ENERGY EFFICIENCY IN THE UK (1990-2000)

Report based on the ODYSSEE data base on energy efficiency indicators and the MURE data base on energy efficiency policy measures with the support from SAVE

March 2002

Summary

This report presents an analysis of energy efficiency trends in the UK on the basis of energy efficiency indicators extracted from the ODYSSEE data base, maintained and updated in the framework of the SAVE programme. This work has been co-funded by the European Commission DG Transport and Energy and the UK Departments of Trade and Industry (DTI) and Environment, Food and Rural Affairs (DEFRA).

This analysis focuses on the period 1990-2000. It also examines policies and measures implemented in the field of energy efficiency with a focus on the years 2000-2001. The full list and descriptions of UK policy measures are presented in detail in an Annex. These descriptions are extracted from the MURE database which is also updated within the SAVE programme.

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March 2002

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1 Introduction

This report represents the UK national case study for the SAVE project “Cross-country comparisons on energy efficiency indicators”. It presents recent energy efficiency trends in the UK on the basis of indicators extracted from the ODYSSEE database.

The first part of the report starts with a review of the situation in terms of data collection and updating. Section 2 then presents some general context which may help to explain trends in energy efficiency:
- the economic situation,
- energy consumption developments,
- recent energy efficiency/environmental policy measures.

An overview of the overall energy efficiency trends by sector is given in Section 3, followed by a focus on one sector, transport. For the other sectors that are not presented in detail (industry, households and services), an annex presents a selection of graphs that show trends for the main indicators.

2 General Context

2.1 REVIEW OF DATA COLLECTION AND UPDATING

Data for the UK input to the ODYSSEE database is collated from a range of sources including the UK Digest of Energy Statistics (DUKES), Transport Statistics Great Britain (TSGB), Energy Factfiles for the Domestic and Non-Domestic sectors published by BRE, colleagues in AEA Technology who manage the National Atmospheric Emissions Inventory (NAEI) and the Energy Efficiency Best Practice Programme (EEBPP), and a wide range of contacts within UK Government and its agencies.

This year has seen the addition of data for 2000 and some updating of data from previous years to reflect revisions made to national data sources and the correction of minor errors. The main points to note from the 2000 data update are:
- Most data provided for 1999 has also been provided for 2000. The only exceptions are the physical output of paper, freight traffic in coasts and rivers and the total floor area of service sector buildings.
- Minor errors in previous years’ data for value added at current prices and energy consumption in the iron and steel sector have been identified and corrected.
- The latest Energy Factfiles have not yet been cleared for publication and hence data from these sources may be subject to later revision.
- Energy consumption data for the road transport sector has been updated using new data from Netcen (part of AEA Technology). This new data is also used as the basis of the current UK National Atmospheric Emissions Inventory.
- Because of the change of reference cycle for the test of the specific consumption of new cars, there is a disruption in the data provided in TSGB between 1995 and 1996.

Therefore for ODYSSEE pre-1996 data have been estimated on the basis of the new cycle.

- Indicators presented in Section 3 and Annex 2 have been calculated directly from UK data sources as ODYSSEE indicators were not available at the time of preparation of this report.

2.2 ECONOMIC CONTEXT

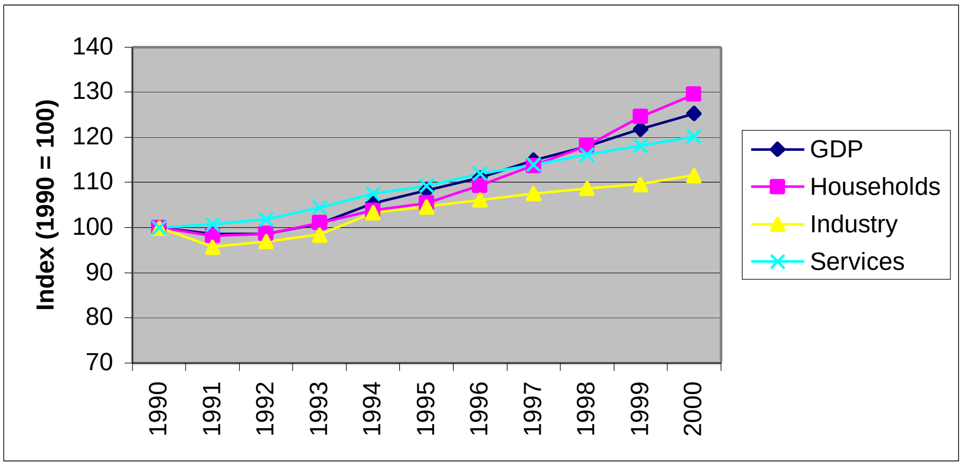
Figure 1 and Table 1 show macroeconomic trends in the UK over the period 1990-2000. All figures are calculated at 1995 prices and then indexed against 1990 values. The whole economy is represented by Gross Domestic Product (GDP), households by private consumption of households, and industry and services by value added.

Table 1: Economic and industrial growth in the UK

%/year	1990-1993	1993-2000	1990-2000
GDP	0.3	3.5	2.5
Industry	-0.5	1.9	1.2

GDP initially dipped in 1991 and then increased again such that the overall increase over the decade averaged 2.5% per year. Household and service sector expenditure followed a similar trend while industrial growth was slower, increasing by only 10% over the period.

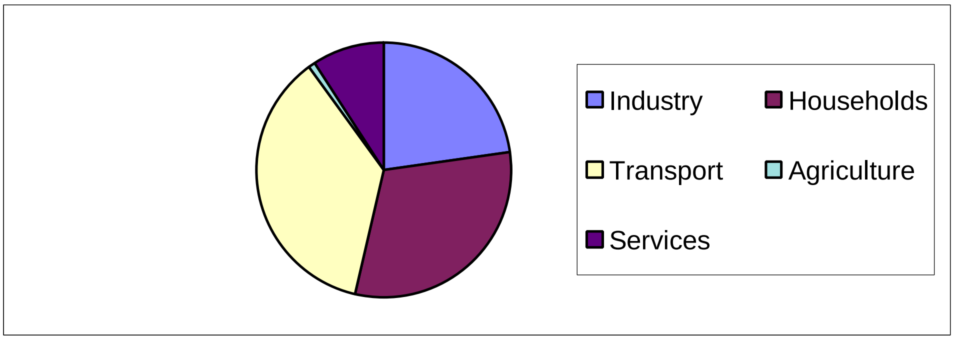
Figure 1: Macroeconomic developments in the UK, 1990-2000



2.3 ENERGY CONSUMPTION TRENDS

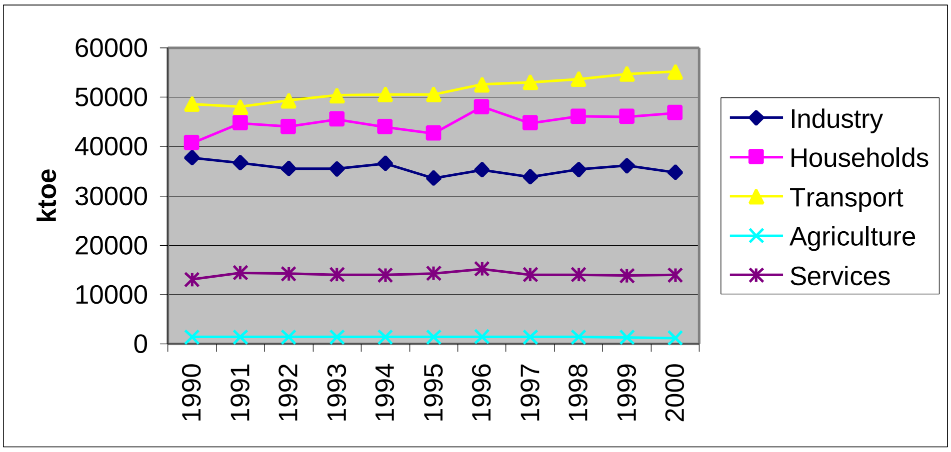
The energy intensity of the UK economy has been reducing at the rate of about 1.5% per year since 1950. This trend is due to a combination of factors: improved energy efficiency, fuel switching, a decline in the importance of energy intensive industries and the fact that some uses, such as space heating, do not increase in line with output. Transport is now the biggest energy user in the UK, accounting for 36% of final energy use in 2000. Households accounted for 31%, industry 23%, services 9% and agriculture 1%. The proportion of final energy demand attributable to each sector in 2000 is shown in Figure 2. Note that the proportion of primary energy consumption due to transport would be smaller, due to the transformation and distribution losses associated with electricity.

Figure 2: UK final consumption by end-use sector in 2000



Annex 2 of this report provides data on energy use in the residential, industry, services and transport sectors between 1990 and 2000. The overall sectoral trends are shown in Figure 3.

Figure 3: UK final consumption by end-use sector (1990-2000)



Total energy consumption increased by over 7% over the decade. Energy use increased in all major sectors over this period, except industry which fell by about 8%. Energy consumption in the residential sector increased by 15% between 1990 and 2000, services energy consumption by 6.5% and transport energy consumption by 13.5%.

2.4 RECENT ENERGY EFFICIENCY/ENVIRONMENTAL POLICIES AND MEASURES

2.4.1 Institutional Changes

The Department of the Environment, Food and Rural Affairs (DEFRA) continues to co-ordinate the UK's climate change programme, with increasing assistance from the devolved administrations: the Scottish Executive, the National Assembly for Wales and the Department for the Environment in Northern Ireland.

A new Carbon Trust was set up in early 2001 to take responsibility for a programme of energy efficiency support measures for businesses.

2.4.2 Measures and programmes

The UK has a legally binding target under the Kyoto Protocol to reduce its greenhouse gas emissions to 12.5% below 1990 levels by 2008-2012 and a domestic goal of a 20% reduction in CO_2 emissions below 1990 levels by 2010. The policies and measures proposed to achieve these goals are listed in Table 2, and some of the key energy efficiency measures are described further below.

Table 2: UK Policies and Measures

Policy	Measures/ programmes
To improve business' use of energy, stimulate investment and cut costs.	• Climate change levy package, including negotiated agreements with energy intensive sectors, an Enhanced Capital Allowances scheme and a new Carbon Trust. • Domestic energy trading scheme. • Energy Efficiency Best Practice Programme. • Exemption of good quality CHP and renewables from the climate change levy. • Market transformation measures. • Integrated Pollution Prevention and Control.
To stimulate new, more efficient sources of power generation.	• Obligation on electricity suppliers to increase the share of electricity generated from renewable sources to at least 10% by 2010. • At least double the UK's CHP capacity by 2010.
To cut emissions from the transport sector.	• European level (ACEA) agreements with car manufacturers. • Graduated vehicle excise duty (see taxation). • Reform of company car taxation (see taxation). • Additional expenditure on public transport.
To promote better energy efficiency in the domestic sector.	• A new Energy Efficiency Commitment (successor to the Energy Efficiency Standards of Performance). • New Home Energy Efficiency Scheme in England and similar schemes in Scotland, Wales and Northern Ireland. • Affordable Warmth Programme. • Promotion of new community heating and upgrading of existing schemes. • More efficient lighting, heating and appliances.
To improve energy efficiency in buildings.	• Improvements in the energy efficiency requirements of the Building Regulations.
To ensure the public sector takes a leading role.	• New targets for energy management of public buildings. • Energy efficiency targets for local authorities, schools and hospitals. • Green travel plans.

