels. For example the UK's Climate Change Levy<sup>7</sup> from 1 April 2013 was 0.524 p/kWh (£9 /tCO<sub>2</sub>) for electricity and 0.182 p/kWh (£9 /tCO<sub>2</sub>) for natural gas.

The UK's Carbon Reduction Commitment Energy Efficiency Scheme (CRC) requires around 4,000 organisations consuming more than 6,000 MWh of electricity a year to purchase carbon allowances from 2011 onwards for the CO<sub>2</sub> emissions due to energy consumption in their buildings.<sup>8</sup> The allowances were originally intended to be traded between participants but this was changed to become a carbon tax payable to the Treasury. The initial cost was £12 /tCO<sub>2</sub>.

In Europe, a number of large emitters are required to participate in the EU Emissions Trading Scheme, the largest multi-country, multi-sector greenhouse gas emissions trading system in the world. It includes more than 11,000 power stations and industrial plants across the EU with

around 1,000 of these in the UK.<sup>9</sup> The scheme works on a ‘cap and trade’ basis and the third phase started on 1 January 2013.

The price of carbon is shown in Figure 3. The scheme has seen prices fall from €20 a tonne in 2011 to €5 a tonne in early 2013. This is due to a combination of factors including recession reducing industrial demand for the permits and the EU issuing too many allowances initially, creating a large overcapacity in the carbon market (the surplus is 1.5 to 2 billion tonnes, or about a year’s worth of emissions).<sup>10</sup>



**Fig 3** EU ETS carbon spot price, € per tCO<sub>2</sub> (source: Thomson Reuters Point Carbon)

In Australia, from July 2012 approximately 185 companies were required to pay a fixed price carbon tax of A\$23 /tCO<sub>2</sub> (approx. £15 /tCO<sub>2</sub>) covering electricity generation and industrial processes.<sup>11</sup> The Australian Government introduced various programs to reduce the carbon tax impact for large industrial emitters (including coal fired power stations and aluminium, steel, cement manufacturers), effectively giving away free carbon credits equivalent to between 50 to 95% of their emissions.<sup>12</sup> These have the effect of significantly reducing the actual carbon tax raised. To compensate households for increased costs due to the carbon tax the income tax-free thresholds were raised.

The fixed price tax is proposed to become an emissions trading scheme from 1 July 2014, linked to the EU ETS. The government claims that the first year of the tax has been successful in creating jobs, improving energy efficiency and reducing carbon emissions.<sup>13</sup> However, the carbon tax has been highly contentious, with the conservative opposition party stating that the federal election in September 2013 would be a referendum on the carbon tax and that ‘getting rid of the carbon tax is fundamental to our plan for a stronger economy.’<sup>14</sup>

Table 1 shows a summary of the price of carbon due to the various schemes above.

Scheme	Cost per tCO <sub>2</sub> in July 2013
UK climate change levy - electricity	£9
UK CRC energy efficiency scheme	£12
EU emissions trading system	£5
Australian carbon tax	£15

**Table 1** Price of carbon under various schemes

### Voluntary Mechanisms

The United Nation’s Clean Development Mechanism is one of the flexibility mechanisms defined in the Kyoto Protocol that provides for emissions reduction projects which generate Certified Emission Reduction (CER) units. There are concerns regarding fraud, including payments made for projects that are financially viable without CERs, emission reductions that aren’t additional, exaggerated carbon benefit claims, carbon leakage, and overproduction to increase CER payments. At the start of 2013 the typical price of CERs was around 0.40€ compared to over 20€ in 2008 – refer to Figure 4.



**Fig 4** Price of Certified Emissions Reduction (CER) units from 2008 to 2013 (source: <http://www.eex.com/en/>)

### 3. CONCLUSION

The future cost of energy is set to increase as it is based on the principles of supply and demand. The future cost of carbon is less certain as it based on the principles of politicians!

## Notes

All websites were accessed on 17 August 2013 unless noted otherwise.

