



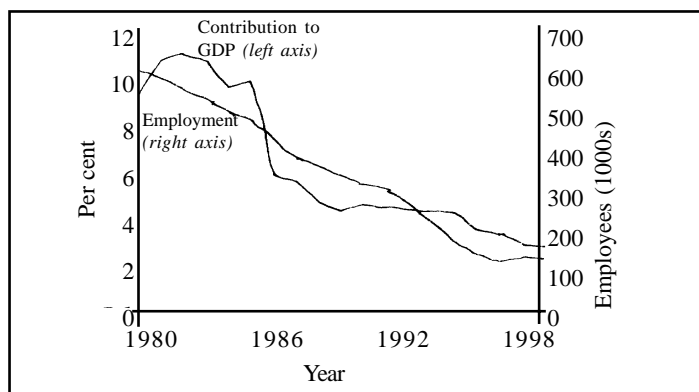
# UK Energy - Update

This Factsheet summarises the importance of the energy industry to the UK economy and the way in which the sources and uses of energy have changed over the last 20 years.

### Importance of the Energy Industry

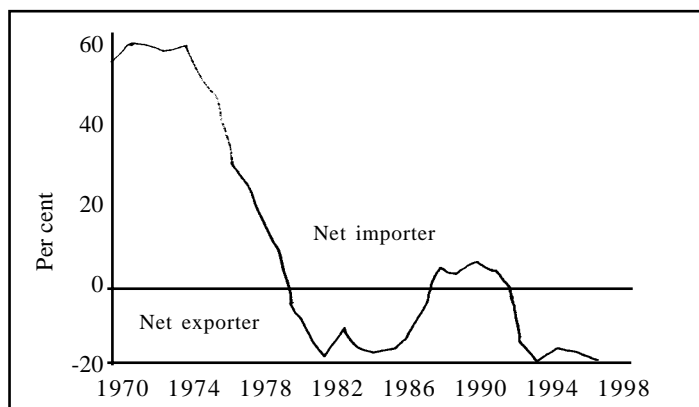
The contribution of the energy industries to UK GDP has dramatically fallen since 1982. Similarly, employment in energy industries has fallen, closure of coal mines being the major cause (Fig 1).

**Fig 1. Contribution of energy industries to UK GDP**



The UK's large reserve of fossil fuels have meant that in almost every year since 1981 the UK has been a **net exporter** of energy and this is expected to continue well into the next century (Fig 2).

**Fig 2. UK net energy imports as a percentage of gross consumption of primary fuels 1970 - 1998**

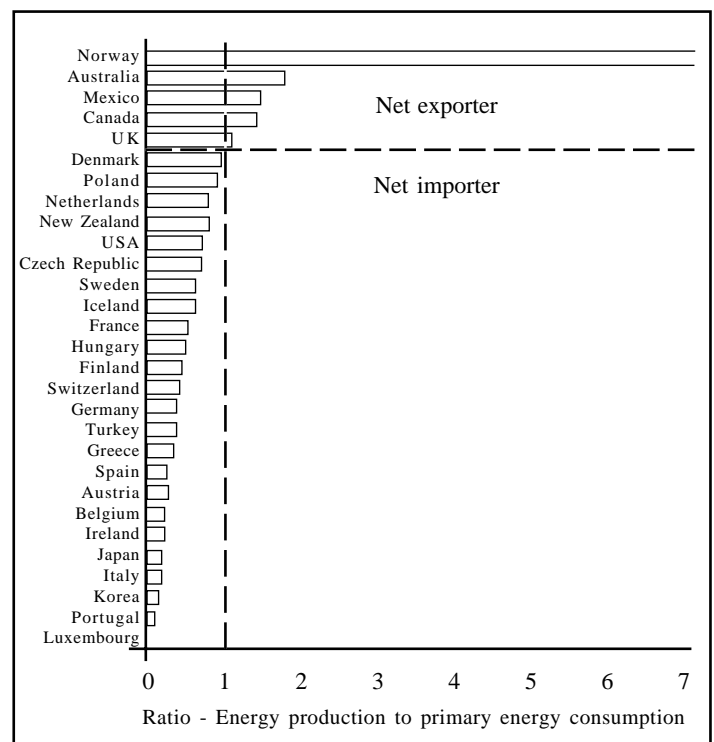


In 1999, energy represented 4% of all exports and 2% of all imports. Thus, the UK is in a small group of countries who produce more energy than they consume (Fig 3).

