

ENERGY TRENDS AND THE SOUTH WEST ECONOMY

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BUSINESS AND ECONOMY

INTRODUCTION

The DTI's report on the recent UK Energy Review (The Energy Challenge) highlighted two key challenges facing the UK with the supply and use of energy in the future:

- Ensuring secure and reliable access to energy resources in the context of rapidly rising global energy demand and uncertainties over imported supplies of key fuels; and
- Reducing dependence on carbon-based energy sources so as to cut carbon emissions and mitigate the risks associated with global climate change.

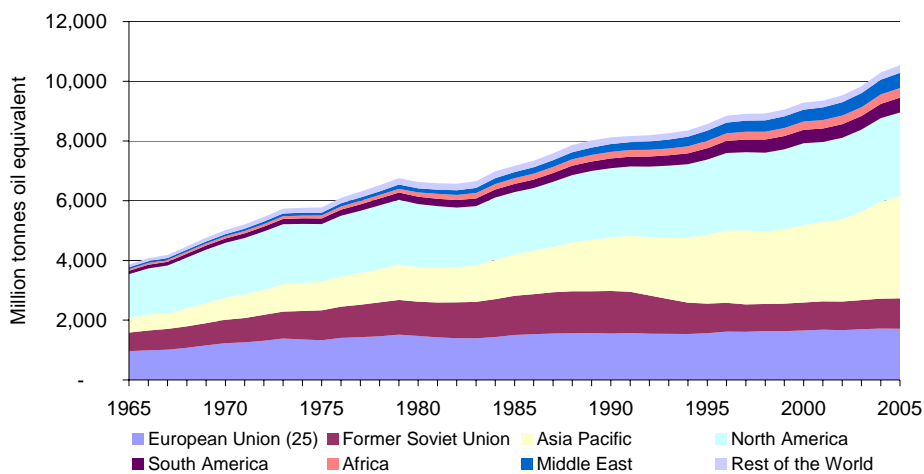
Both of these issues are likely to contribute to higher energy costs (and to higher taxes and charges on energy use and carbon emissions) and to stricter regulations on energy efficiency. This bulletin considers the possible implications of these trends for households and businesses within the South West.

ENERGY TRENDS

Increasing globalisation of energy markets – evidenced by growing international trade flows and falling price differentials between major markets – means that the energy issues facing the UK, and the South West, are increasingly determined by global patterns of demand and supply. Recent trends in global energy markets have been dominated by rapid growth in demand from the fast growing Asian economies – particularly China and India – combined with uncertainties over supplies for the main fuels.

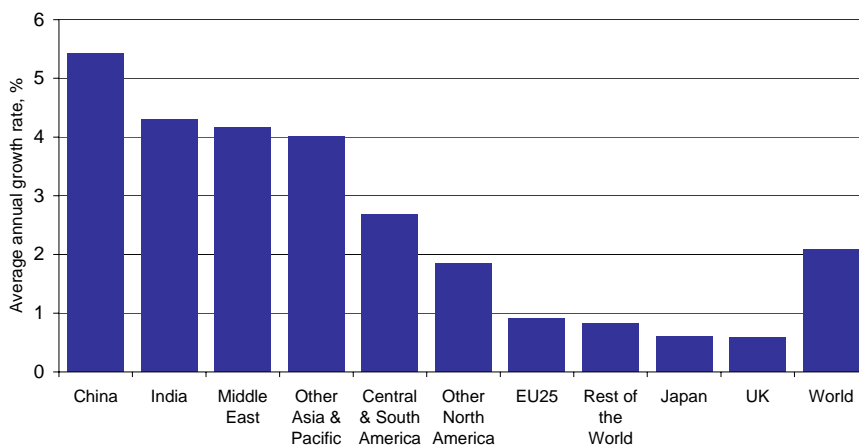
- Global energy consumption has increased at an average rate of around 2 per cent a year since 1995 – Figures 1 & 2.
- Most of this growth has been in Asia – China & India accounted for almost 40 per cent of total growth in world energy consumption between 1995 and 2005; and more than 50 per cent of growth of consumption between 2000 and 2005 – Figure 3.

Figure 1: Global Energy Consumption by Region



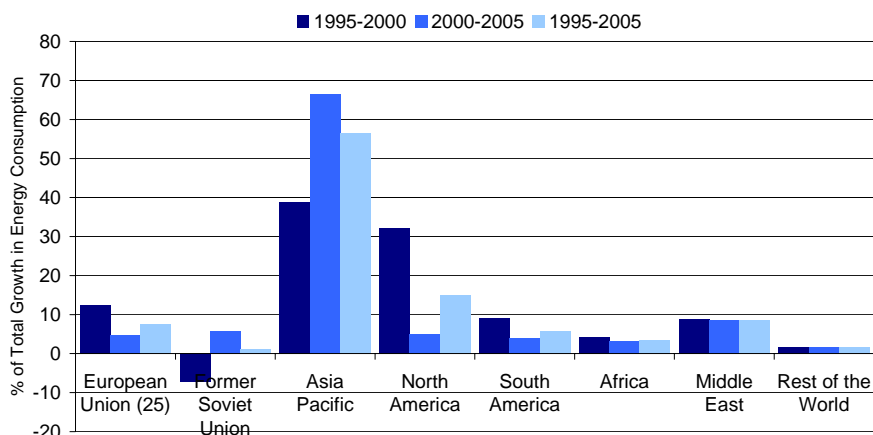
Source: BP Statistical Review of World Energy, 2006

Figure 2: Growth of Energy Consumption, 1995-2005



Source: BP Statistical Review of World Energy, 2006

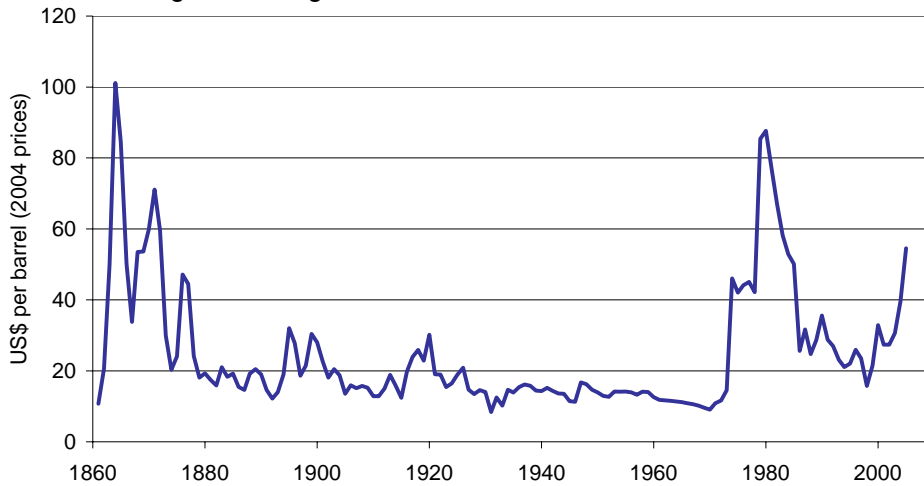
Figure 3: Contribution to Growth in World Energy Consumption



Source: BP Statistical Review of World Energy, 2006

Together these trends produced rapidly rising energy prices during the period since 2001. The price of Brent crude oil rose from a low of around \$20 per barrel in late 2001 to a peak of \$70 per barrel in spring 2006, since when prices have moderated slightly to stand at around \$60 per barrel at the time of writing. The recent trend in oil prices is in sharp contrast with generally declining real prices since the late-1970s (Figure 4).

