

the energy market

a forward view of supply and prices

This report has been commissioned by MITIE from Oxford Carbon Consultants, as part of a series on climate change, energy and real estate. The series provides a straightforward guide to the present position and likely future developments, for owners and occupiers of commercial and public sector buildings. These reports have been prepared by Dr Mark Hinnells, who has been involved in policy advice to government and industry for 15 years and is a senior researcher at the University of Oxford. The series comprises:

Report 1 Climate change policy

Report 2 EPCs and DEC's

Report 3 CRC energy efficiency scheme

Report 4 Low carbon leases

Report 5 The energy market

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Background and overview

This paper explores a range of perspectives on energy supply, its issues and constraints over the next 5-10 years. There is no consensus on the future of prices: every organisation must make its own decisions. But those decisions should be based on understanding the different perspectives and risks. This paper cannot be definitive, but outlines some of the factors to be considered.

Fossil fuel prices: the long view

Ultimately, all fossil fuel prices are linked to and driven by oil prices. This is because gas and oil are substitutable, and electricity can be generated from gas. Thus oil prices are an indicator for wider energy prices.

Average oil prices over the longer term (in real terms) have been relatively stable, although with significant volatility around the average. The period 1973-85 marked a departure from this stability, as has the period since 2002, with prices up by a factor of 7 at their peak of \$140 a barrel. Many, including Goldman Sachs and OPEC, have predicted oil prices of up to \$200 a barrel, given

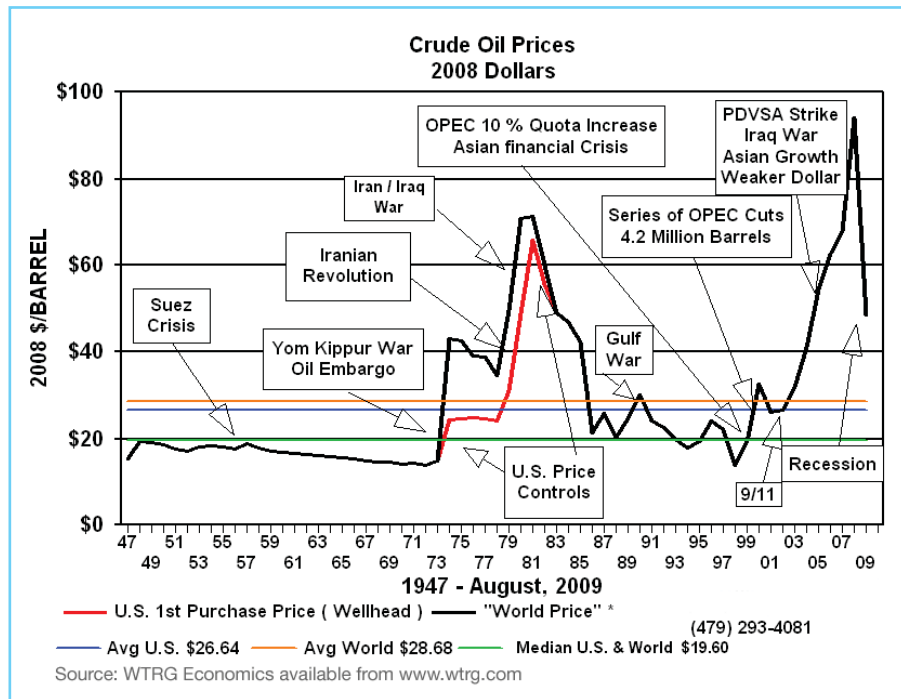
the constraint on global availability and increased industrialisation. Global recession pulled prices back to around \$40 a barrel in early 2009, but they are on the rise again. A rise to \$200 a barrel may only be delayed, not prevented. In the long term, supply is unlikely to be able to meet demand. This means tapping resources that are harder to access and thus more expensive, such as Canadian oil sands, and the potential for extraction is finite. Ultimately also, whatever reserves there may be available, there is a limit to what level of emissions we could release to the atmosphere without causing catastrophic climate change.

Generating capacity and electricity prices

Whilst fossil fuel prices are an important input into electricity prices, there are other factors, not least the availability of generating capacity and the cost of new capacity. There is a range of views on whether the UK has sufficient generating capacity.

National Grid Transco (NGC) are required, as part of their licence conditions, to produce a Seven Year Statement for gas and electricity demand and supply, to help developers plan new gas and power

Oil prices since 1947 (in 2007 dollar terms)



generation capacity. The Seven Year Statement 2008 expects that, up to 2015, planned increases of some 30 GW in electricity capacity (including power station projects which are under construction, or are consented) will match expected increases in demand, leading to a similar or larger plant margin. This would imply a relatively stable future for electricity prices. However, NGC does not take full account of planned plant closures. Only 1.5GW of nuclear Magnox capacity, for example, is noted as being decommissioned.