Since 1950, the energy ratio (energy consumption ÷ GDP) or the extra energy we have used per extra unit of economic output, has fallen (Fig 4). This is a result of:

1. Increases in energy efficiency
2. Fuel switching
3. A decline in the relative importance of energy intensive industries
4. The fact that some industrial uses, eg. space heating of buildings do not increase in proportion to output.

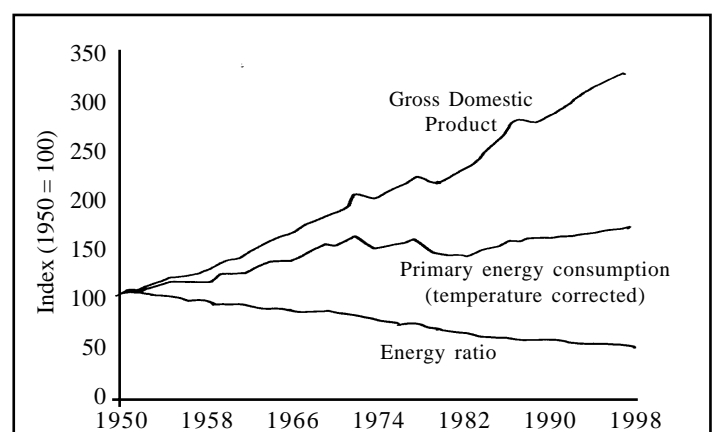
**Fig 3. Ratio of energy production to primary energy consumption in OECD countries, 1997**



### Sources of UK energy

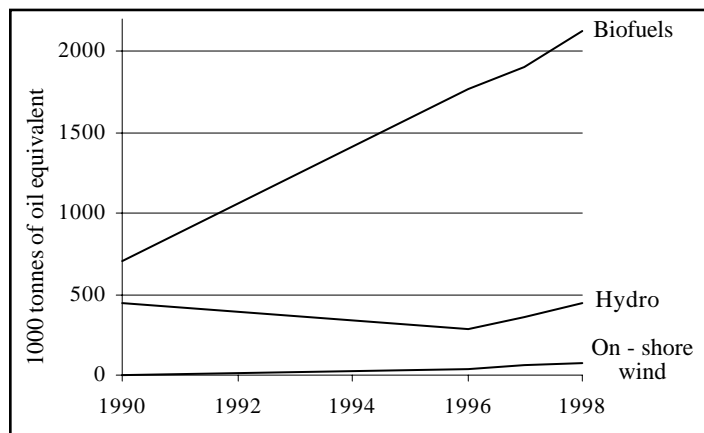
Since 1960, UK energy supplies have become more diverse, that is, we have used an increasing number of different sources. This is considered sensible because it safeguards the consumer and the economy from a sudden shortage of any one type of fuel source. Since the 1970s, the UK has become less dependent on fossil fuels because the contribution from nuclear energy and renewables has increased.

**Fig 4. The UK energy ratio since 1950**



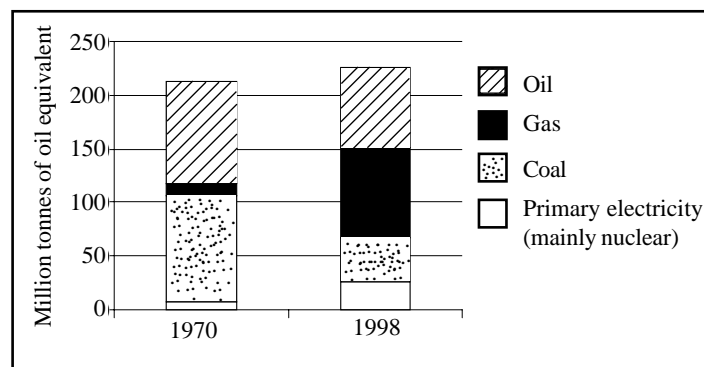
For example, in 1998, renewables produced 2.6% of UK electricity generation, and an increasing percentage of non-renewable energy comes from biofuel and on-shore wind (Fig 5).