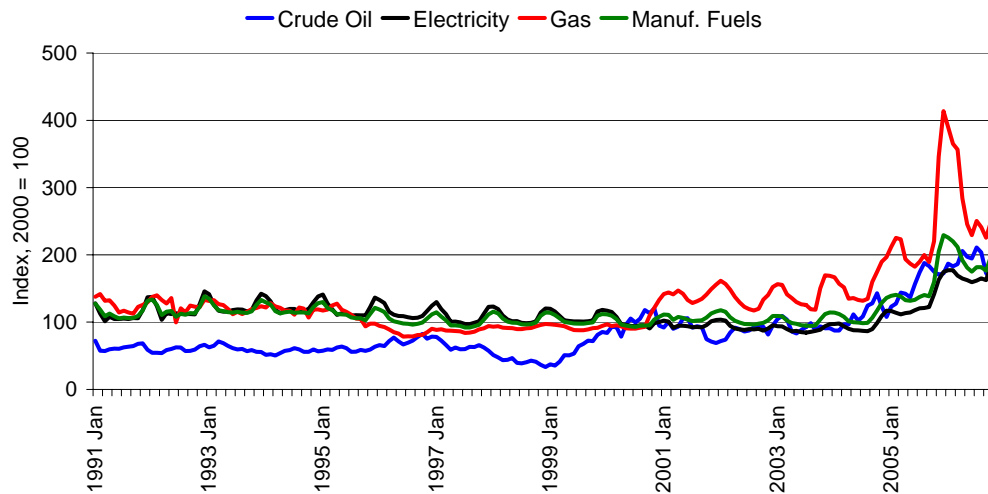
Figure 4: Long-term movements in the Real Price of Oil



Source: BP Statistical Review of World Energy, 2006

Gas prices have recently been highly volatile, although the longer term trend has seen UK wholesale gas prices rise by an average annual rate of around 20 per cent since the mid-1990s. The key factors in the UK gas market have been declining North Sea production and growing demand, particularly for electricity generation.

Figure 5: UK Producer Fuel Prices

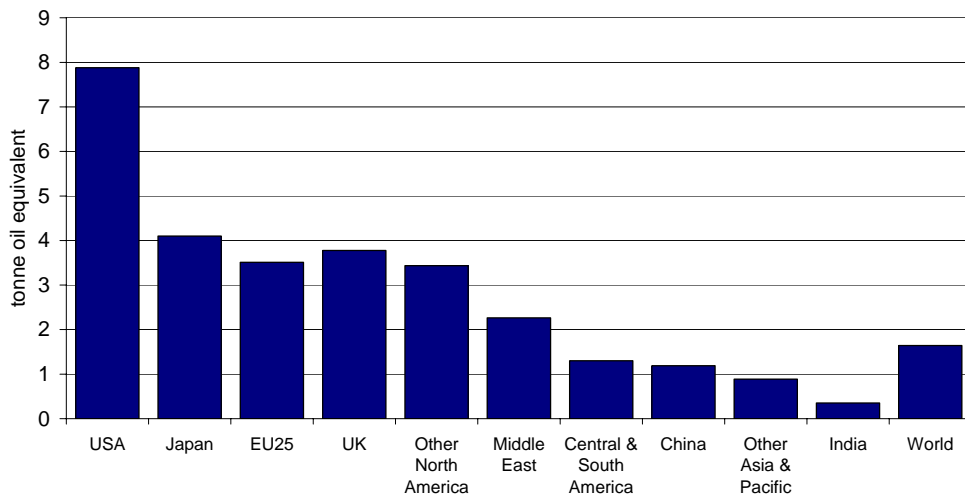


Source: ONS Producer Prices

UK electricity prices had been declining steadily since the mid-1990s, but rose sharply during 2005, driven by the rising costs of oil and gas for power generation. Rising prices for basic fuels have resulted in a general rise in energy costs for households and businesses, and have been a key driver of input price inflation. Overall consumer energy prices have risen at an average annual of 6.2 per cent since 2001, and prices for domestic energy have risen at almost twice that rate (12.2 per cent). This is set against inflation of non-energy prices at around 1.7 per cent, and overall CPI inflation of 2.0 per cent over this period.

Continued rapid growth of energy demand from the major Asian economies is likely to dominate world energy markets several years. The scope for additional energy consumption in China and India is underlined by their low current levels of consumption per person (Figure 5). India, in particular, currently consumes only around one quarter as much energy per person as the world as a whole, and less than one twentieth as much as the USA. If, as seems probable, increasing economic prosperity in the larger Asian economies continues to be associated with increasingly energy-intensive lifestyles, then this will generate very large increases in global energy demand over coming decades. For example, if Asian per head consumption (currently 0.9 tonne oil equivalent) rose to equal the current world average (1.6 tonne oil equivalent), this would increase global energy consumption by around 2,500 million tonne oil equivalent per year, or around 75 per cent over current levels.

Figure 6: Energy Consumption per Person, 2005

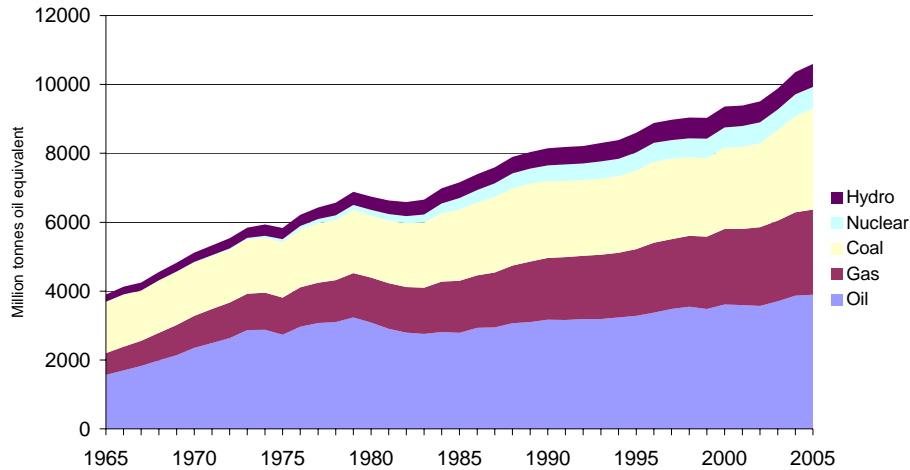


Source: BP *Statistical Review of World Energy*, 2006

Whilst much attention has been focused on the implications of Asian economic development for the oil market, recent growth of energy consumption has actually been focused on coal. Coal consumption has risen by around 4.4 per cent a year between 2000 and 2005, contributing 46 per cent of the total rise in global energy consumption over this period (Figures 7 and 8). Overall energy demand rose by 2.5 per cent a year since 2000, whilst oil consumption rose by 1.5 per cent a year. The rapid expansion in coal consumption by the Chinese economy has been the primary cause of growing global demand for this fuel. Chinese coal consumption grew by around 10 per cent a year during 2000-2005, and

