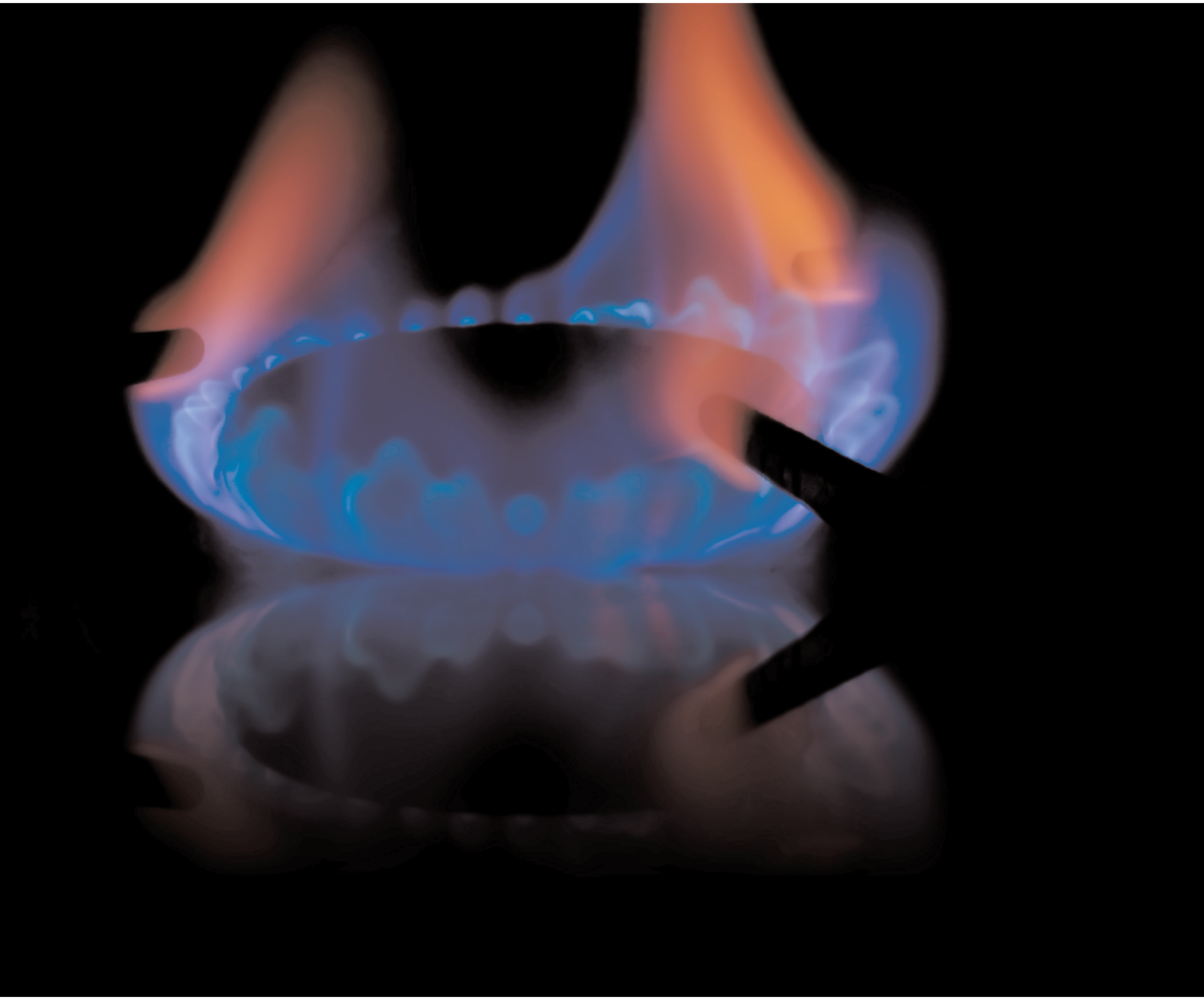
GLAECONOMICS

Current Issues Note 21

Rising energy prices and their effects on environmental behaviour

By **Simon Kyte** and **Benjamin Gill**



Transport for London

LONDON DEVELOPMENT AGENCY

MAYOR OF LONDON

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Greater London Authority
July 2008

Published by
Greater London Authority
City Hall
The Queen's Walk
London SE1 2AA
www.london.gov.uk
enquiries **020 7983 4000**
minicom **020 7983 4458**

ISBN: **978-1-84781-181-3**

Cover photograph
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This publication is printed on recycled paper

For more information about this publication, please contact:
GLA Economics
telephone 020 7983 4922
email glaeconomics@london.gov.uk

GLA Economics provides expert advice and analysis on London's economy and the economic issues facing the capital. Data and analysis from GLA Economics form a basis for the policy and investment decisions facing the Mayor of London and the GLA group. The unit is funded by the Greater London Authority, Transport for London and the London Development Agency.