The **Climate Change Levy** is a new energy tax applied to the business and public sectors from April 2001 (excluding good quality CHP and renewable energy). Revenue from the levy (expected to be around £1 billion in 2001/02) is being recycled to business via a reduction in employers' National Insurance Contributions and £150 million of additional support for energy saving measures. This additional support takes the form of an Enhanced Capital Allowances (ECA) scheme and the new Carbon Trust. Energy intensive sectors can obtain an 80% discount in levy rates if they agree to meet targets for improving energy efficiency or reducing carbon emissions.

The **Enhanced Capital Allowances scheme** administered by the Carbon Trust gives 100% first year capital allowances for approved energy saving instruments for businesses, who will be able to take this into account when calculating their corporation or income tax bills.

The **Carbon Trust** was set up in April 2001 to provide a co-ordinated, targeted programme of support measures for businesses investing in energy saving technology and practices. It will recycle around £100 million of climate change levy receipts over three years. It is currently developing its programme, but elements will include:

- a programme to accelerate the take up of existing energy efficiency technologies building on the Energy Efficiency Best Practice Programme;
- the enhanced capital allowances scheme;
- a Low Carbon Innovation Programme to support new and emerging technologies.

The **Energy Efficiency Best Practice Programme** is the UK's main energy efficiency information, advice and research programme for organisations in the public and private sectors. The provision of site specific advice (energy audits) is a growing part of this programme.

A **domestic emissions trading** scheme will begin trading in April 2002. The Government will provide support to kick start the scheme by providing a financial incentive for companies to take on binding emission reduction targets. Participants will be able to bid in absolute levels of emission reductions at prices set through an auction to be held in April 2002.

The **Energy Efficiency Commitment** comes into force in April 2002 and will ensure electricity and gas suppliers help their domestic customers, particularly the elderly and those on low incomes, to save energy and cut their fuel bills.

The **New Home Energy Efficiency Scheme (HEES)** was launched in June 2000, and provides grants of up to £1000 for households living on low incomes for a range of heating improvements and insulation measures.

The **Affordable Warmth Programme** has been developed in conjunction with Transco and will facilitate the installation of efficient gas central heating systems and insulation in a million homes by the end of 2005 through the use of operation lease finance.

2.4.3 Budgets

Estimated annual budgets for new programmes:

Enhanced capital allowances: £100 million (2001/02)
Carbon Trust: £33 million (2001/02)
Emissions trading scheme: £30 million (2002/03)

2.4.4 Taxation

The climate change levy is a major new energy-related tax that came into operation in 2001. This is described in the section on programmes and measures, above. Rates of levy are:

- 0.15p/kWh for gas
- 1.17p/kg (equivalent to 0.15p/kWh) for coal
- 0.96p/kg (equivalent to 0.07p/kWh) for liquefied petroleum gas (LPG),
- 0.43p/kWh for electricity.

Car registration tax (Vehicle Excise Duty) has been linked to specific CO_2 emissions since April 2001. The current VED rates are shown below. This replaced the old two-tier system whereby cars with engine sizes below 1200cc were eligible for reduced VED.

Table 3: New car registration taxes from April 2001

Band	CO_2 Emission Figure	Alternative Fuel Car		Gasoline Car		Diesel Car	
	(g/km)	£	Euro	£	Euro	£	Euro
A	Up to 150	90	144	100	160	110	176
B	151 to 165	110	176	120	192	130	208
C	166 to 185	130	208	140	224	150	240
D	Over 185	150	240	155	248	160	256

From April 2002, company cars first registered after January 1998 are to be taxed on a percentage of their price list according to one of 21 CO_2 emission bands. Older company cars will be taxed on the basis of engine size. The charge will build up from 15 per cent of the car's price to a maximum of 35 per cent - in 1 per cent steps for every 5g/km CO_2 above a specified level.

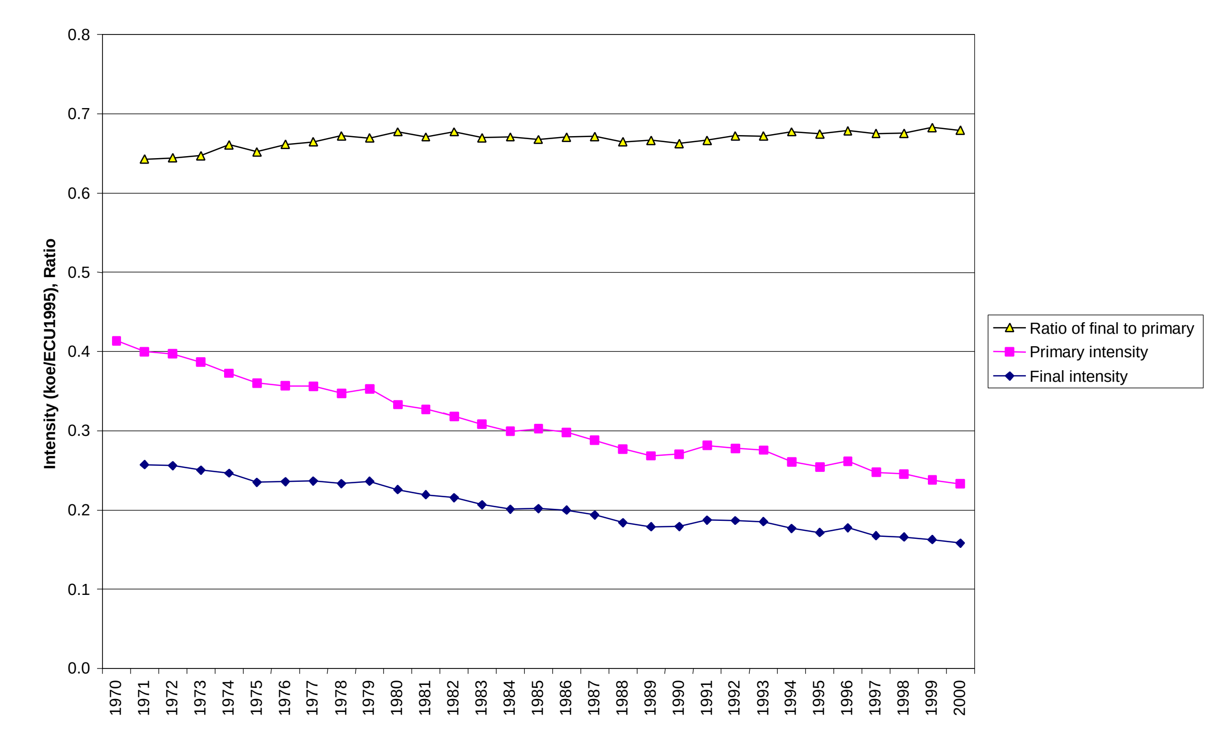
3 Overall assessment of energy efficiency and CO_2 trends

3.1 PRIMARY AND FINAL ENERGY INTENSITY

Two general indicators are generally used to characterise the overall energy efficiency trends: primary energy intensity (i.e. the ratio primary consumption over GDP), and final energy intensity (ratio final consumption over GDP). Primary intensity provides an assessment of the energy productivity of the whole economy. Final intensity characterises the energy productivity of final consumers only. Final consumption, according to the ODYSSEE definition, excludes non-energy uses.

Figure 4 shows a downward trend in both primary and final energy intensity over the whole period 1970-2000. Overall the last decade, primary energy intensity has fallen faster than final energy intensity, and so the ratio of final to primary energy has increased by 7.5%.

Figure 4: Primary and final intensity for the UK, 1970-2000



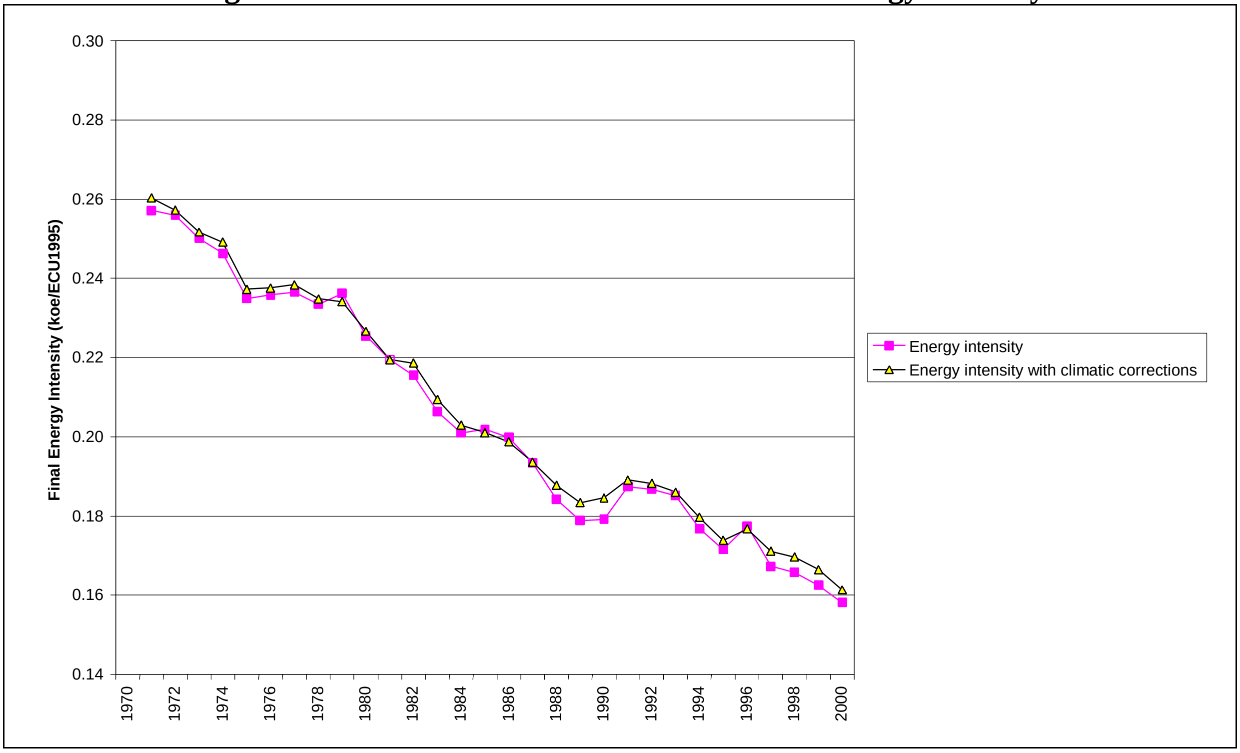
The downward trend in energy intensity suggests improvements in energy efficiency, but there may be other underlying effects such as changes in the structure of the economy. This is explored further in Section 3.3.