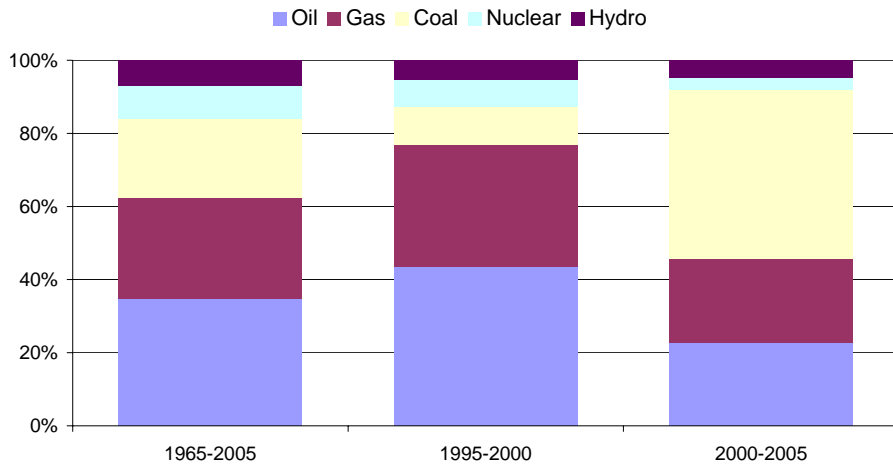
China accounted for almost three quarters of global growth in coal consumption over this period. However, China's coal production more than matched consumption growth, so that China has become a net exporter of coal over this period. Also evident from Figure 8, is the declining importance of nuclear as a source of global energy growth.

Figure 7: Global Energy Consumption by Source



Source: BP Statistical Review of World Energy, 2006

Figure 8: Contribution to total growth of energy consumption



Source: BP Statistical Review of World Energy, 2006

Continued growth of global energy demand, driven in particular by further rapid development of the major Asian economies, raises risks that supplies do not expand to meet demand, putting severe upward pressure on energy prices. There is a significant risk that supplier economies do not make sufficient investments to increase output in line with global demand. These risks are compounded by risks of political instability and poor governance in some supplying nations, raising the spectre of global supply shortages and rapidly increasing, and increasingly volatile, energy costs for all consuming economies.

For the UK, the situation is further complicated by the move from net exporter to net importer of energy resources – as coal reserves dwindle, and North Sea oil and gas production gradually decline. The UK is expected to import around 40 per cent of its gas by 2010, rising to 80-90 per cent by 2020. The UK is also expected to become a net importer of oil by around 2010, and is already a net importer of coal. These developments will increase the UK's exposure to international supply risks including those associated with insufficient investment in global energy infrastructure, increasing remoteness from supplies, political instability and the threat of international terrorism, and the effects of accidents and natural disasters.

A key factor in ensuring secure energy supplies is to maintain a diverse energy mix, particularly with regards to fuel for electricity generation. The UK will require substantial additional investment in electricity generating capacity over the next 20 years to replace closing coal, oil and nuclear power stations and to meet the expected growth in demand. Current market conditions would promote further development of gas-fired generation, greatly increasing the UK's dependency on this fuel source just as the UK becomes more reliant on gas imports. A key aim of policy will be to promote a more diverse generation mix where it is efficient to do so.

Associated with the need to replace ageing power generating capacity is the risk that new capacity will not be developed quickly enough to ensure that electricity supply matches demand, particularly at times of peak demand. Such a situation would result in higher electricity prices for business and domestic consumers, and potentially in a lower quality of supply, with further implications for business costs.

A further key energy use is for transport. Good transport links are vital to modern business and economic efficiency – as they support the economic gains from trade and provide access to a variety of jobs and services. As elsewhere, transport in the UK is heavily reliant on oil as a fuel source. The UK energy review, *The Energy Challenge*, argues that growth in transport is likely to moderate over the near future which, together with continuing improvements in energy efficiency for transport, should imply reductions in energy use by UK transport from around 2015.

There is little consensus concerning the likely future path of energy prices. Prices for both crude oil and gas in the UK have fallen sharply from their peaks earlier this year, reflecting improvements in supply. Prices remain highly volatile, however, and future prices are highly uncertain. Thus, the Bank of England *Inflation Report* concludes that the behaviour of energy futures markets suggest considerable uncertainty among market participants concerning oil and gas prices even over the short term. Futures prices for crude oil are in the range \$60-\$65 per barrel for the period to 2010, close to current spot levels. Similarly, futures prices for gas suggest no trend in gas prices for the remainder of this decade, but with substantial volatility around the average level. The latest version of the HM Treasury's *Forecasts for the UK Economy: A comparison of independent forecasts* published in December 2006 contains 27 recent independent forecasts of Brent Crude oil prices for December 2007, which range from \$50 to \$73 per barrel with a median forecast of \$60 per barrel – implying

that forecasters as a group cannot agree on whether oil prices are most likely to rise or fall over the coming year. Uncertainty over future energy prices increases further as the forecast horizon lengthens.

CLIMATE CHANGE

The dangers posed by global climate change are becoming increasingly apparent. The links between use of carbon-based fuels, increasing atmospheric concentrations of carbon dioxide (CO₂), and rising global temperatures have been well established. A growing global consensus agrees that responding to climate change requires reducing the dependence of the global economy on carbon-based energy sources: by improving energy efficiency and switching to more sustainable energy sources. The Government's recent energy review, *The Energy Challenge*, proposes a number of actions to help combat climate change, including:

- Strong UK support for the EU Emissions Trading Scheme (ETS) and for fiscal measures to provide incentives towards greater energy efficiency.
- Proposing several measures to strengthen the EU ETS, including the possible extension of the scheme to other sectors not currently covered. This includes support for the inclusion of aviation within the ETS.
- Policies to reduce energy use in homes, through improved information, incentives to support greater energy efficiency, and stricter regulation of energy efficiency requirements for new-build homes and for domestic lighting and appliances.
- Support for the development and application of technologies to promote energy efficiency and reduce emissions from road transport, including UK support for new EU targets on car fuel efficiency.
- Support for the development of a 'distributed energy' system in the UK, where an increasing proportion of electricity is generated using renewable sources and close to the point of use, rather than at large, remote power stations. This also includes support for local combined heat and power (CHP) schemes.
- Help ensure that new investment in power generation is focused in renewables and low-carbon sources (including gas, clear coal, and possibly nuclear).