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1. Introduction

Whilst higher energy prices are unwelcome to most UK consumers, many in the environmental and public policy arenas have seen a 'silver lining' in how they might affect environmental behaviour. This Current Issues Note briefly examines the drivers which have increased energy prices and then investigates the potential impacts on households, transport and commerce and industry.

2. Current energy price situation[1]

As at June 2008, the price of oil was mainly in the range of $130 - $140 per barrel, not far off twice what it was 12 months earlier. Even allowing for spikes and troughs, it is historically very high and expectations are generally that they are likely to remain so – including the expectation of the Prime Minister, Gordon Brown. Even Saudi Arabia's decision to increase oil production may be completely negated by attacks on production facilities in Nigeria. The central estimate of market expectations is also increasing in terms of expected oil prices in six months' time[2] but there is also an increased degree of uncertainty with some claiming that speculators have driven the market upwards and that another bubble is about to burst. Some commentators have suggested that the credit crisis and the housing slowdown have led to speculators pumping cash into commodities including oil.

The US is the major importer of oil so the recent price increases have had a direct impact on their economy. However, the UK only became a net importer of oil in 2004[3]. North Sea Oil production peaked twice – once in the mid-1980s and in 1999 at which point the UK was producing around 2.9 million barrels a day or around 4 per cent of global oil production[4]. But the production decline from peak has been steep and the UK consumes over 1.8 million barrels of oil a day. Therefore the amount of oil imported into the UK seems likely to increase with a growing impact on the UK's trade deficit. There are some caveats here. For example, the higher the oil price goes the more profitable it will be to exploit new fields in the North Sea for oil that is extremely high quality and low in sulphur.

The historical time series for gas prices has influences such as the opening and later redesign of the Bacton Interconnector as well as gas market liberalisation. The Bacton Interconnector is responsible for much of the link between oil prices and gas prices. This is on account of the Interconnector linking the UK market to a far less deregulated European market where gas prices are still predominantly determined by oil production and prices. With the increased deregulation now going through EU markets this

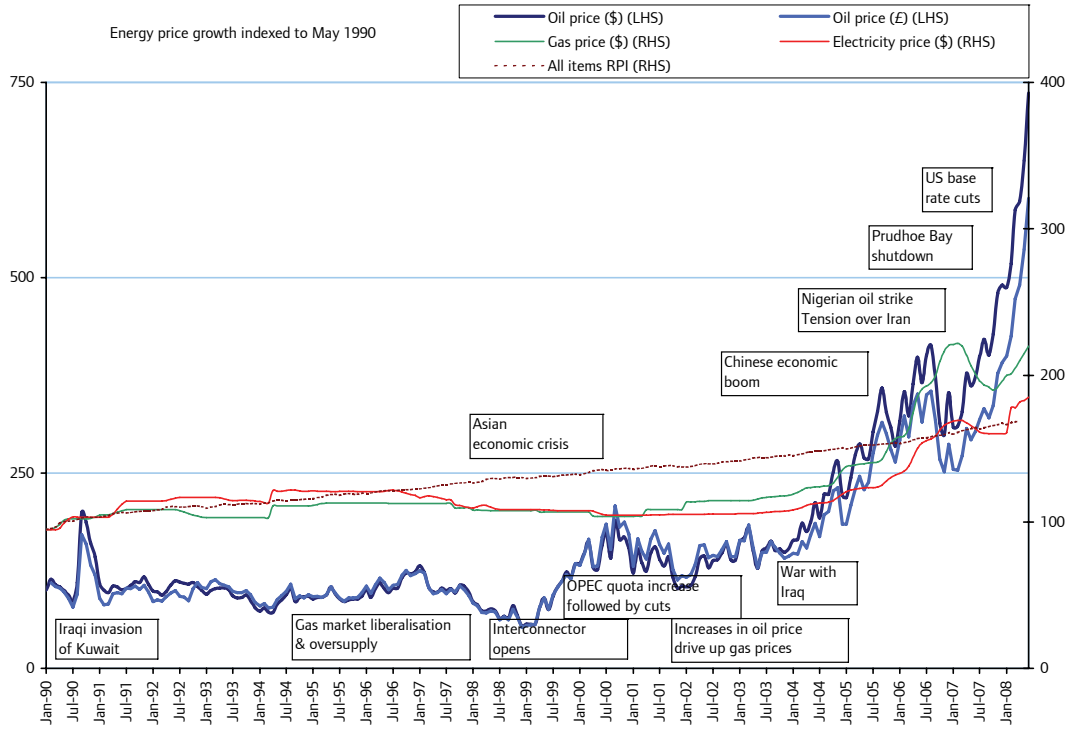
[1] As of June 2008.
[2] However, some analysts such as Franciso Blanch at Merrill Lynch have suggested that a 'demand destruction' point may now be looming. This is a point at which oil becomes so expensive that demand falls away.
[3] A country which is a net oil exporter should in theory see some benefit from higher oil prices. However, higher oil prices filter through into the production costs of many industries and so would contribute to a rise in the inflation rate within the oil-exporting country.
[4] This includes the UK's non-North Sea Oil.

relationship may now be nearing breaking point. However, there is also a more intuitive relationship in that oil and gas are seen as strong substitutes. Increased prices for oil therefore tend to drive increased demand for gas, thereby raising prices.