**Fig 5. UK use of renewables 1990 - 1998**



Since 1970, consumption of primary electricity (mainly nuclear) and gas has increased and use of coal and oil has decreased (Fig 6).

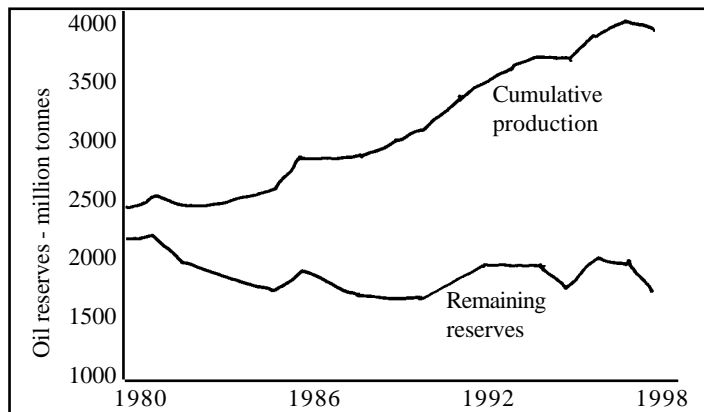
**Fig 6. UK energy consumption 1970 -1998**



**Resource Depletion**

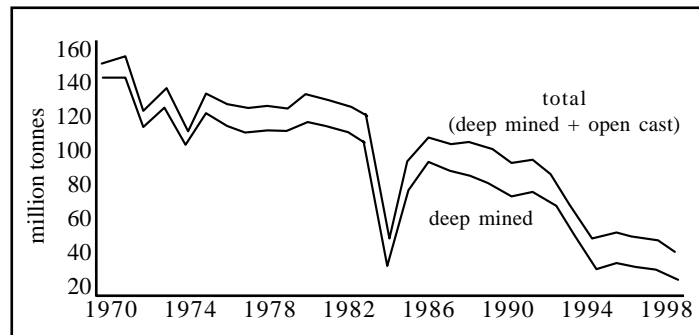
Since 1980, the UK has dramatically increased its oil production but reserves have remained at about the same level (Fig 7). However, we are consuming an increasing percentage of those resources – in 1998 it was estimated that we used 7.5% of proven, probable and possible oil reserves. In other words, if we carry on using this amount and no more oil is discovered, then we will completely run out in 12-13 years. However, it is worth pointing out that as reserves decline, the value of any new finds increase and this makes it economically worthwhile to search harder and it also makes previously uneconomic supplies worth exploiting.

**Fig 7. Cumulative production and estimates of remaining reserves 1980 - 1998**



Similarly, we are using an increasing percentage of our gas resources, but again economists remain optimistic that new reserves will be found. There are an estimated 200 million tonnes of economically viable coal reserves in the UK, but coal production has declined since the 1970s. (Fig 8)

**Fig 8. UK coal production 1970 - 1998**



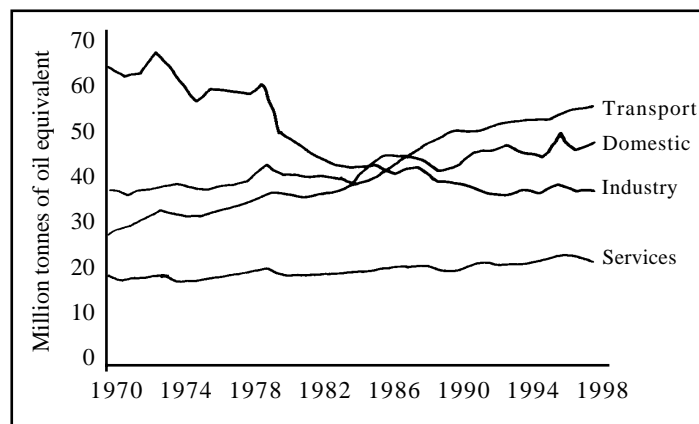
This is the result of:

1. Greater use of gas and oil instead of coal
2. Greater use of imported coal
3. Greater use of renewables
4. Greater use of nuclear power

**What are we using energy for?**

Transport is the biggest user of energy in the UK (Fig 9), followed by domestic use, industry and finally the service sector (commerce, public administration and agriculture).