ENERGY USE IN THE SOUTH WEST

The Department of Trade and Industry (DTI) provide various data on energy use within the UK regions. Data on consumer expenditure on energy is also available from the ONS *Expenditure and Food Survey*. This section uses this data to provide a summary of energy use patterns and trends within the South West region.

Energy Use by Consuming Sector

Figure 9 shows DTI estimates of total energy use within the British regions during 2003, broken down by consuming sector (domestic, industrial/commercial, and transport). Total South West energy consumption was estimated at around 135

Terrawatt Hours (135,000 GWh) during 2003, around 8 per cent of total consumption within the British regions. Industrial and commercial users consumed a smaller proportion of total energy used in the region than was the case elsewhere – this sector accounted for only 32 per cent of total energy use in the South West as compared with 38 per cent for Great Britain as a whole. On the other hand, energy use by transport was proportionally more important within the South West than in all of the other British regions.

Figure 9: Regional Energy Use by Sector, 2003

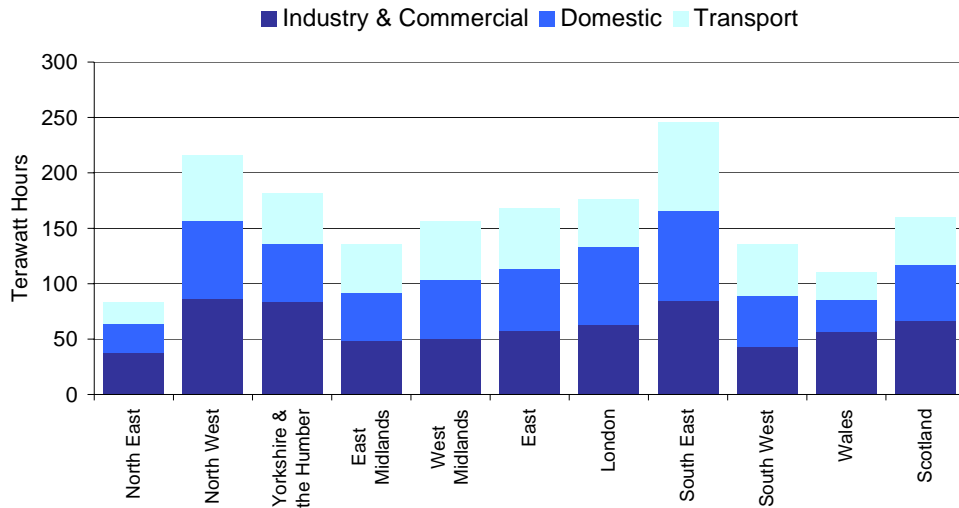
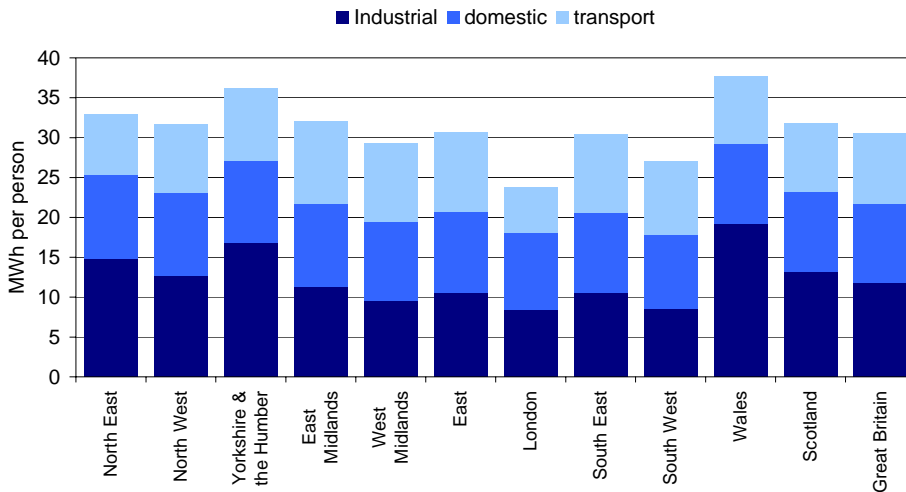


Figure 10: Energy Consumption per Person, 2003

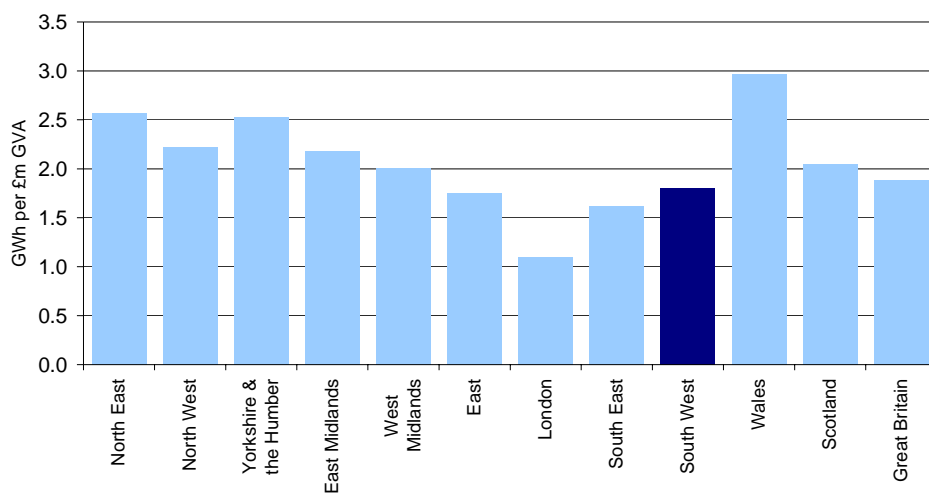


On a per capita basis, the South West is among the least energy-intensive of the British regions (Figure 10). Based on the DTI estimates of total consumption and ONS sub-national population estimates, the South West consumed around 27 MWh (Megawatt Hours) of energy per resident during 2003, the 2nd lowest level among British regions (behind London), and substantially lower than consumption per person across all regions (31 MWh). The South West has

relatively low industrial and domestic energy consumption – ranking 10th and 11th among the UK regions on energy consumption per person in these sectors. This is partially offset by relatively high energy consumption per person within the region's transport sector (9.3 MWh per person compared to 8.8 MWh for the British regions as a whole, and ranked 5th).