Others are less sanguine. The Department of Energy and Climate Change (DECC) maintains that around 20 GW of total generating capacity will retire by 2020. EDF and E.ON UK, however, predict overall capacity retirement at 32 GW and 26 GW respectively, whilst REF point to 11GW of ageing nuclear and 15 to 25 GW of coal plant¹. Utiyx suggests that in all probability by 2015 some 12 GW of generating capacity, most of it coal-fired, will have been retired as a result of the EU Large Combustion Plant Directive alone. The higher estimates of retired plant would suggest the risk of power shortages

and higher energy prices. At the same time, much of the projected new capacity is gas-fired, and gas may become more expensive as demand increases².

According to Dieter Helm, a much more radical view of both energy policy and prices is needed. *“there are three broad challenges which are unlikely to go away, and each marks a significant move away from the 1980s and 1990s. These are: the increasing dependency on energy imports, notably gas, and notably from Russia; the security of supply concerns which arise from the ageing of existing plants and the likely emergence of a major capacity gap in the next decade; and the need to decarbonise the economy.”*³

Helm believes that, since privatisation, the energy industry has sweated its assets better than anyone could have expected, and kept prices low. The downside of this is that there has been a lack of investment in new capacity. The implication is that we can expect increasing energy prices from higher demand compared to uncertain supply.

The government view

The Government, unfortunately, does not have a single coherent view of energy prices, with the Treasury and DECC taking different views. Policy has broadly been to keep energy prices low, and there is a tendency for projections to be as much wishful thinking as analysis.

The Treasury has taken the following approach to forecasting prices: *“The oil price will be based on the average of independent forecasts for one year ahead. If the average of independent forecasts shows a fall in the oil price, that price in real terms will be used for the remainder of the five year forecast period. If the average of independent forecasts for one year ahead shows a rise, then the previous convention that oil prices would be close to their current levels in nominal dollar terms over the coming year, and remain flat in real terms thereafter, will be adopted.”*

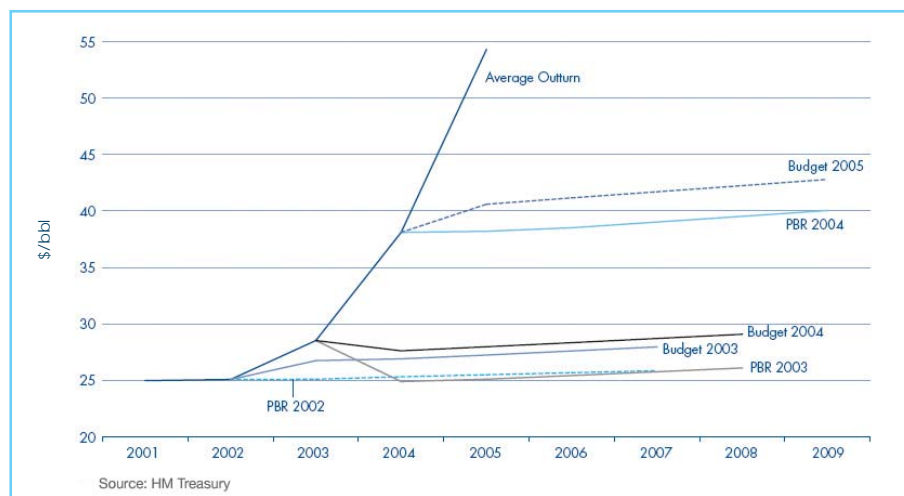
This conservative approach, although justified by the need to be cautious about tax revenues, came in for some comment from the National Audit Office⁴. It means that even if the best information available suggested oil prices were going to double over the next five years, all the Treasury would assume over those five years would be one year's price increase, followed by four years of flat prices, in real terms. It would appear the Treasury is systemically blinkered to any forecast price rises that will inevitably come with the global peaking of oil. The chart to the right shows that, historically, outturn has been very different to Treasury projections.

BERR has until recently, used similar very conservative assumptions, up to and including the 2007 Energy White Paper. However, in response to much criticism, it has recently revised its energy price scenarios. However, there is no indication of the relative likelihood of each of these scenarios⁵. The different scenarios only indicate the high level of uncertainty surrounding price.