**Fig 9. Final UK energy consumption by sector 1970 - 1998**



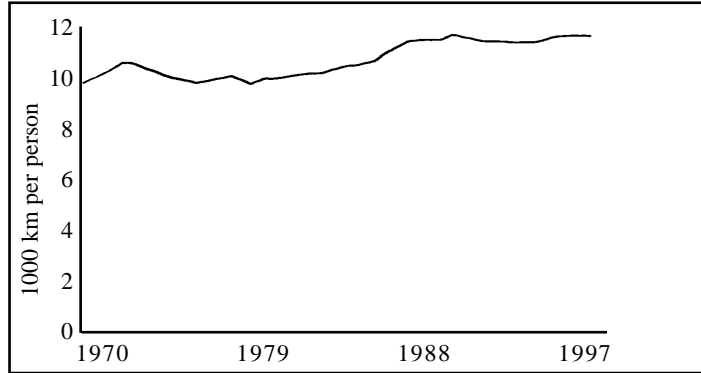
Significantly, while energy used for transport, domestic purposes and services is increasing, energy use in industry is declining - since 1970 it has fallen by 44%. The largest industrial uses of energy are the engineering and iron and steel industries (Table 1). The energy intensity of almost all industry including iron, steel and chemicals has declined, that is, these industries are using less energy per tonne of iron, steel or chemical produced.

**Table 1 UK industrial energy use by sector in 1998**

	Energy use (1000 tonnes of oil equivalent)
Engineering and metals	9 900
of which iron and steel	4 400
Chemicals	7 000
Food, beverages and tobacco	4 000
Mineral products	2 700
Paper, printing and publishing	2 400
Textiles	1 000
Other industry	8 000
<b>All industrial energy use</b>	<b>35 000</b>

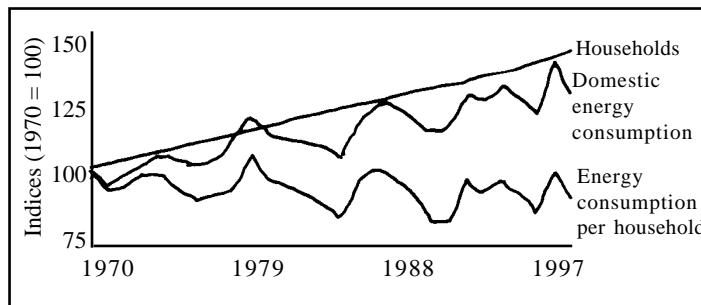
Within the transport industry, air transport has seen the fastest increase in energy use. Conversely, fuel consumption in the rail and water sector has actually fallen since 1970. Meanwhile the number and use of cars has increased (Fig 10) and fuel use in freight transport has more than doubled since 1970.

**Fig 10. UK car use per person 1970 - 1997**



Despite fluctuations, the trend is that domestic energy consumption is increasing. This is a result of the increase in the number of households and the increasing use of energy for space heating and huge increases in the energy consumption from appliances, especially electric showers. However, because there has been a huge increase in the use and depth of insulation—especially loft insulation—total energy used per household has remained about the same for the last 30 years (Fig 11).