The recent increase in the ratio of final to primary energy may be explained by the increased proportion of energy use by the transport sector, as discussed in Section 2.3. In this sector, there is little consumption of electricity so the difference between final and primary energy use is much less. The efficiency of electricity generation has also increased markedly over the last decade due to the introduction of combined cycle gas turbine plant. These effects have offset a recent trend towards increased use of electricity in the industrial sector.

Energy intensity values will be influenced by the climate, as more space hearing is required in colder years. To clean energy indicators, and in particular energy intensities, from the influence of climatic variations, indicators are calculated with climatic corrections. The final energy intensity with climatic corrections represents the theoretical value of the final intensity corresponding to a normal winter.

Figure 5 shows the long term trend in final energy intensity corrected for climatic variations. With the exception of 1996, most winters in the last decade were warmer than the long term average, and so the final energy intensity increases when climate is taken into account.

Figure 5: Effect of climatic variations on final energy intensity



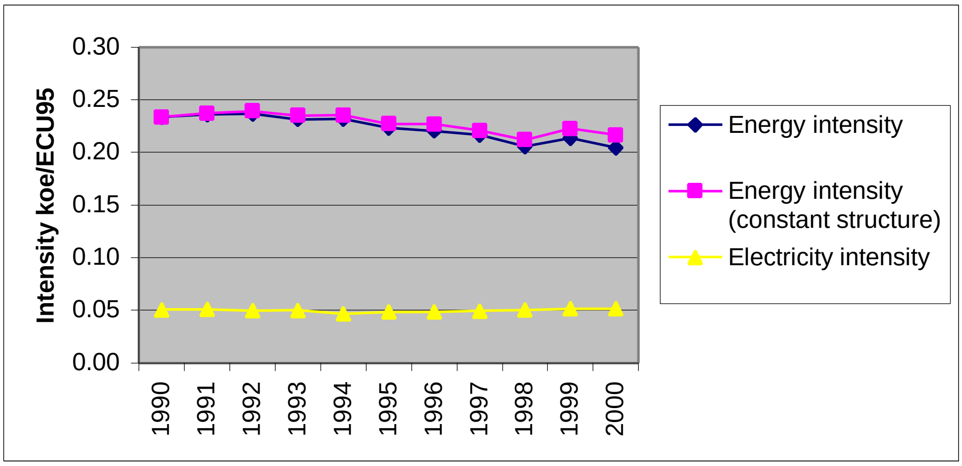
3.2 OVERVIEW OF MAIN ENERGY INDICATORS BY SECTOR

This section provides an overview of the main energy indicators for industry, households and the services sector between 1990 and 2000. Annex 2 shows longer term trends in these indicators, and other selected sectoral indicators. Transport indicators are shown in Section 4.

3.2.1 Industry

Figure 6 shows trends in energy intensity and electricity intensity for UK manufacturing industry between 1990 and 2000. This comes against a background of growth in the value of manufacturing industry (up 10% between 1990 and 2000). Energy consumption has fallen by 4% over the period while electricity consumption has risen by about 1% per year.

Figure 6: Energy and electricity intensity of manufacturing industry

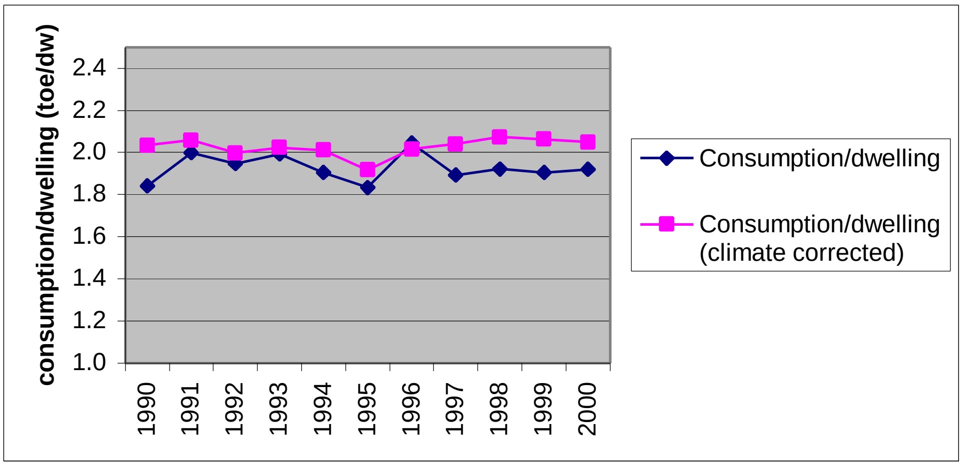


The final energy intensity indicator can be "cleaned" from the influence of changes in the structure of industry by calculating a fictitious intensity at constant structure of industry (in this case the year 1990 is taken as the reference structure). As shown in Figure 6, this has the effect of increasing energy intensity towards the end of the decade, indicating a shift towards less energy intensive manufacturing sectors. This accords with the trends in energy and electricity consumption, indicating a move away from traditional heavy industry, e.g. primary metal production and towards higher value light industries such as electronics and printing.

3.2.2 Households

Figure 7 shows trends in energy consumption per household between 1990 and 2000. The trend for energy consumption per unit floor area would be similar as average floor areas have not changed significantly in recent years. There has been little change in average energy consumption, aside from the natural fluctuations due to climatic conditions. As noted above, winter temperatures were above the long term average for most years in the 1990's and so the climatically corrected figures for energy per dwelling are generally higher.

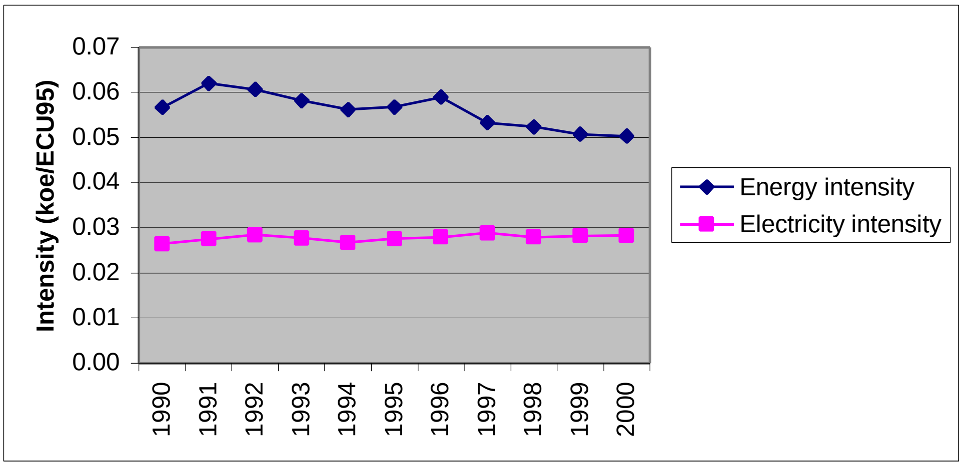
Figure 7: Energy consumption per dwelling for UK households



3.2.3 Services

Figure 8 shows trends in energy and electricity intensity for the UK services sector between 1990 and 2000. The value of this sector rose by about 20% over the period whilst energy consumption rose by only 7%. Electricity consumption kept pace with the value of the sector, with any efficiency gains offset by the increased use of electrical equipment such as computers in offices. The reduction in energy intensity can largely be attributed to improvements in the efficiency of space heating, better insulation and the turnover of older buildings. There will also be climatic effects due to fluctuating space heating requirements, which would explain the peak in 1996.

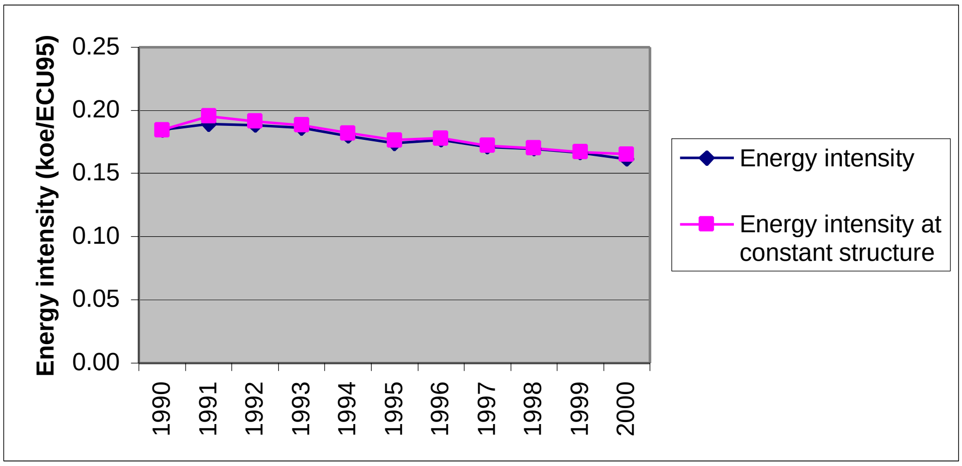
Figure 8: Energy and electricity intensity for the UK services sector



3.3 INTERPRETATION OF FINAL ENERGY INTENSITY VARIATIONS

Variations in the final energy intensity once cleaned from climatic fluctuations, stem from changes in the structure of the GDP by branch ("structural changes"), in lifestyles (more cars, bigger cars, larger dwellings) or in the economy not reflected in the GDP structure (other structural changes), and finally changes in energy efficiency. Final energy intensity can be "cleaned" from the influence of changes in the structure of the GDP, by calculating a fictitious intensity at constant GDP structure (in this case the year 1990 is taken as the reference structure). If we consider that changes in macro-economic or industrial structures are not really efficiency changes, intensity at constant structure with climatic corrections provides a good overall indicator of energy efficiency. In the case of the UK over the period 1990-2000, there was little difference between the values of energy intensity and energy intensity at constant structure (see Figure 9). This suggests that structural changes such as the relatively high growth of the services sector, have had little effect on overall energy intensity.

Figure 9: UK energy intensity at constant GDP structure

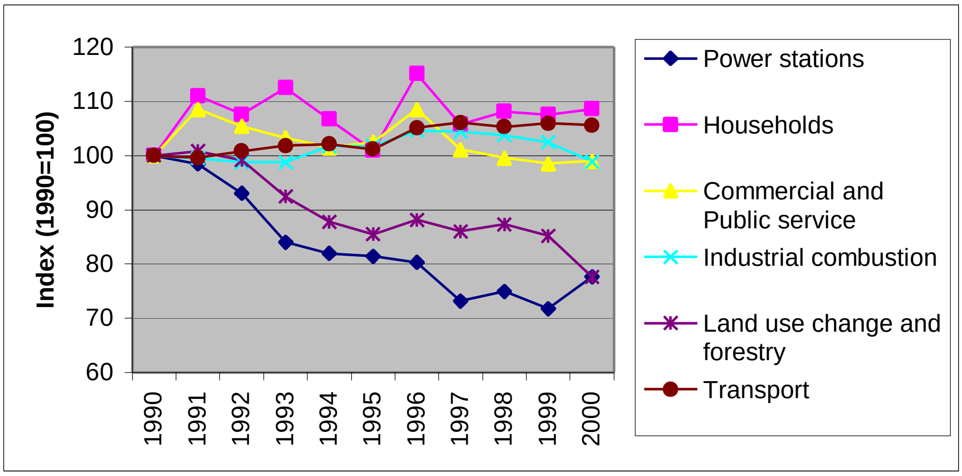


3.4 CO_2 EMISSIONS

Under the Kyoto protocol, the UK is committed to reducing greenhouse gas emissions by 12.5% below 1990 levels in the period 2008-2010. The Government has also adopted a domestic goal of reducing carbon dioxide (CO_2) emissions by 20% below 1990 levels by 2010.