In July 2009 OFGEM (the energy regulator, which operates at arm's length from Government) released a new set of energy price scenarios, which reflect what others have been saying for some time now⁶. The four scenarios would result in increases in domestic energy bills of between 14% and 25% above inflation by 2020, compared to 2009 levels, with the possibility that wholesale price spikes could lead to an increase in domestic energy bills of up to 60% in the interim. This is because the final electricity price will be dominated less by the cost of fuel, and more by the cost of infrastructure investment. Whilst OFGEM's focus is the domestic customer, the effect would be the same for other types of customer. They have issued a consultation to get feedback from industry and commentators both on the projections, and what routes the UK might take to avoid the worst case.

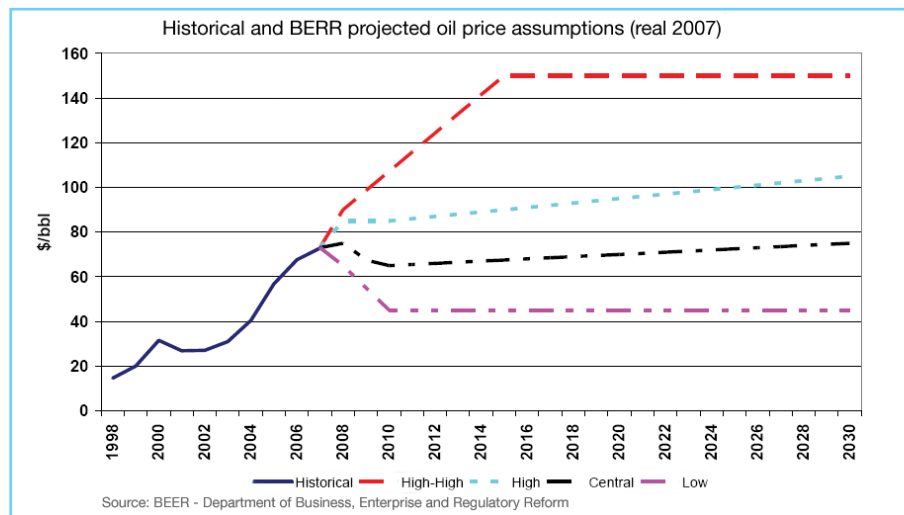
Comparison of Treasury assumptions and actual outturn

Comparison of Budget and Pre-Budget oil price assumptions and outturn prices over the rolling review period since November 2002, US dollars per barrel

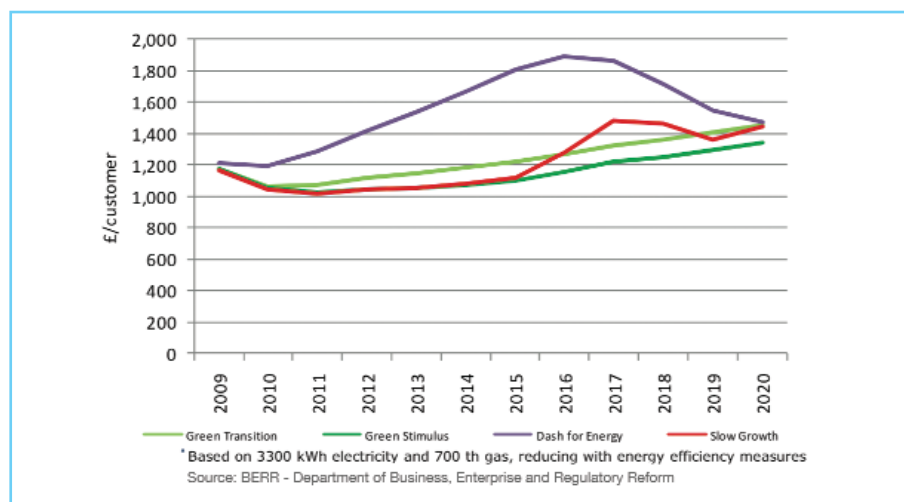


BERR oil price projections

(NB BERR produces projections for a range of fuels, each following the same basic pattern)



Average domestic consumer bill*



The futures market view

Futures markets will not make price forecasts over such long time periods. In addition, futures markets are volatile from day to day. Last December, futures markets were betting on a 60% increase in oil price over the next 7 years (see graph to the right). Interestingly, oil prices are already at \$70 - \$80 a barrel, so most of that projected increase has already happened. Gas prices have not been so volatile, yet.