1. *Energy price rises and fuel poverty* by Paul Bolton, Key Issues for the New Parliament, 2010  
[http://www.parliament.uk/documents/commons/lib/research/key\\_issues/Key%20Issues%20Energy%20price%20rises%20and%20fuel%20poverty.pdf](http://www.parliament.uk/documents/commons/lib/research/key_issues/Key%20Issues%20Energy%20price%20rises%20and%20fuel%20poverty.pdf).
2. Source: Chapter 4 of *Statutory Security of Supply Report*, a report produced jointly by DECC and Ofgem November 2010. <http://www.decc.gov.uk/assets/decc/what%20we%20do/uk%20energy%20supply/resilience/803-security-of-supply-report.pdf>
3. *How much shale gas do we have?*, British Geological Survey. [www.bgs.ac.uk/research/energy/shaleGas/howMuch.html](http://www.bgs.ac.uk/research/energy/shaleGas/howMuch.html)  
A report available from this website, *The unconventional hydrocarbon resources of Britain's onshore basins - shale gas*, published by Department for Climate Change in 2012, has the following conclusion:  
'Shale gas is currently produced in significant volumes only in the US and that success has raised interest in the UK potential. The untested shale rock volume in the UK is very large, however, more drilling, fracture stimulating and production testing is necessary to prove that shale gas development is technically and economically viable.  
Even if one assumes that the American shale gas producing analogies are valid, many of the operating conditions are different in the UK. In the UK, land owners do not own mineral rights, so there is less incentive to support development, and local authorities must grant planning consent. The US has relatively permissive environmental regulations, low population densities, tax incentives, existing infrastructure, well developed supply chains and access to technology. Cumulatively, these factors mean that it is far from certain that the conditions that underpin shale gas production in North America will be replicable in the UK.'
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5. *Project Discovery: Options for delivering secure and sustainable energy supplies*, Office of Gas and Electricity Markets (Ofgem), 3 February 2010. An Ofgem press release on 4 October 2010 gave the breakdown for new piping and wiring. [www.ofgem.gov.uk/ofgem-publications/76341/rrio-oct-press-notice.pdf](http://www.ofgem.gov.uk/ofgem-publications/76341/rrio-oct-press-notice.pdf)
6. Energy price statistics, August and December 2012, Eurostat statistics explained, European Commission.  
[http://epp.eurostat.ec.europa.eu/statistics\\_explained/index.php/Energy\\_price\\_statistics](http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Energy_price_statistics)
7. [http://customs.hmrc.gov.uk/channelsPortalWebApp/channelsPortalWebApp.portal?nfpb=true&pageLabel=pageExcise\\_InfoGuides&propertyType=document&id=HMCE\\_CL\\_001174](http://customs.hmrc.gov.uk/channelsPortalWebApp/channelsPortalWebApp.portal?nfpb=true&pageLabel=pageExcise_InfoGuides&propertyType=document&id=HMCE_CL_001174)
8. The rules of the CRC-EES are published at <http://www.environment-agency.gov.uk/business/topics/pollution/126698.aspx>.
9. [www.gov.uk/participating-in-the-eu-ets](http://www.gov.uk/participating-in-the-eu-ets)
10. *ETS, RIP? The failure to reform Europe's carbon market will reverberate round the world*, The Economist, 20 April 2013. [www.economist.com/news/finance-and-economics/21576388-failure-reform-europes-carbon-market-will-reverberate-round-world-ets](http://www.economist.com/news/finance-and-economics/21576388-failure-reform-europes-carbon-market-will-reverberate-round-world-ets)
11. Refer to Australian Government Clean Energy Plan. [www.cleanenergyfuture.gov.au/clean-energy-future/securing-a-clean-energy-future/#content04](http://www.cleanenergyfuture.gov.au/clean-energy-future/securing-a-clean-energy-future/#content04)
12. Details of the free carbon units are available on the Clean Energy Regulator website. In 2012/13 the 'Jobs and Competitiveness Program' covered 94.5% of the carbon tax for companies conducting emissions-intensive and trade-

exposed activities. 41.7 million tonnes of free carbon credits were issued to coal fired power stations.

[www.cleanenergyregulator.gov.au/Carbon-Pricing-Mechanism/Industry-Assistance/Pages/default.aspx](http://www.cleanenergyregulator.gov.au/Carbon-Pricing-Mechanism/Industry-Assistance/Pages/default.aspx)

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#### **The inevitable legal bit**

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