Consequently, it should be no surprise that gas prices have reached record highs during the same period as oil prices. Increases in oil prices drove gas prices upwards in the early part of the 2000s and are doing so again. The price of gas for delivery in the first three months of 2009 is edging £1 per therm on commodity markets – more than double the cost in the summer of 2007. Wholesale prices are now above retail prices. However, pipeline data suggests that in May 2008 the UK was a net exporter of gas with European firms buying from the UK to top up their own supplies.

It has been posited that there is about a nine month gap between oil price peaks and energy utility bill peaks and empirically this relationship seems to hold over the last few years (see Figure 1). This means that even if oil prices were now to fall, increases in energy utility bills would still probably follow.

Figure 1: – Oil and gas prices and their relationship with energy utility prices



Source: Ecowin and various other sources/GLA Economics

3. Drivers of the oil price hike

Demand issues

- China's growth has been faster than expected with implications for oil demand. For example, in January 2008, China's oil purchases were up 16 per cent on one year previously. China's rate of GDP growth has averaged 10 per cent per annum since 1990.
- Human population growth has increased the demand for oil. In 1990 there were around 5 ¼ billion people on Earth, now there are around 6 $^{2}/_{3}$ billion and that number is increasing by around 6 ½ million a month.

Supply issues

- Oil quotas by OPEC that restrict supply.
- Talk of 'peak oil'[5].
- The shutdown of Prudhoe Bay[6], the fall off in North Sea oil production and problems in increasing Russian oil output.

Political tensions

- Iran: Tensions between President Mahmoud Ahmadinejad's insistence on an Iranian nuclear programme and Western countries. Increasing tensions between Israel and Iran.
- Turkey: An important transportation route of oil from Iraq passes through Turkey. However, south-eastern Turkey has internal tensions between Kurdish rebels and the Turkish Government.
- Nigeria: Oil production has been disrupted by a series of strikes, attacks on oil refineries and the kidnappings of oil company employees.

The weakening US$

- World markets price oil in US$. Over the last few years the US$ has depreciated. This means that for a given oil price in US$ oil has become cheaper in terms of other currencies. Hence a falling US$ increases the demand for oil from non-US investors across the globe boosting the US$ price of oil.
- Over recent years a negative relationship has built up between the US$'s exchange rate and the price of oil. This means that if the US$ depreciates on average the price of oil has risen. Traders are now using this relationship to hedge against a depreciating US$ (ie when the US$ falls they increase their demand for oil contracts, which puts upward pressure on the price of oil). Hence the recent weakness in the US$ has boosted the demand for oil contracts and therefore the price of oil.

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[5] Peak oil is the moment in time at which maximum global oil production is reached and is a concept popularised by M King Hubbert in 1974. Originally he suggested that peak oil would take place in 1995 on the basis of what were then current trends. Actually, it is far from clear when peak oil will be reached but oil is a finite resource. However, as oil becomes more valuable reserves of oil which were once too costly to extract become viable. Peak oil has been criticised by Michael Lynch and others for ignoring technological progress.

[6] Prudhoe Bay is an oil field in Alaska – the largest in the United States. In the summer of 2006 an oil leak was attributed to pipeline rupture. Subsequent inspection led BP to shut down the whole field on account of severe corrosion.

4. The impacts of increased energy prices

Higher energy utility bills could have particularly strong effects on households at present. Real disposable incomes are already being squeezed on account of food price inflation and general imported inflation[7]. Access to credit has been reduced by the credit crunch and the labour market seems to have arrived at a turning point. Energy price rises will push more people in London into fuel poverty.

The effects of increasing energy prices

Impacts on domestic households

1. Impacts on new housing design - likely to be long lags involved. Only around 1 per cent of domestic housing stock is created each year and difficulties in housing markets may be likely to slow this still further.
2. Positive impact on reduced energy consumption. Other things being equal high prices ought to lead to lower levels of household energy consumption. Lower energy-intensive consumer durables should become more attractive but these are precisely the type of goods whose purchase may be delayed on account of the credit crunch.
3. Distributional impacts with those on low or fixed incomes likely to suffer most. Some of these distributional impacts are not intuitive. For example, young families are often hit hard on account of not receiving winter fuel payments.
4. Squeeze on real disposable incomes may have some negative impact on some environmental products where a price premium is in place.