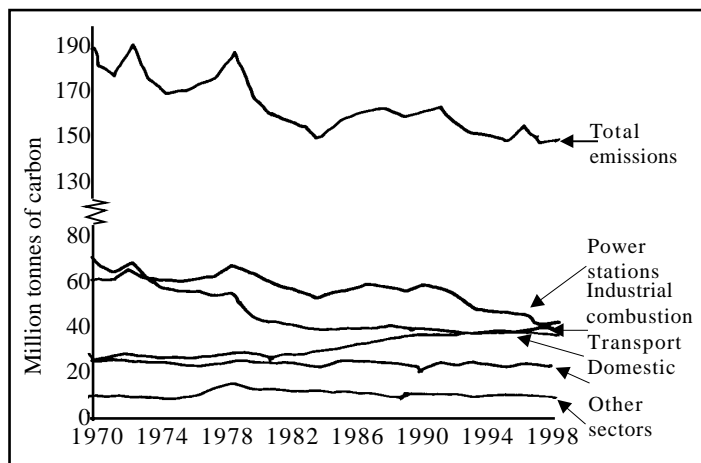
**Fig 11. Energy consumption and number of households 1970 - 1997**



**Energy and the environment**

Carbon dioxide is the most serious anthropogenic (human-made) greenhouse gas. The total U.K. in carbon dioxide emissions and emissions per unit of GDP declined significantly since 1970. The only sector in which carbon dioxide emissions are not decreasing is transport (Fig 12.)

**Fig 12. UK carbon dioxide emissions by source 1970 - 1998**

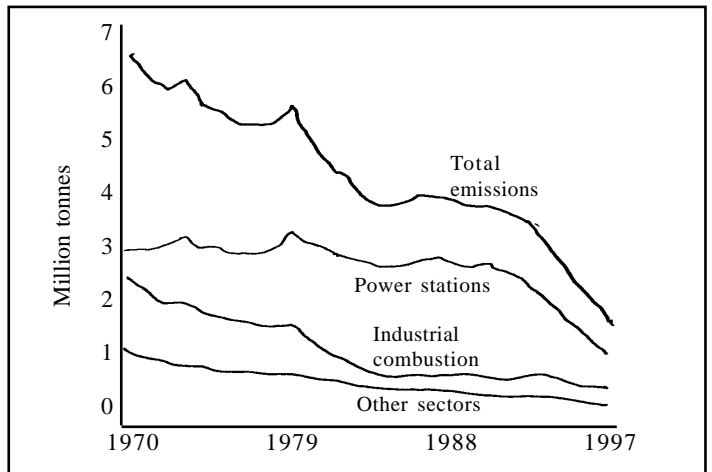


Reduced carbon dioxide emissions are a result of:

1. The increased efficiency of power stations
2. Increased use of nuclear power
3. The substitution of oil and gas for coal

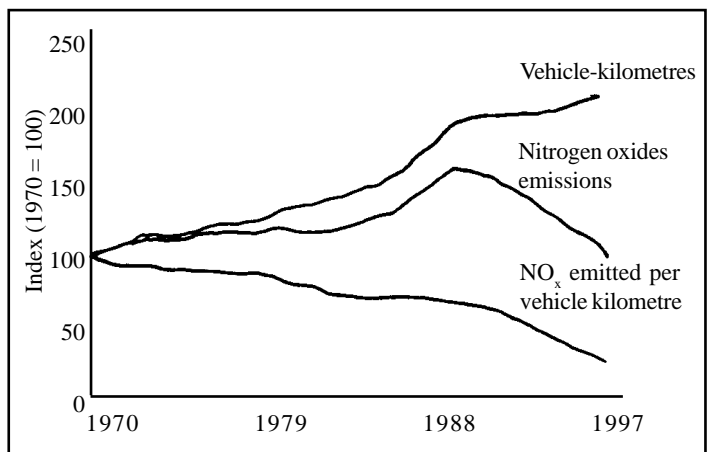
Similarly, emissions of sulphur dioxide – one of the major contributors of acid rain – have decreased dramatically since 1970 (Fig 13). The installation of flue gas desulphurisation – removing sulphur from the chimney gases at power stations – has decreased emissions from power stations by 65% since 1970.

**Fig 13. UK sulphur dioxide emissions by sector 1970 - 1997**



Total emissions of nitrogen oxides have also decreased since 1990. The increased use of energy in transport, tighter emission standards on heavy goods vehicles and the introduction of catalytic converters on all new cars in 1983 has succeeded in reducing emissions (Fig 14).

**Fig 14. Road transport emissions of nitrogen dioxides 1970 - 1997**



The implications of all of these changes will be examined in a future Factsheet.

**Acknowledgements:**

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