On alternative measure of energy intensity is to compare energy consumption to economic output – as measured by regional Gross Value Added (GVA). The South West had the 4th lowest level of energy consumption per £m of GVA among the British regions during 2003, behind London, the South East and East of England (Figure 11).

Figure 11: Energy Intensity of Regional Economies



Energy Use by Industry

Information on energy use by industry is available at the UK level within the ONS *UK Environmental Accounts*. Direct information on energy use by industry at a regional level is not available. However, analysis of the UK data and the SWBEM *South West Regional Accounts* suggests that the relatively low overall energy-intensity of South West industry and commerce is largely explained by the composition of the region's industry – i.e. to the low prevalence of energy-intensive industry sectors within the region.

Table 1 lists UK industries according to their energy intensity (measured by energy consumption per unit of output). The industries divided into five quintile groups by this measure of energy intensity, labelled 'very high', 'high', etc.

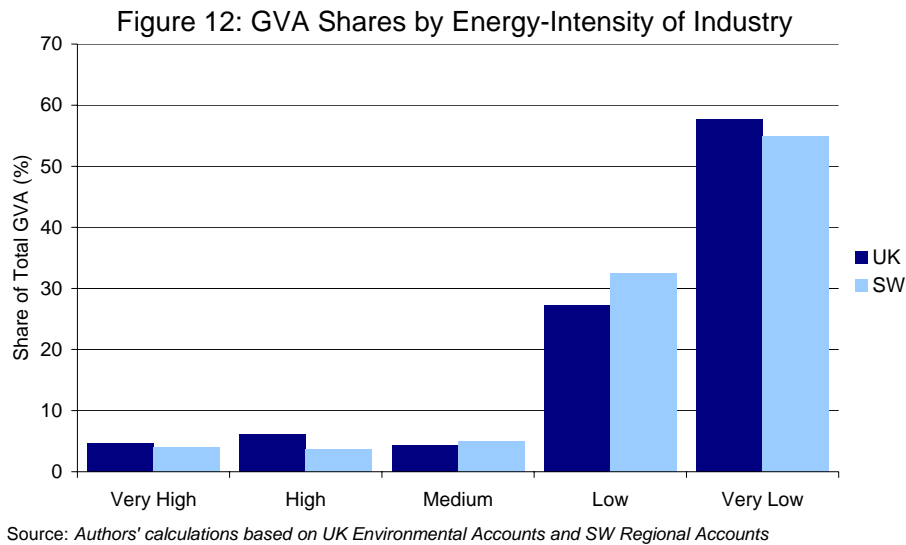
The most energy intensive industries in the UK, according to these estimates, are electricity production; fuel processing; air transport; cement, lime & plaster manufacturing; and basic chemicals. High energy-intensity industries account for the bulk of total energy consumption by UK industries: the top 5 energy-intensive industries consumed just over half of all energy used by industry in the UK during 2005, and the top quintile (13 sectors labelled 'very high' in Table 1) consumed two thirds of all energy used by industry. 'High' energy-intensive

sectors contributed a further 13 per cent of total UK industrial energy consumption.

Table 1: Energy Intensity of UK Industries
Tonnes of oil equivalent per £m GVA

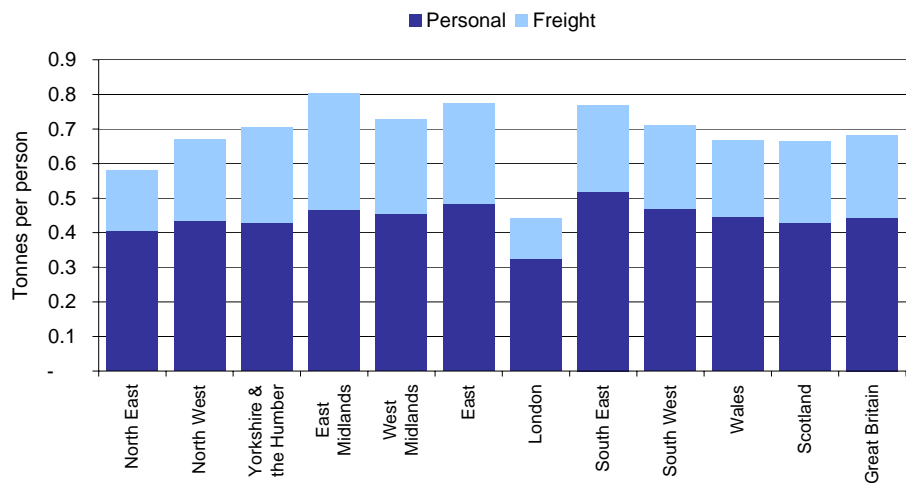
<i>Very High</i>		<i>Low</i>	
Electricity production & distribution	5586	Machinery & Equipment	66
Coke Ovens, fuel processing	2643	Public Admin & Defence	64
Air transport	2244	Radio, televisions & communications	62
Cement, lime & plaster	2159	Clothing	60
Iron & steel	1921	Other transport equipment	59
Basic Chemicals	1132	Electrical machinery & apparatus	51
Other land transport	930	Wholesale distribution	39
Man Made Fibres	890	Health & social services	36
Structural clay products	738	Water supply	33
Glass & glass products	553	Education	32
Textiles	480	Construction	32
Non-ferrous metals	463	Motor distribution	31
Rubber Products	451	Membership activities	29
<i>High</i>		<i>Very Low</i>	
Pulp, paper & Paper Products	418	Retail distribution	28
Railway transport	377	Hotels & catering	28
Oil & Gas Extraction	362	Office machinery & computers	26
Fishing	360	Other services	24
Wood & Wood Products	286	Medical & precision instruments	23
Other Manufacturing & Recycling	265	Post & telecoms	21
Ceramic goods	259	Recreational services	16
Pesticides	238	Tobacco Products	9
Soap & detergents	235	Business Services	8
Plastic Products	203	Ancillary transport services	7
Forestry	203	Financial Services	4
Gas distribution	200	Water transport	2
Food & Drink	193		
<i>Medium</i>			
Agriculture	191		
Other Mining & Quarrying	184		
Metal Castings	170		
Other Chemicals	166		
Articles of concrete & stone	151		
Coal Extraction	141		
Leather & Footwear	129		
Pharmaceuticals	127		
Motor Vehicles	107		
Paints, varnishes, printing ink	96		
Fabricated metal products	72		
Sewage & sanitary services	70		
Printing & Publishing	69		

Source: Authors' Calculations based on UK Environmental Accounts & UK Input-Output Accounts



The South West has relatively small shares of 'very high' and 'high' energy intensive sectors. Figure 12 shows the shares of total output from the five energy-intensity groups defined in Table 1 within the South West and the UK. 'Very high' energy intensity industries accounted for 4.0 per cent of South West output in 2004, compared with 4.6 per cent of UK output, while 'high' energy intensity sectors made up 3.7 per cent of South West output compared to 6.1 per cent of UK output at this time.