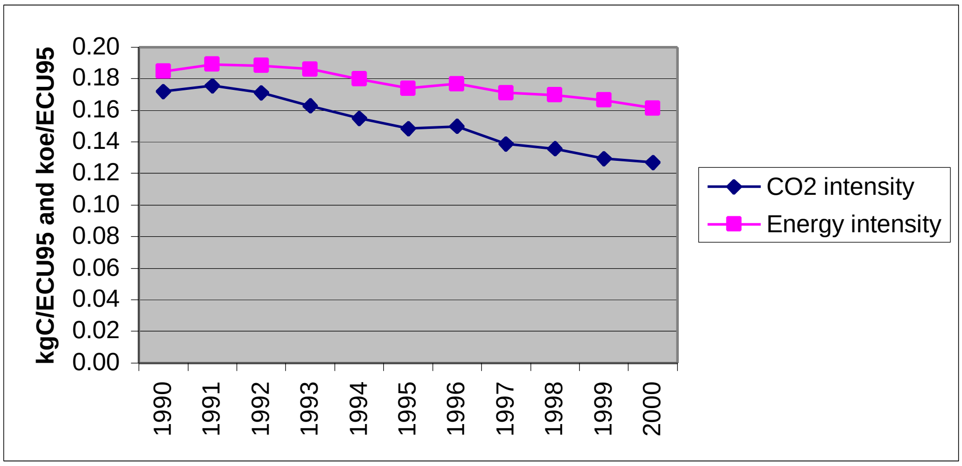
CO_2 emissions are reported annually by source sector according to the requirements of the United Nations Framework Convention on Climate Change (UNFCCC). Figure 10 shows the trend in emissions from each source sector over the period 1990-2000.

Figure 10: UK carbon dioxide emission trends 1990-2000



CO_2 intensity has reduced more rapidly than energy intensity over the period, due to fuel switching, mainly from coal to gas. This effect is shown in Figure 11.

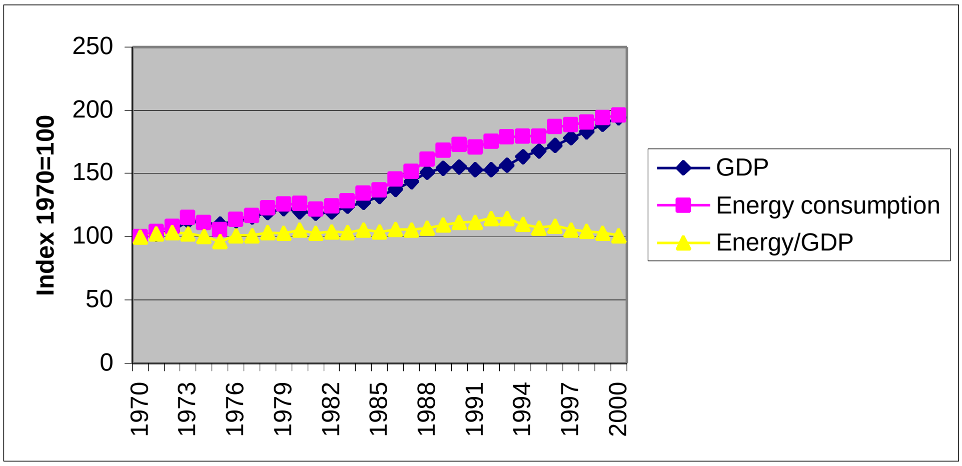
Figure 11: Energy and carbon dioxide intensities 1990-2000



4 Transport energy efficiency trends

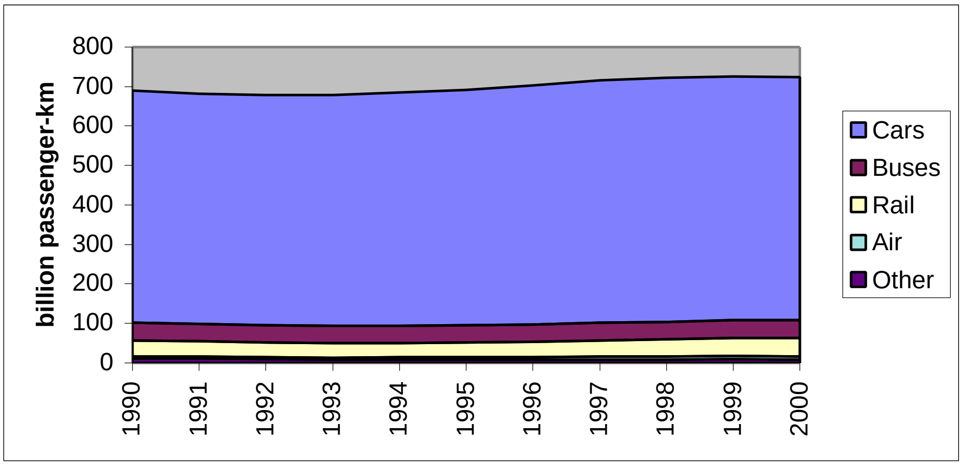
The intensity of transport relates the energy consumption of the sector to the total GDP, as transport activities are influenced by all economic sectors. It is not an energy efficiency indicators per se, but it does show the dynamics of transport energy consumption in relation to economic growth. Figure 12 shows how this indicator has been fairly stable, such that transport energy use and economic growth have followed a similar trend over the last 3 decades. Some analysts believe that this link will shortly be broken by through a shift to public transport (as part of the Government's 10 year plan for transport) and increases in car fuel economy due to the Voluntary Agreements with car manufacturers.

Figure 12: Transport energy use and economic growth since 1970



Passenger transport in the UK is currently dominated by the car, as shown in Figure 13. Cars currently contribute about 85% of passenger-kilometres, with buses and rail at about 6% each. Domestic air transport is grew at a rate of about 6% per year between 1995 and 2000, but still only contributes about 1% of total passenger-km.

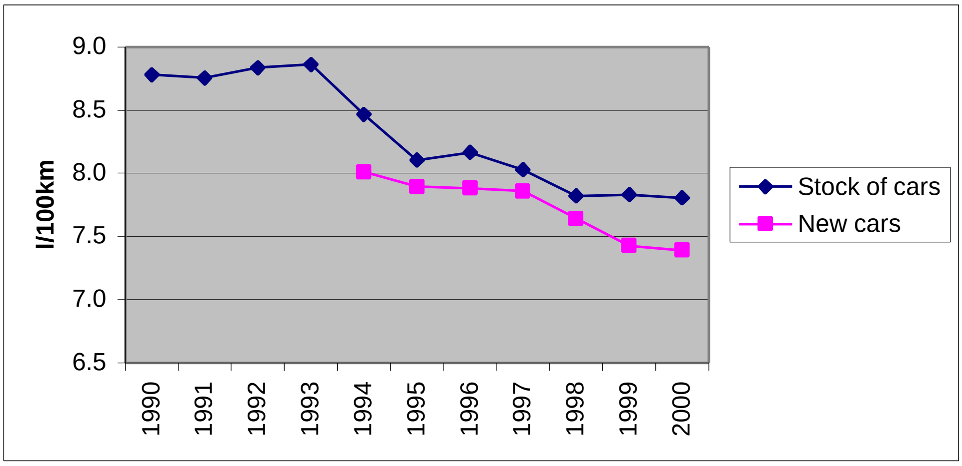
Figure 13: Passenger transport by mode, 1990-2000



4.1 ENERGY EFFICIENCY OF CARS

Figure 14 shows trends in the fuel efficiency of new cars and the UK stock of cars since 1990. The new car data was supplied by ACEA and data is not available before 1994; previous UK data on new car fuel consumption was based on a different test cycle. Figure 14 indicates that fuel economy is improving for new cars, which is leading to improvements in the vehicle fleet. This suggests the ACEA/JAMA/KAMA agreements with the European Commission are starting to have an impact, after many years of fairly steady specific energy consumption.

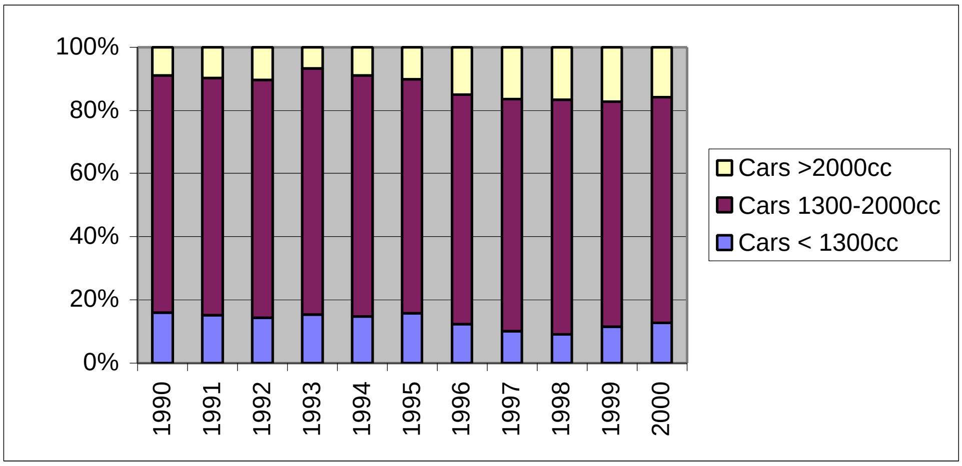
Figure 14: UK car fuel efficiency 1990-2000



The number of cars in the UK stock is increasing but this is offset by a reduction in the average distance driven each year. Therefore overall the unit consumption per car is falling at a similar rate to the fuel efficiency.