Impacts on transport

5. Higher fuel prices will result in rising air fares unless some type of subsidy system prevents this. Consolidation in the airline industry is already happening especially in the US.
6. Sales of high-fuel consuming cars are likely to fall as consumers shift to cars that consume less fuel. However in the UK this effect is dampened because the share of tax in petrol and diesel prices is very high. Therefore, for example a 10 per cent rise in oil prices leads to a proportionately smaller increase in petrol prices. However, purchases of new more fuel efficient cars may be delayed by the squeeze on real disposable incomes.
7. There may be some country-specific impacts on motor manufacturers. For example, German cars have been getting heavier and their fuel consumption less efficient whereas French-manufactured vehicles have been becoming rapidly more fuel efficient.

[7] Due in the main to the recent depreciation of sterling.

8. Higher running costs for public transport systems may lead to higher fares. However, demand is likely to increase as people abandon their cars for public transport. This could increase capacity pressures.
9. Some public transport projects which have until now been delayed may become more attractive given revised appraisal estimates.

Impacts on commerce and industry

10. For London compared to other regions, energy bills form a relatively lower part of total bills within the commercial sector. Industrial sectors which are likely to be hardest hit are transport and manufacturing. The least seriously affected sector is likely to be the financial and business service sector.
11. More energy efficient production methods will be encouraged by higher energy prices.

5. Effect of energy and fuel price rises on the environmental segmentation matrix[8]

It seems likely that all segments of the environmental segmentation matrix will attempt to cut energy consumption due to energy price rises. However, for those segments with an interest in environmental issues, rising energy prices and climate change concerns will tend to reinforce one another, whilst for those which are disinterested, the primary driver will be rising energy price alone.

In less affluent segments there is likely to be a marked increase in the numbers in fuel poverty. This will be driven not just by rising fuel and energy costs, but also by the fact that both the public and private sectors are likely to keep a relatively tight rein on pay awards and through other rising costs eating into real disposable incomes. It has been estimated[9] that a 10 per cent increase in energy utility bills will move an extra 400,000 people nationally into fuel poverty. As London has about 12 per cent of the country's population living in fuel poverty and assuming that it has a similar proportion to nationally immediately above the fuel poverty line, an indicative figure for London would be an extra 48,000 in fuel poverty[10]. The campaign group, National Energy Action, recently suggested that rises of 40 per cent in energy utility bills could result in a further 1.6 million households nationally descending into fuel poverty. That would mean that more than twice as many people in the UK would be living in fuel poverty than in 2005.

[8] The market segmentation matrix for the UK shows that groups who are most responsible for carbon emissions are also the most likely to be concerned about environmental issues. The Energy Saving Trust matrix is being used by some parts of the London administration.
[9] National Energy Action/Age Concern.
[10] These indicative estimates are based on the national definition of fuel poverty.

Reductions in car use due to higher fuel prices will be affected by fuel price sensitivity of fuel consumption, vehicle ownership and fuel efficiency. A study undertaken at the Transport Studies Unit at University College London[11], suggests the following:

A 10 per cent increase in fuel prices should result in:

- A 2.5 per cent reduction of fuel use in the short term, building to a 6 per cent reduction in the longer run;
- A fuel efficiency increase of 1.5 per cent in the short term, building to a fuel efficiency increase of 4 per cent in the longer run;
- A 1 per cent fall in vehicle ownership in the short term, building to a 2.5 per cent reduction over the longer term.

There may be additional considerations in London. The introduction of congestion charging may already have persuaded those likely to be sensitive to travel cost changes to switch mode. Therefore we might expect that fuel prices will have a lesser effect on determining whether people switch to public transport (as price-sensitive consumers have already switched as a result of the congestion charge) in the capital – or at least in the Inner London area.

The UCL study also suggested that a 10 per cent decrease in incomes would result in:

- A 4 per cent reduction in fuel use in the short term and a reduction in excess of 10 per cent in the longer run;
- A smaller reduction in the volume of traffic: 2 per cent in the short run and about 5 per cent in the longer term.

The UCL analysis therefore suggests that a reduction in income would have a larger impact on fuel use than a similar proportionate increase in fuel prices.

[11] Goodwin, Dargay and Hanly – 'Elasticities of road traffic and fuel consumption with respect to price and income: a review' (Transport Reviews Vol 24 No 3, May 2004).

GLAECONOMICS

Greater London Authority
City Hall
The Queen's Walk
London SE1 2AA

Tel: 020 7983 4922
Fax: 020 7983 4137
Minicom: 020 7983 4458
Email: glaeconomics@london.gov.uk

www.london.gov.uk/mayor/economic_unit

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