Figure 13: Transport Fuel Consumption, 2004



Energy Use by Transport

The South West has relatively high fuel use per person for personal road transport at around 0.47 tonnes per person per year in 2004, the 3rd highest among the British regions and around 10 per cent above the overall level for Great Britain (Figure 13). Around 95.6 per cent of personal transport fuel consumption is for private vehicles— marginally above the share for Britain as a whole (94.2 per cent).

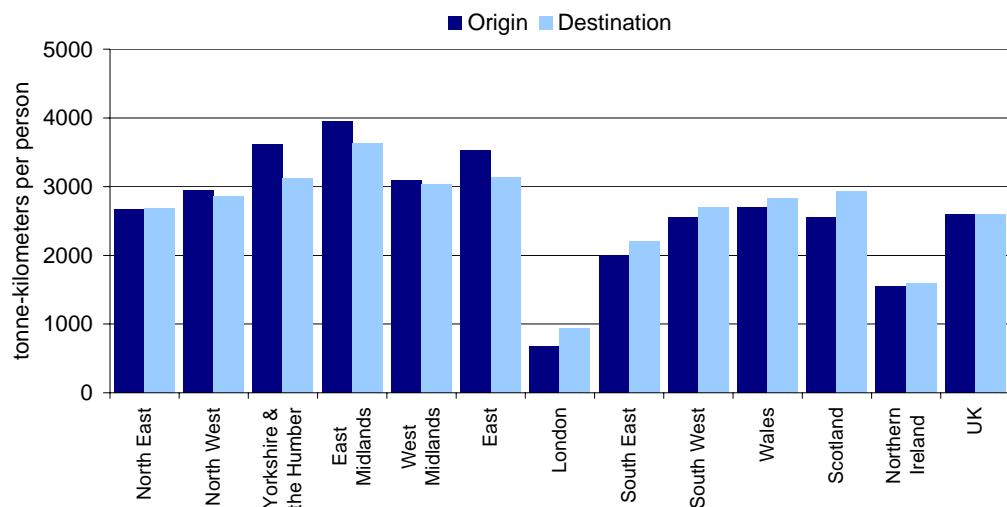
Table 2: Trips & Distance Travelled, 2004/5

	Trips - per person				Distance Travelled - miles per person			Average miles per trip	
	Car Driver	Car Passenger	All	Average Car occupancy	Car Driver	Car Passenger	All	Car	ALL
North East	403	222	999	1.55	3205	1666	6207	7.8	6.2
North West	437	239	1065	1.55	3522	1939	6569	8.1	6.2
Yorkshire & the Humber	427	227	1032	1.53	3695	2137	7182	8.9	7.0
East Midlands	430	243	1046	1.57	3858	2115	7125	8.9	6.8
West Midlands	468	261	1075	1.56	3736	2079	6872	8.0	6.4
East	478	248	1060	1.52	4302	2489	8339	9.4	7.9
London	243	150	905	1.62	1814	1178	5313	7.6	5.9
South East	494	253	1072	1.51	4431	2345	8194	9.1	7.6
South West	500	255	1096	1.51	4544	2381	8117	9.2	7.4
Wales	479	260	1031	1.54	4325	2255	7593	8.9	7.4
Scotland	407	229	1014	1.56	3566	2093	7333	8.9	7.2
Northern Ireland	417	237	947	1.57	3162	1698	5951	7.4	6.3
South West Rank	1	3	1	12	1	2	3	2	3

Source: ONS UK Regional Travel Statistics, 2006

Residents of the South West travel further, making more and longer trips, than those of most other parts of the UK. The South West has the highest number of trips per person among the UK regions during 2004/5, according to the ONS *UK Regional Travel Statistics, 2006* (Table 2, previous page). Around 69 per cent of all trips were by car, above the national average and the 4th highest among the UK regions. Moreover, there was a relatively low average number of vehicle occupants (driver plus passengers) for car trips made by South West residents – the lowest among the UK regions. The region's residents also make, on average, relatively long trips – with the 3rd longest average trip and the 2nd longest average car trip among the UK regions in 2004/5.

Figure 14: Freight Transport by Road per Person



Source: UK Regional Travel Statistics, 2006

Fuel use per person for freight transport is close to the level for Great Britain as a whole, and ranked 6th among the British regions in 2004 (Figure 13). Freight movements by road transport originating in the South West amounted to around 2,500 tonne-kilometres per person during 2005, according to the *UK Regional Transport Statistics, 2006* (1 tonne-kilometres equals 1 tonne of freight transported over 1 km). This was marginally less than the UK average, of 2,600 tonne-kilometres per person. Road freight movements per person ending in the South West were around 2,700 tonne-kms at this time, just above the national average. The South West was one of only 3 English regions for which freight movements into the region exceeded those out of the region (the others being London and the South East), although this was also true for Wales, Scotland and Northern Ireland. As with other UK regions, the majority of road freight movements were within the South West rather than between the South West and other regions.

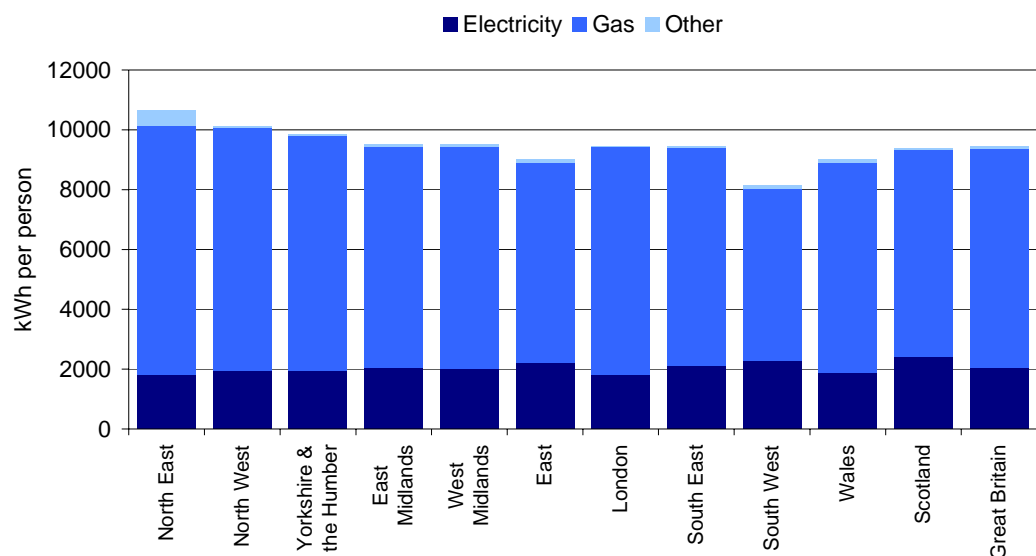
South West residents make relatively little use of public transport as compared with the rest of the country. The South West had the 2nd lowest number of bus or light rail journeys per person among the British regions during 2005. Bus journeys in the region are relatively long on average – at just over 1 km – ranked 2nd behind East of England. In terms of journeys made, bus usage in the region has been falling steadily over the last 10 years, with journeys per person falling from around 42 during 1995 to 36 in 2005. Over this time, however, the average length of bus journeys has increased by around 16 per cent. These trends are similar to those in other regions other than London, where bus and light rail journeys have become more frequent and shorter during this period.