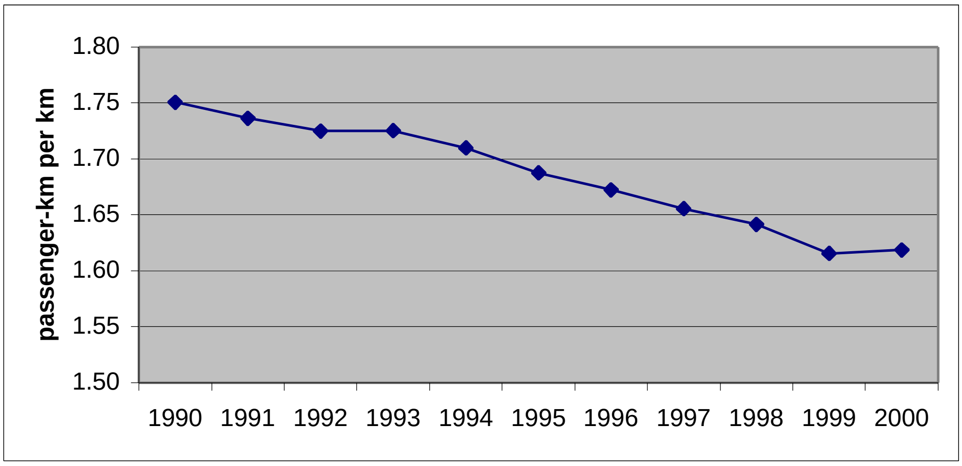
There are a number of possible reasons for an apparent efficiency improvement – the technology may be improving, customers may be downsizing to smaller vehicles or there may be differences in driving behaviour, for example due to speed restrictions. Indicators from the ODYSSEE database, such as the energy savings indicator, may help to disaggregate these effects when available. Figure 15 suggests that in fact UK customers are “upsizing”, with a greater proportion of cars over 2 litre engine size sold in the second half of the decade. It is hoped that the new graduated vehicle excise duty described in Section 2.4 will help to reverse this trend.

Figure 15: Engine size distribution for new car sales


100%
80%
60%
40%
20%
0%
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
Cars >2000cc
Cars 1300-2000cc
Cars < 1300cc

Specific fuel consumption per passenger-km is improving at a slower rate because car occupancy continues to fall (see Figure 16). This is likely to result from growth in ownership, with 68% of households having regular use of a car in 2000 compared to 63% in 1990.

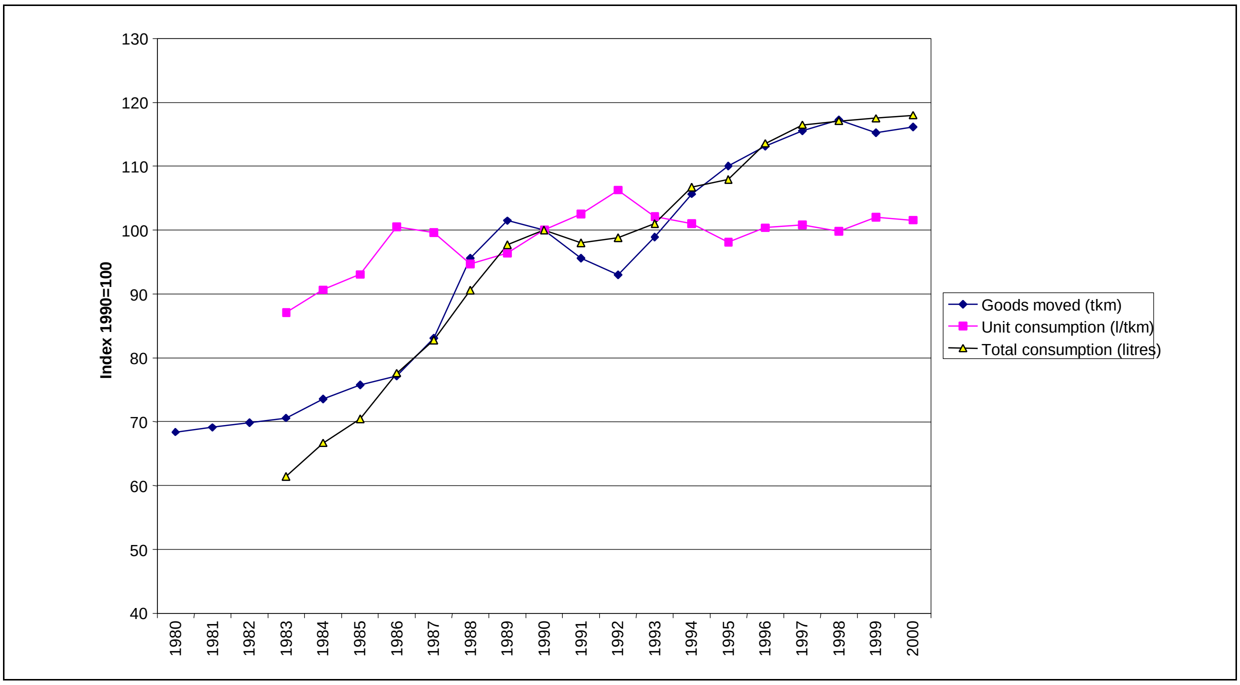
Figure 16: Occupancy of cars



4.2 ENERGY EFFICIENCY OF FREIGHT TRANSPORT

Unit consumption of trucks (toe/vehicle) has increased steadily at a rate of about 3% per year between 1990 and 2000, but there has been a corresponding increase of 1.6% per year in the distance travelled by a truck, and the average load has also increased. Overall, therefore, the specific energy consumption of trucks (energy per tonne-km) is likely to have remained fairly constant. Unfortunately data on goods moved (tonne-km) is not disaggregated by vehicle type. However, we are able to see a similar trend in Figure 17, which shows the goods moved, unit consumption and total consumption for all road freight transport, i.e. trucks and vans.

Figure 17: Goods moved, unit consumption and total consumption for Road freight transport 1980-2000 (Index 1990=100)


130
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1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
Goods moved (tkm)
Unit consumption (l/tkm)
Total consumption (litres)

5 Conclusions

UK final energy intensity has continued to fall over the period 1990-2000. Structural changes, such as the relatively high growth of the services sector, have had little effect on this final energy intensity. Instead gains can be attributed to fuel switching in industry, households and the services sector, and energy efficiency improvements in all sectors.

In manufacturing industry, final energy intensity has fallen by about 13% over the decade. Electricity consumption has rose by 1% per year, so improvements in primary energy intensity did not keep pace with those of final energy intensity. For industry the structural effects were greater, with a trend away from energy-intensive sectors making a significant contribution to energy intensity changes.

The energy consumption per household changed little over the period 1990-2000, with greater demands for electrical appliances being offset by improvements in space heating efficiency and insulation. The picture was similar in the services sector with energy intensity falling by 10% while electricity intensity increased slightly. Again this suggests increased use of electrical equipment such as office computers accompanied by improved building energy efficiency.

Energy consumption by transport has been increasing in line with economic growth (GDP) for over 30 years but there are some signs that the link will be broken in the next few years. In particular, the fuel economy of new cars is improving rapidly and this is starting to have an impact on the efficiency of the car stock. Less encouragingly, the unit consumption of freight transport (energy consumption per tonne-km goods moved) has remained fairly constant over the period 1990-2000.

Annex 1: Summary of Energy Efficiency Measures by Sector

This annex lists UK energy efficiency measures that have been in place during the period 1990-2000 and are included in the MURE database. Further details of current measures are provided in Annex 3.

Industry sector

MURE Code	Measure Title
A0UK5	Making a Corporate Commitment
A0UK7	Building Regulations (Amendment) 1994: Limitation of Heat Loss Through the Building Fabric
A0UK8	Building Regulations (Amendment) 1994: Controls for Space Heating and Hot Water Storage
A0UK9	Building Regulations (Amendment) 1994: Insulation of Vessels, Pipes and Ducts
A0UK10	Building Regulations (Amendment) 1994: Lighting
A0UK15	Best Practice Programme – Industry
A0UK14	Energy Saving Trust
A0UK37	Emissions Trading Scheme
A0UK38	Climate Change Levy
A0UK39	Making a Corporate Commitment 2
A0UK44	Revised Building Regulations (2001
A0UK45	The Carbon Trust
A0UK46	Integrated Pollution Prevention and Control (IPPC)
A0UK47	The Enhanced Capital Allowance Scheme

Domestic sector

MURE Code	Measure Title
A1-UK 1	Building Regulations 1991 - Limitation of Heat Loss through the building fabric
A1-UK-2	Building Regulations 1991 – Insulation of Hot Water Storage Vessels, Pipes
A1-UK-3	Building Regulations 1991 – Controls for Space Heating and Hot Water Supply
B4-UK-1	Home Energy Efficiency Scheme
B4-UK-3	The Energy Saving Trust
B4-UK-7	The Energy Saving Trust – CHP in Residential Buildings
B4-UK-14	The Energy Saving Trust – Energy Efficiency Advice centres
B4-UK-15	Reduction in VAT rate for Energy Saving Materials
C1 UK 1	VAT on Domestic Fuel
B4 UK 18	New Home Energy Efficiency Scheme
B6 UK 4	"Are you doing your bit?" campaign
E1 UK 2	Energy Efficiency Commitment
A1 UK 6	Revised Building Regulations (2001)
B4 UK 19	Transco Affordable Warmth Campaign
B4 UK 17	Replacement of Community Heating

Transport sector

MURE Code	Measure Title
C0UK2	EU CO_2 from Cars Strategy
D0UK2	Graduated Vehicle Excise Duty
D0UK3	Company Car Taxation
E0UK6	Ten Year Plan for Transport
H0UK7	Greener Fleet Certification Scheme – Motorvate

Services sector

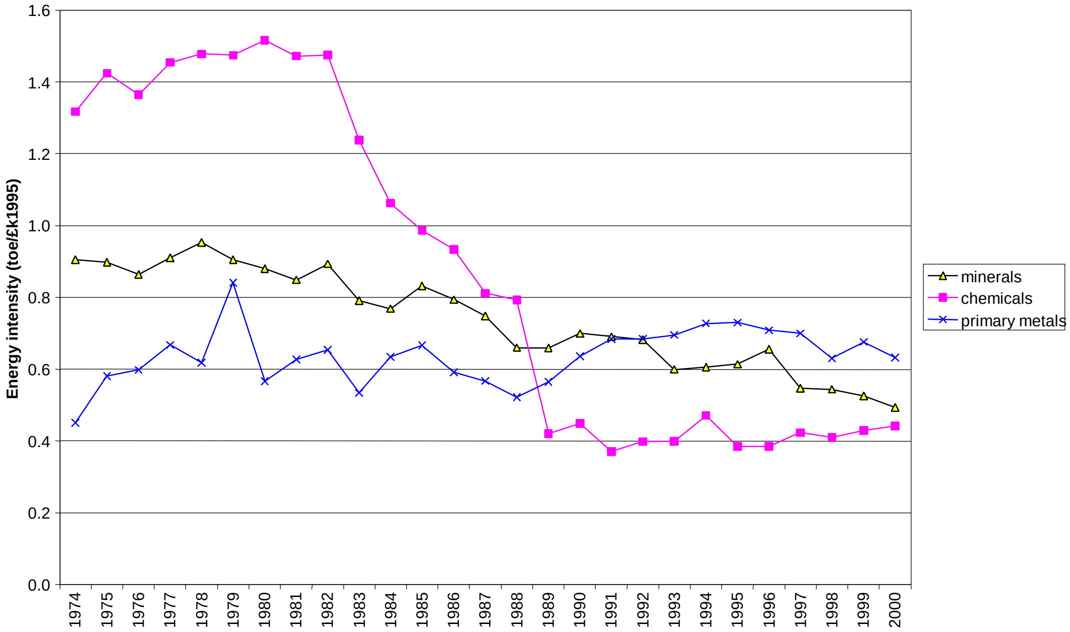
Energy efficiency measures for the tertiary or services sector had not been collated at the time of preparation of this report. However, some of the measures described under industry or households are also applicable to the services sector, e.g. the Energy Efficiency Best Practice Programme and the Carbon Trust.