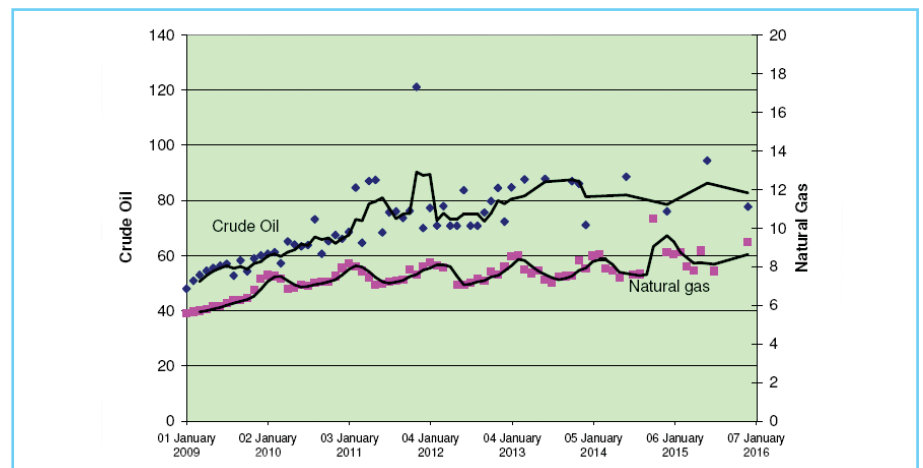
How to use this information

In the last few years, businesses have been hit hard by a near doubling in energy prices. Although the recession has provided temporary relief, and despite the range of perspectives on the subject, there are good solid reasons why oil, gas and electricity prices are all destined to increase. Over the next few years, most people expect energy prices to go up at several times the Bank of England inflation target of 2%. Whilst prices are likely to remain flat during the recession, economic recovery is likely to accelerate energy demand. Within this, significant seasonal variation is evident. Business investment decisions need to be made in the context of future energy (and carbon) prices.

There are a number of basic facts:

- Fossil fuel prices (as well as electricity purchased from fossil-fuelled power generation) will increasingly be driven by constrained supply and increasing demand.
- The cost of renewable generation such as wind, hydro, and PV is determined by the cost of the asset (which is coming down with increasing volume) and cost of

Futures market prices (as of December 2008)⁷



money (currently low, but variable). It is not based on the cost of fuel. However, the price of renewably generated energy may be set by its alternative, fossil fuel.

- The cost of energy efficiency is made up of the cost of investment, the cost of time, and the opportunity cost.

In decision making on investments that use or generate energy, the rate of return will be adjusted for risk. In the past, incentives for renewables (such as the Renewable Obligation Certificate price) have been heavily discounted, because investors have been uncertain about how long they would be in place. However, the risk associated with investments in energy efficiency or on-site renewables is now relatively low. By comparison, the risk of increased energy prices is high. On this basis, energy efficiency, onsite renewables or combined heat and power all look like increasingly sensible investments.

It would therefore be worth considering:

- Setting out a strategy for energy use and energy generation.
- Identifying what development plans there are in the pipeline. What can be done to reduce projected energy demand increases or to generate energy?
- Assessing costs of energy efficiency measures, CHP or on-site renewables. One option is to develop 'marginal cost abatement curves' that rank measures by cost of saving and show the total amount of carbon saved. McKinsey have developed a national cost curve and this might serve as a useful example⁸.
- Whether a consultant or Facilities Management partner might help manage the combination of risks now faced.

1 Renewable Energy Foundation (2008) Electricity Prices In The United Kingdom Fundamental Drivers and Probable Trends 2008 to 2020
 2 Andrew Horstead, Research Manager, Utiylx, writing for the Energy Institute www.energyinst.org.uk/index.cfm?PageID=1251
 3 Dieter Helm 2008 in 'Credible energy policy Meeting the challenges of security of supply and climate change' Policy Exchange
 4 National Audit Office (2005) Audit of Assumptions for the 2005 Pre-Budget Report. Report by the comptroller and auditor general | HC 707 Session 2005-2006 | 5 December 2005. www.hm-treasury.gov.uk/d/pbr05_nao_508.pdf.
 5 BERR (May 2008) Update to present the latest fossil fuel price assumptions following the January 2008 Call for Evidence. www.berr.gov.uk/files/file46071.pdf
 6 Downloadable from www.ofgem.gov.uk/Markets/WhlMkts/Discovery/Documents1/Discovery_Scenarios_ConDoc_FINAL.pdf
 7 For the latest futures market prices see www.futures.tradingcharts.com/marketquotes/index.php3?market=CL
 8 www.mckinsey.com/clientservice/ccsi/pathways_low_carbon_economy.asp