Comparatively few air transport movements (take offs & landings) and passenger journeys take place through South West airports. South West airports had around 124,000 air transport movements during 2005, just over 5 per cent of the UK total. This was equivalent to around 25 movements per 1000 residents, compared to 38 for the UK as a whole and 4th lowest among the UK regions. Around 7.6 million passengers travelled through South West airports during 2005, only around 3 per cent of the UK total. The rapid growth in the region’s airport capacity over recent years is, however, reflected in the growth of passenger numbers. These have grown from only around 2 million in 2005, at an average annual growth rate of more than 14 per cent, as compared to around 6 per cent growth in passenger numbers for English airports over the same period.

Domestic Energy Use

On average, each household in the South West consumed around 18,500 kWh (kilo-watt hours) of energy for non-transport uses during 2004 according to DTI estimates, the lowest level of energy consumption per household among the British regions and substantially below the rate of consumption for Great Britain as a whole (22,200 kWh per person). The region also had the lowest level of domestic energy consumption per person at this time, at around 8,200 kWh compared to 9,400 kWh for Great Britain.

Figure 15: Domestic Energy Consumption, 2004



South West households derived a larger share of their energy requirements from electricity, and a correspondingly smaller share from gas, than was the case in Great Britain as a whole (Figure 15). During 2004, around 28 per cent of energy consumed by South West households for non-transport uses was in the form of electricity, with 71 per cent as gas. The comparator figures for Great Britain were 22 per cent and 77 per cent, respectively. Indeed, South West electricity consumption per person was among the highest among the British regions, ranked 2nd behind Scotland, whilst gas consumption per person was the lowest among the British regions at only around 80 per cent of the British average.

High levels of electricity usage by the region’s households, are in sharp contrast with the region’s relatively small contribution to electricity generation in the UK. DTI data suggest that the South West is responsible for around 9 per cent of total electricity

consumption in Britain, and 10 per cent of domestic electricity consumption, but is home to only around 4 per cent of electricity generating capacity.

According to the latest ONS Expenditure and Food Survey, the average South West household spent £12.20 per week on domestic energy and fuel during the period from 2002/3 – 2004/5. This was the 4th highest level of average expenditure among the UK regions at this time, behind Northern Ireland, Scotland and Wales. South West households also spent around £15.90 per week on transport fuel at this time, giving a total direct energy expenditure of around £28.10 per week, or almost 7 per cent of total household expenditure. Energy expenditure as a share of total expenditure was broadly in line with the UK average.

Table 3: Energy Expenditure by UK Households

	Average weekly household expenditure on energy (£)			Energy expenditure as % of total expenditure		
	Domestic	Transport	TOTAL	Domestic	Transport	TOTAL
	Fuel	Fuel		Fuel	Fuel	
Lowest 10 per cent	8.1	3.1	11.2	5.5	2.1	7.6
2nd decile group	9.5	4.7	14.2	5.3	2.6	8.0
3rd decile group	10.6	8.0	18.6	4.3	3.2	7.5
4th decile group	11.2	10.9	22.1	3.6	3.5	7.1
5th decile group	12.1	13.8	25.9	3.2	3.7	6.9
6th decile group	13.2	17.2	30.4	3.0	3.9	7.0
7th decile group	13.3	20.2	33.5	2.7	4.1	6.8
8th decile group	14.5	23.6	38.1	2.6	4.2	6.7
Highest 10 per cent	14.9	27.0	41.9	2.2	4.1	6.3

Source: ONS Family Spending, 2005

More detailed information data on patterns of household expenditure on energy are available for the UK, but not for the UK regions. Overall energy expenditure rises with household income (Table 3). For domestic (non-transport) fuels, energy spending declines as a proportion of total expenditure as income rises; whereas expenditure on transport fuels tends to rise as a proportion of total expenditure as income rises. These two offsetting effects mean that total expenditure on energy makes up a similar share of total expenditure for households in all income groups.

The combination of poor quality housing, high energy prices and low incomes can make it difficult for some households to maintain adequate living conditions – a situation referred to as ‘fuel poverty’. The Government have made substantial efforts to reduce fuel poverty in the UK, and the incidence of fuel poverty has declined sharply according to official data. Fuel poverty is, however, likely to be worsened by rising energy costs unless mitigated by changes to benefits and/or improvement in housing conditions. The South West has a relatively low proportion of households in fuel poverty. According to DTI estimates, around 6.5 per cent of South West households lived in fuel poverty during 2003, compared to 7.2 per cent of households in England, and down from more than 12 per cent in 2001.

GLOBAL & REGIONAL ENERGY TRENDS: SUMMARY

- Global energy consumption has grown steadily over recent years, driven by continuing rapid growth among the major Asian economies.
- This trend is likely to continue in future, as economic development in China and India is associated with increasing industrialisation and with more energy-intensive lifestyles.
- Together with constraints on supplies of the main fuels (particularly oil and gas), growing demand has resulted in substantial increases in global energy prices, and also in a high degree of volatility on global markets.
- Continued brisk growth of global energy demand raises risks that investment in energy infrastructure is not sufficient for supply growth to match demand, putting severe pressure on energy prices. These risks are compounded by risks of political instability and poor governance in some supplying nations.
- There is, nevertheless, considerable uncertainty over the future path of energy prices. Current market expectations are for oil and gas prices to remain close to their present levels over the medium term (until 2010).
- In the UK, higher world energy prices have meant increases in direct fuel costs to businesses and households, and also in higher electricity costs. This has been a key driver of input price inflation.
- The availability of North Sea oil and gas has made the UK self-sufficient in energy over recent years. The UK is, however, now a net importer of coal, and is expected to become a net importer of both oil and gas in the near future. This increases the UK's reliance on distant energy supplies and its exposure to developments in global energy markets.
- The other key issue facing the UK, as all other economies, is the need to reduce reliance on carbon-based energy sources in order to mitigate the dangers from global climate change. This will require incentives to promote greater energy efficiency and to switch from carbon-based to more sustainable energy sources.
- Taken together, the main current trends suggest a future of higher energy costs due to tighter global energy markets and to the effects of policies aimed at reducing carbon dioxide emissions – such as carbon taxes, higher fuel duties, and higher prices for tradeable emissions permits (under schemes such as the EU ETS).
- Overall, the South West is a relatively low energy-intensity economy compared to other UK regions, as measured by either energy consumption per person or in relation to economic output (per £1 million of GVA).
- The region's relatively low overall energy consumption masks, however, a higher than average reliance on energy for transport. High consumption of energy for transport is clearly related to the region's dispersed and peripheral population geography, and to the poor quality of public transport infrastructure in more remote areas.
- Relatively low industrial energy use within the South West is most likely due to the region's economic structure – with a small share of energy-intensive industries as compared to the UK as a whole (although detailed data on energy use by industry are not available at the regional level).
- South West households have the lowest level of non-transport energy consumption per person among the UK regions. Household expenditure on

fuel and energy is, however, relatively high, although fuel poverty is relatively low.