Annex 2: Long-term Sectoral Energy Efficiency Trends

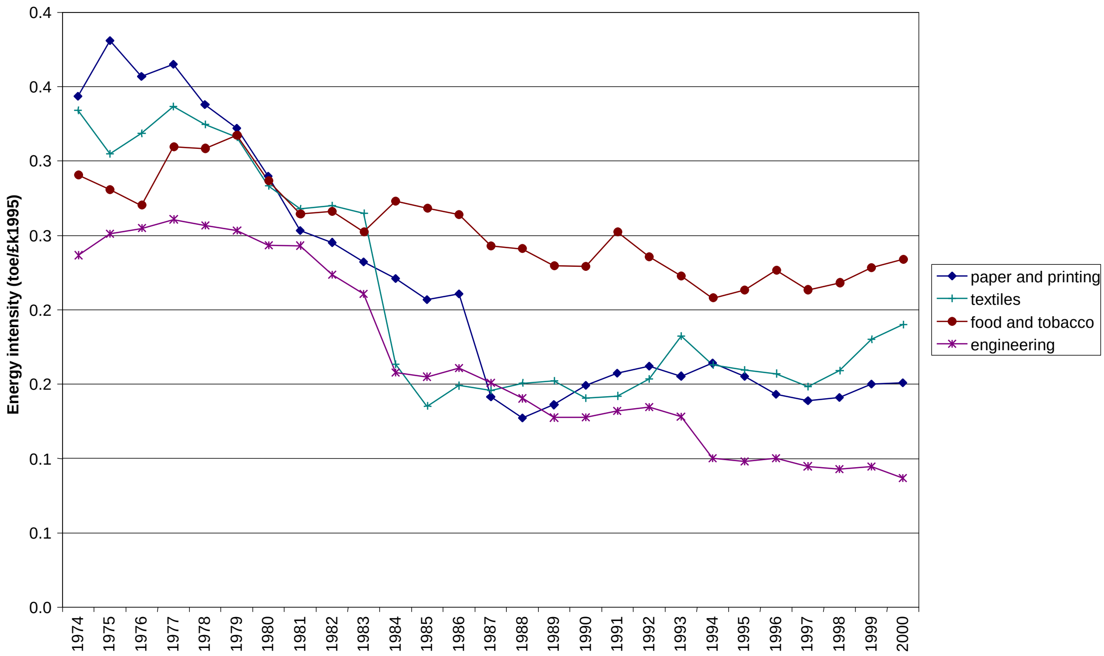
The graphs in this annex illustrate some of the trends described in Section 3.

Industry

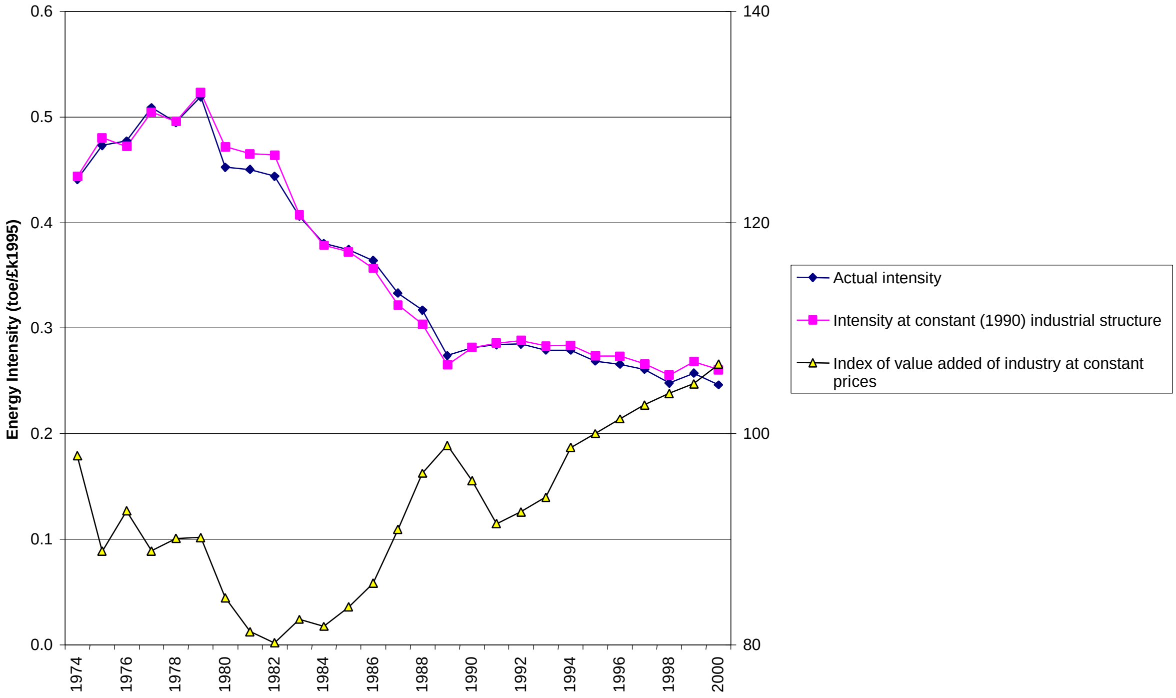
Energy intensity for the minerals, chemicals and primary metals industries



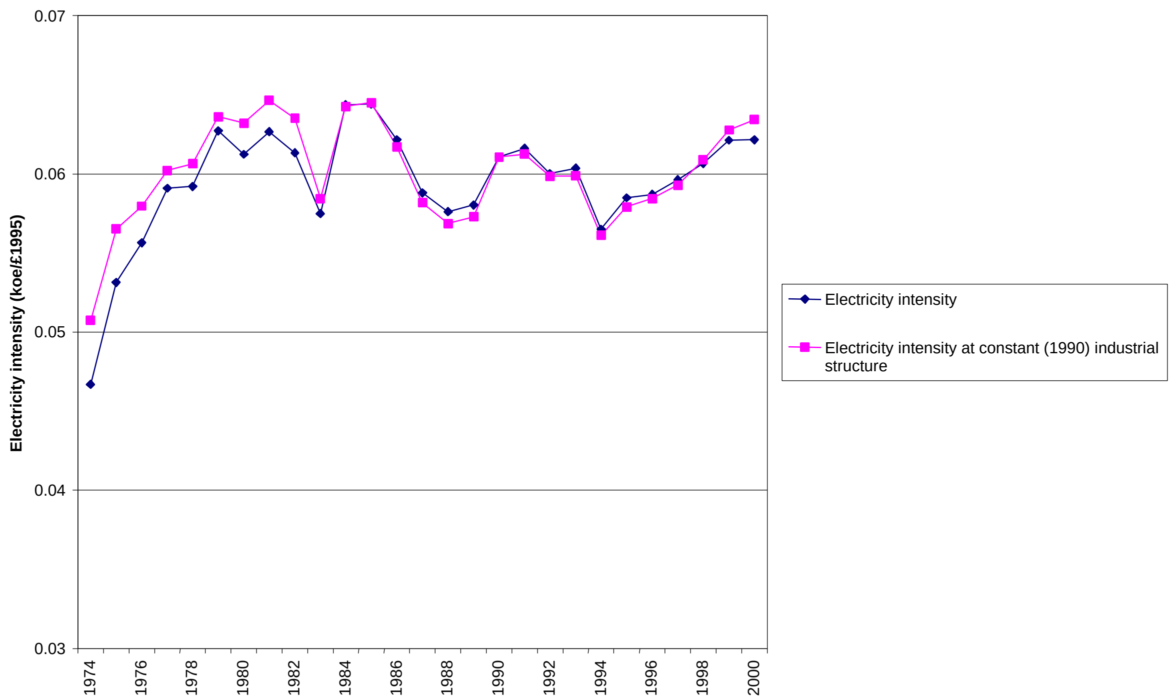
Energy intensity for the paper, textiles, food and engineering industries



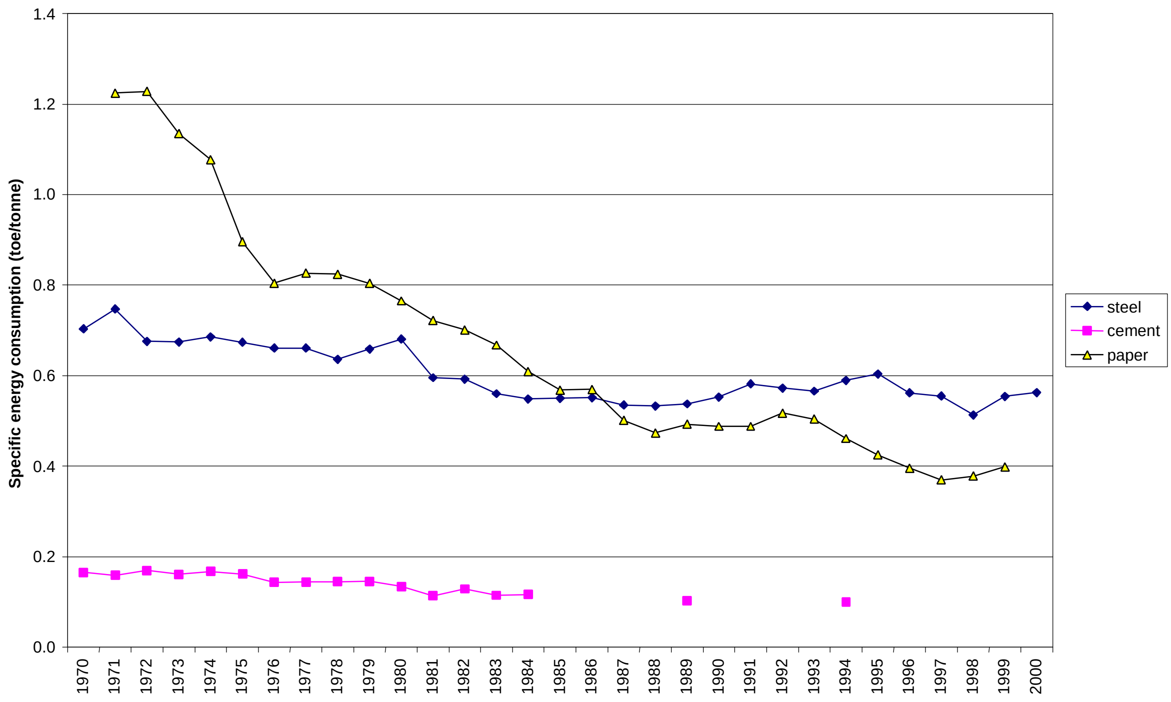
Energy intensity of industry and the effect of industrial structure



Electricity intensity of industry and the effect of industrial structure

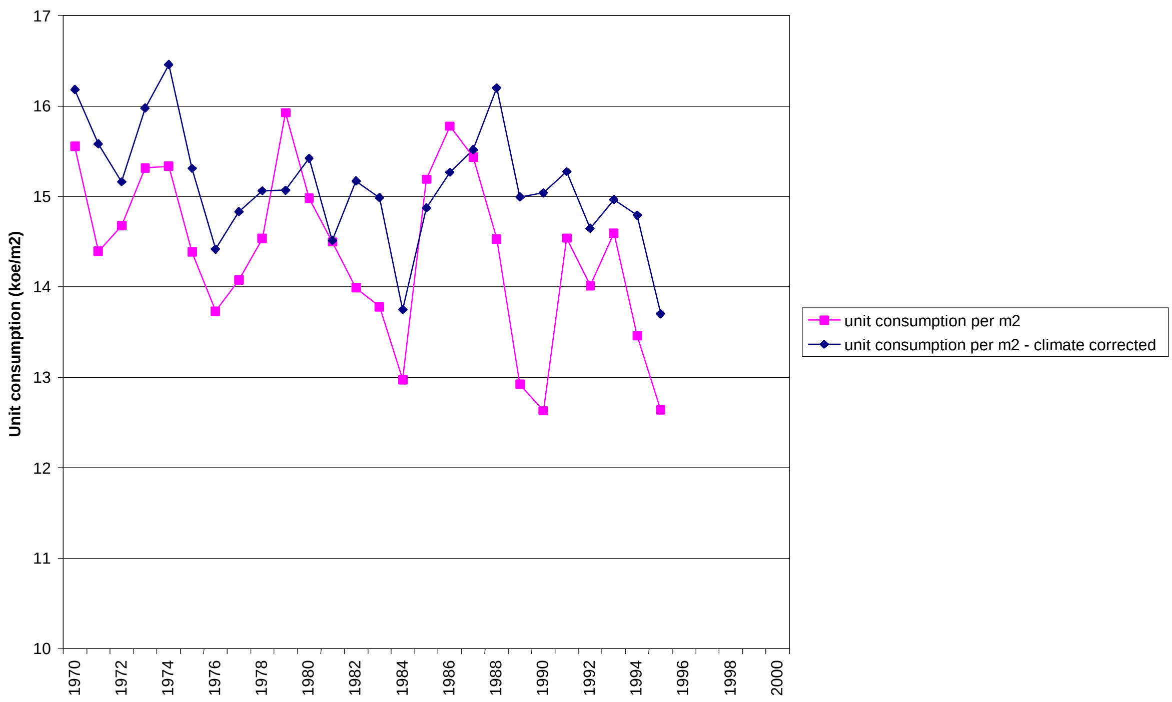


Unit energy consumption for the production of steel, cement and paper

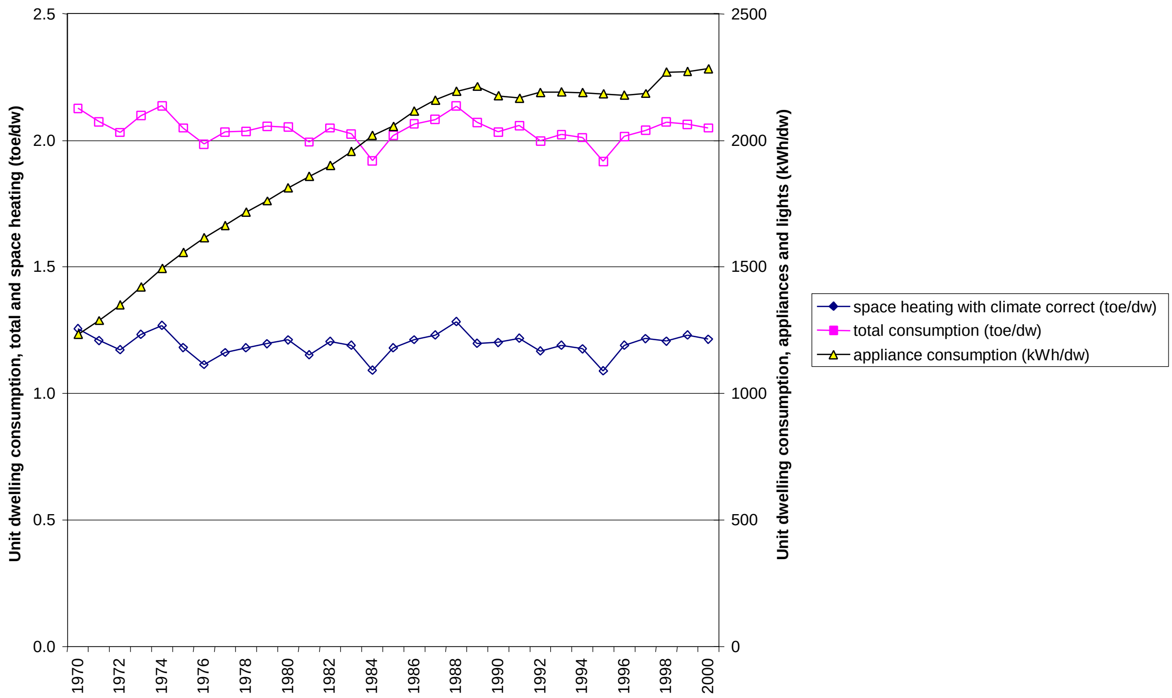


Households

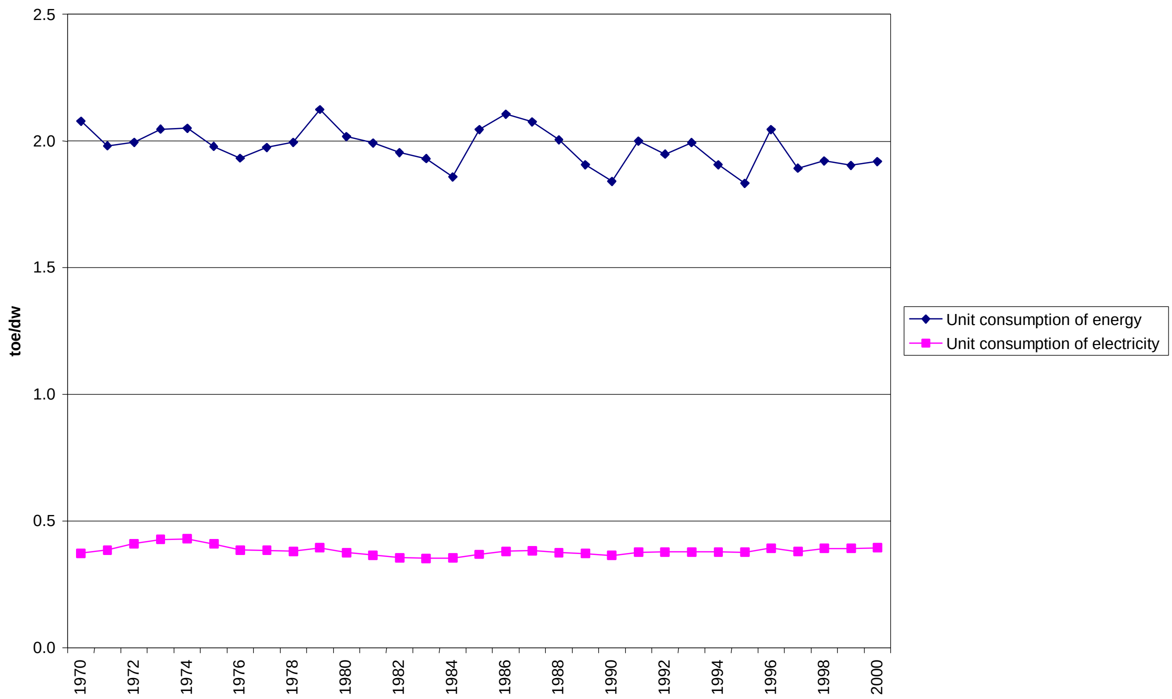
Unit consumption per unit floor area for households