- South West households depend more on electricity as an energy source than is the case in other parts of the UK.

POSSIBLE ECONOMIC IMPLICATIONS FOR THE SOUTH WEST

The issues identified above are likely to influence economic activity in the South West in two broad ways:

1. Changes in global and national energy markets could influence the rate and pattern of economic growth in all economies, including the South West. Such general effects would result from higher production costs consequent upon increased energy prices, increased taxes on energy use, additional production costs associated with tradeable emissions permits, etc. Higher production costs could result in a general reduction in economic growth rates. They might also, however, be expected to result in a change in the structure of economic activity away from energy-intensive and towards less energy-intensive products, industries and technologies in all economies.
2. Changes in the competitiveness of the South West economy because of changes in production and transportation costs *relative to* those in key competitor economies. The above analysis suggests that the South West economy has relatively low energy intensity compared to other parts of the UK, in which case a rise in energy costs might actually improve the regions' competitive position relative to other UK regions, by promoting growth of those (relatively) low energy-intensity industries in which the South West specialises. Similar effects could occur in relation to the international competitiveness of the South West economy.

The South West also has a natural advantage as a location for some types of 'renewable' electricity generation – in particular wind, wave and tidal power (although the South West currently has only a minor share in wind powered capacity as compared to Scotland and Wales in particular). Increasing costs for carbon-based energy sources (oil, gas, and coal) could further stimulate development of renewable generation capacity, which could potentially benefit the South West. The broader 'distributed energy' agenda, set out within the UK Energy Review, would also be expected to lead to a reduction in the concentration of electricity generation and some convergence between electricity supply and demand at a regional level – implying growth in electricity generation within the South West.

On the other hand, the South West's relatively high transport-related energy consumption might inhibit movement of goods and, particularly, people. Higher transport costs could damage the competitiveness of South West businesses directly, by adding to the costs of transported intermediate goods and to the costs of moving finished goods to market. They might also damage South West business competitiveness indirectly, by reducing mobility in labour markets and so lowering the quality of labour market matches and labour productivity. The relative geographical isolation and low population density of parts of the South West could mean that these areas are particularly damaged by such an increase in transport costs. It is, however, important not to overstate the likely size of such effects. Fuel costs comprise a relatively small share of the total costs of motoring and public transport, and even a very large increase in the price of petrol or diesel would have a much smaller impact on total travel costs. (For example, for a fairly typical new family car costing

around £14,000, travelling 10,000 miles a year and returning 42 miles per petrol, a 50 per cent increase in petrol prices would raise total costs by only 7 per cent.)

Such region-specific effects, in addition to being complex, are likely to be fairly small for plausible changes in energy costs – since the differences between the South West and other parts of the UK, in terms patterns of energy usage, are generally minor.

One exception is clear from the analysis above, and indicative of a more general effect – that is, the relatively low energy-intensity of London. Experimental data on energy usage by NUTS3 regions from the DTI suggest other major UK cities also have lower levels of energy consumption relative to their economic output. Clearly, this is partly related to industry structure – with cities economies being concentrated in services and power generation and other high energy-intensity activities being located outside of the main urban areas. It is, however, also the case that urban areas have lower energy costs associated with transporting goods and people than do more rural locations. This is clear in the case of London, which has by far the lowest levels of transport-related energy consumption per person among the UK regions. Increasing energy costs, and greater emphasis on energy-efficiency, may support concentration of both population and economic activity.

Quantifying the likely scale of these effects is fraught with difficulties. For one thing, the future path of energy prices is far from certain. Rather than attempt to forecast of the implications of future changes in energy prices for the South West economy, we briefly present and discuss the results of a simple simulation using a CGE model of the South West economy, which has been developed by SWBEM in collaboration with the University of Strathclyde. The exercise attempts to simulate the implications of an increase in imported energy costs for South West. More specifically, the simulation considers the effects of a permanent 10 per cent increase in prices of energy products imported into the South West from the rest of the UK and overseas. The model produces detailed output on output, GVA, employment, wages, prices and many other economic variables. We present here only a brief overview of the results, which are summarised in Table 4.

The results are reported relative to the benchmark growth path – from the SWBEM long-run output and employment projections. Note that these projections are based on recent trend growth in the key macroeconomic variables for the South West (employment, productivity and output), and therefore incorporate the effects of rises in energy costs over the recent past (1997-2001, during which time oil prices rose by around 9 per cent and gas prices by 12 per cent in real terms). The 10 per cent rise in energy costs within the simulations should therefore be interpreted as an additional 10 per cent increase, above the recent trend.

Table 4: Illustrative Simulation Results - Increase in imported energy costs

	% change relative to baseline after	
	3 years	20 years
GVA	-0.10	-2.19
Consumption	-0.16	-2.08
Investment	-0.26	-2.71
Total Employment	-0.37	-2.92
GVA by sector		
Agriculture etc.	-0.67	-2.75
Manufacturing	-0.54	-3.31
Utilities	3.00	2.13
Construction	-0.97	-3.61
Retail, distribution & transport	-0.19	-2.66
Other Services	-0.38	-2.35
Employment by sector		
Agriculture etc.	-1.02	-3.62
Manufacturing	-0.68	-3.78
Utilities	4.56	2.97
Construction	-1.19	-4.12
Retail, distribution & transport	-0.05	-2.96
Other Services	-0.62	-2.95

Source: *SWBEM*

The results imply a reduction in South West GVA of around 2.2 per cent relative to the benchmark growth path over a 20 year period. Note that this implies only a very marginal reduction in the average growth rate of GVA – from 2.6 per cent per year under the benchmark base to around 2.5 per cent per year. Similarly, a 2.9 per cent reduction in total employment over a 20 year period implies a reduction in the average annual growth rate of total employment from 0.4 per cent a year to 0.3 per cent a year.

The Business and Economy Module of the South West Observatory provides a dynamic source of economic and business research and intelligence, with comprehensive data and analysis to support regional development and evidence based decision making. To improve the availability of regional data the Business and Economy Module has developed a set of Regional Accounts which are freely available to all. For further information please visit the Business and Economy Module website (www.swo.org.uk/bem).

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