Unit dwelling consumption for households

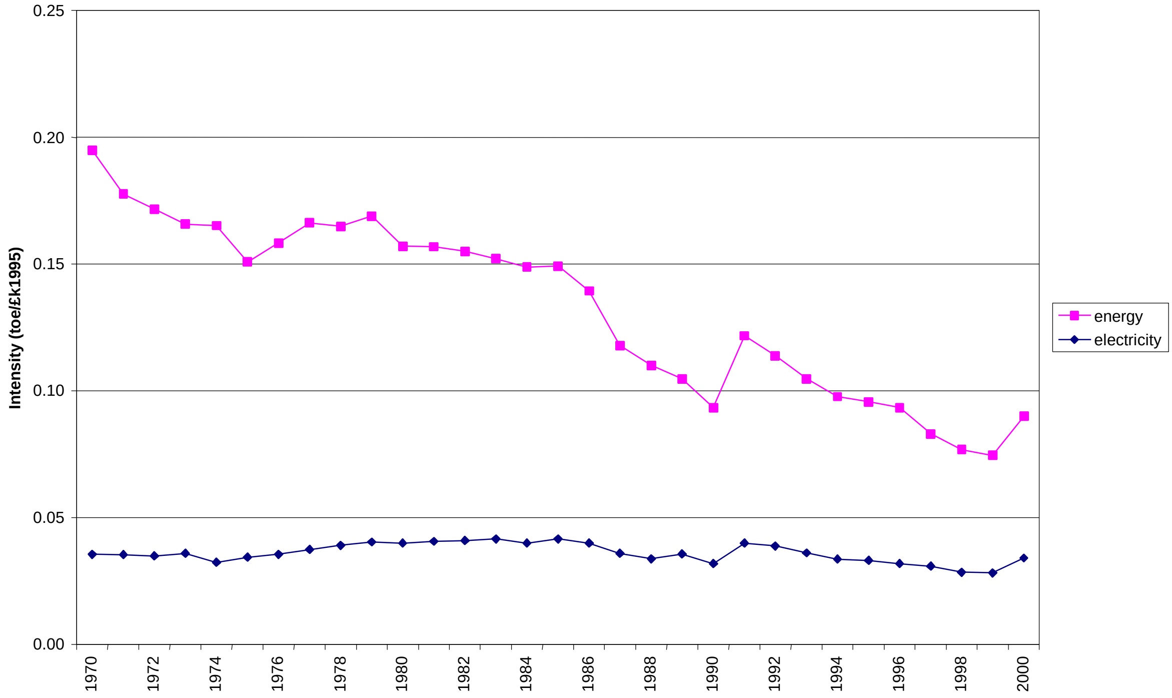


Unit consumption of energy and electricity for households

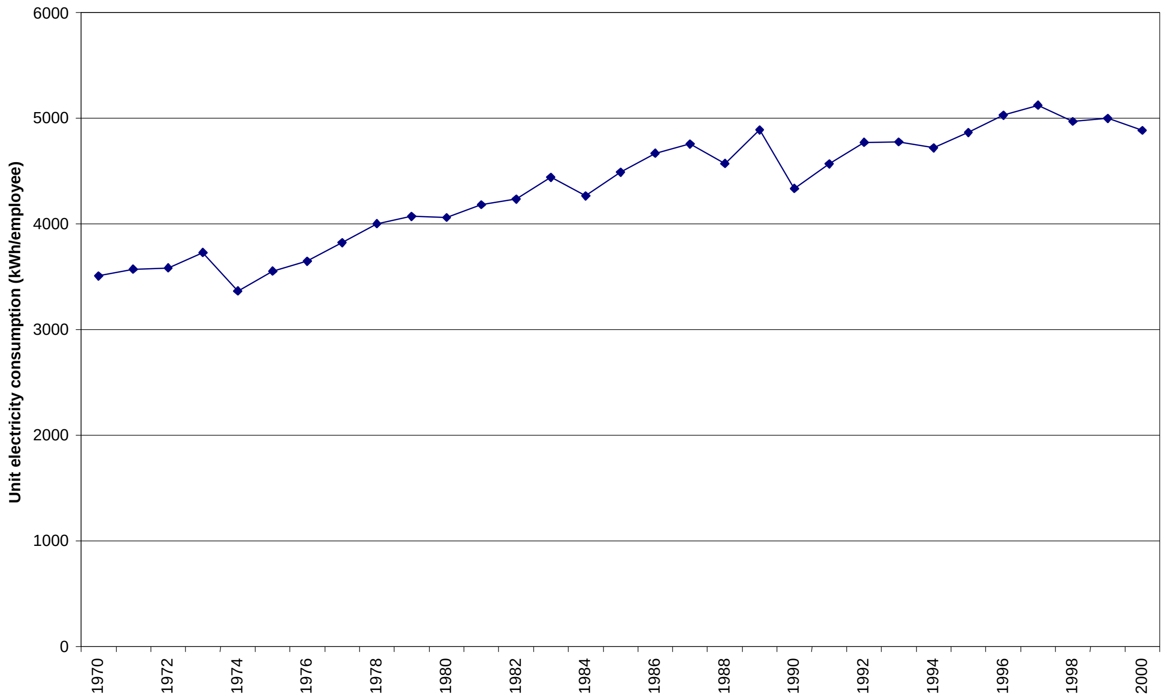


Services sector

Energy and electricity intensity of the services sector



Electricity consumption per employee for the services sector



Annex 3: Description of Energy Efficiency Measures

This annex provides detailed descriptions of UK energy efficiency measures in the industry, domestic and transport sectors. These descriptions have been used to update the MURE database under the auspices of the European Commission's ODYSSEE-MURE project. Energy efficiency measures for the tertiary or services sector had not been collated at the time of preparation of this report. However, some of the measures described under industry or households are also applicable to the services sector, e.g. the Energy Efficiency Best Practice Programme and the Carbon Trust.

Industry sector

Title of the measure:	Emissions Trading Scheme

The Government has been working alongside the Emissions Trading Group (a group of around 100 major companies, trade associations and other organisations; www.uketg.com) to develop a UK wide volunatary emissions trading scheme which will begin trading in April 2002. A framework for the scheme was published in August 2001 to allow companies to make forward looking trades, and registration for the scheme started in January 2002.

There are four main ways to enter:
1. The Government has agreed to provide a financial incentive for organisations that agree to take on voluntary targets for a five-year period, 2002-2006. Up to £215 million has been made available, equivalent to £30 million per year after tax. Participating organisations will be required to make absolute reductions in emissions against a 1998-2000 baseline. The targets and the level of incentive payment will be set through a competitive bidding process. Each participant will be able to bid in absolute levels of emission reduction at prices set through an auction, to be held in April 2002. The Government will be aiming to obtain the maximum level of reductions for the incentive money. Organisations successfully bidding in the auction will then have to deliver five equal annual emission reductions to qualify for their incentive payments. The incentive is not available for emissions sources already covered by a Climate Change Agreement and emissions from electricity generation for usage off-site. It will be possible for a participant to take on a target based on emissions from one or more other organisations. An energy services company, for example, could join the scheme by taking a single target covering emissions from a number of client sites.
2. Companies which already have emission or energy targets set through the Climate Change Agreements will be able to use the trading scheme either to help meet their target or to sell any over-achievement if they can do better than their target. Many of the targets set through the Climate Change Agreements are efficiency targets – i.e. relative rather than absolute emission caps – so trading by these companies will be subject to certain restrictions. A "gateway" will control the flow of allowances from this sector into the rest of the trading scheme.
3. Organisations will be able to undertake emission-reduction projects and sell the resulting credits into the scheme. These credits can then be used by other participants to meet their targets. A project must be additional to emission reductions that would have been delivered under business as usual.

4. Anyone who doesn't want to enter the scheme on the basis of an emissions target or an emissions reduction project can simply open an account in the registry to buy and sell allowances.

A participant's emissions will include both direct emissions – such as those from fossil fuel combustion or other industrial processes – and indirect emissions associated with energy usage. In this way all measures that reduce energy use or emissions will contribute towards delivering the target reductions. Each participant will need to measure and report their initial (baseline) emissions and their annual emissions according to the Government's reporting guidelines. All reported emissions will be subject to independent third-party verification.

Organisations which receive the financial incentive will have emission targets covering each annual compliance period. Organisations will be allocated emissions allowances equal to this target each year, provided they have been in compliance in the previous year. For the first year of the scheme, organisations will receive allowances for the compliance period January to December 2002 in April 2002. For subsequent years, allocation of at least some allowances may be made earlier than this. At the end of each compliance year, organisations will have a three-month reconciliation period to compile their verified emissions report and to undertake any further trading necessary to meet their target. By the end of this period each participant will have demonstrated to the Government that it has sufficient allowances to cover all of its emissions. This form of emissions trading is called “cap and trade”. Companies entering the scheme through the Climate Change Agreements will not receive allowances up front. At the end of each “milestone year” in which they have targets (every second year starting from 2002) they will receive allowances if they have beaten their target, or they will be able to buy additional allowances if they have not achieved their target. This form of emissions trading is called “baseline and credit”. Emission reduction projects will only receive credits after the emission reductions have been verified. The rules for projects are being developed separately to those covering the rest of the scheme but the Government hopes to allow projects to start as soon as possible after the trading scheme is up and running.

All allowance holdings will be recorded on a computerised registry. All target-holders will have a compliance account in the registry for their allowances issued by Government. Following each compliance period the Government will check the total holdings in each compliance account and all allowances needed to cover emissions over the preceding year will be retired. Any allowances that remain can be banked for future use or sold. There will be no restriction on banking up to 2007. Participants with absolute emissions targets will also be able to bank any over-achievement of their own target into the Kyoto Protocol commitment period starting in 2008. Participants in the scheme will be able to trade directly between themselves or through third party brokers.

In order to ensure compliance, the scheme will be equipped with penalties that are sufficiently strong to ensure it operates effectively but are not disproportionate for a voluntary scheme. A participant must be able to demonstrate that it is in compliance in order to receive an incentive payment and a full allocation of allowances the following year.

References:

Framework Document for the the UK Emissions Trading Scheme: August 2001, DEFRA.
www.defra.gov.uk/environment/climatechange/trading/index.htm
The UK’s Third National Communication under the UNFCC, DEFRA, DEFRA Publications.

Title of the measure:	Climate Change Levy

The climate change levy is a tax on the use of energy in industry, commerce and the public sector, with offsetting cuts in employers' National Insurance Contributions - NICs - and additional support for energy efficiency schemes and renewable sources of energy. The levy forms a key part of the Government's overall Climate Change Programme. The basic design of the levy follows the recommendations made in Lord Marshall's report *Economic Instruments and the Business Use of Energy*, published in October 1998. The introduction of the levy was announced in the 1999 Budget, and it has been applied to energy used in industry, commerce and public sectors since April 2001. Legislation to implement the levy is contained in the Finance Act 2000, which received Royal Assent on 28th July 2000.

Rates of levy are:
- 0.15p/kWh for gas
- 1.17p/kg (equivalent to 0.15p/kWh) for coal
- 0.96p/kg (equivalent to 0.07p/kWh) for liquefied petroleum gas (LPG),
- 0.43p/kWh for electricity.

The levy is expected to raise around £1 billion in its first full year (2001/02).

The levy does *not* apply to fuels used by the domestic or transport sector, or fuels used for the production of other forms of energy (e.g. electricity generation) or for non-energy purposes. The levy does not apply to energy used by registered charities for non-business uses, and energy used by very small firms, i.e. those using a *de minimis* (domestic) amount of energy. The levy does *not* apply to oils, which are already subject to excise duty.

There are also several exemptions from the levy, including:
- Electricity generated from new renewable energy (e.g. solar and wind power)
- Fuel used by good quality combined heat and power schemes ("Good Quality CHP" - certified via the CHP Quality Assurance Programme CHP*QA*)
- Fuels used as a feedstock
- Electricity used in electrolysis processes, for example, the chlor-alkali process, or primary aluminium smelting.

The Government has also proposed an exemption for natural gas in Northern Ireland for 5 years. This is to help develop the emerging gas market. This proposal has not yet had EC State Aid Approval.

The exemptions for renewable energy and CHP are intended to encourage the take up of these technologies by industry.

Revenue from the levy will be recycled to businesses principally through a cut in the rate of employers' National Insurance Contributions of 0.3 percentage points. Businesses will also benefit from schemes aimed at promoting energy efficiency and stimulating the take-up of renewable sources of energy, e.g. solar and wind power. £50 million per annum of revenue will be allocated to these schemes - a major increase from current levels of funding. There is also a scheme of 100% first year capital allowances for certain energy saving investments, which is expected to be worth up to £70 million in 2001/02. (see separate measures in database)

Energy intensive sectors can obtain an 80% discount in levy rates if they agree to meet targets for improving energy efficiency or reducing carbon emissions. These climate change agreements are detailed in a separate measure in the database.

References:

http://www.defra.gov.uk/environment/ccl/intro.htm
Climate Change: The UK Programme, Cm4923, The Stationery Office, London

Title of the measure:	***The Enhanced Capital Allowance Scheme***

The November 1999 Pre-Budget Report, announced support for business investment in low carbon technologies under the climate change levy package (see separate measure in database). This has allowed for the introduction of a 100% first year Enhanced Capital Allowance (ECA) scheme.

In December 1999 the Government issued a Consultation Document, 'Energy Efficiency Measures under the Climate Change Levy.' Following analysis of the response it was proposed that the ECA scheme would support CHP, boilers, motors, variable speed drives, lighting, refrigeration, pipe insulation materials and thermal screens, which meet the relevant energy efficiency criteria. Other technologies can be added subject to satisfactory methods of certification and subject to cost-effectiveness criteria and controls on cost to the Government. The first full list of qualifying products, called the Energy Technology Product List, was published in April 2001. The Energy Technology Product List is updated on the first of every month. An order to give statutory force to the Energy Technology List was laid on 17 July 2001 and took effect from 7 August 2001.

The scheme builds on existing statutory provisions, under which businesses may obtain tax relief, in the form of capital allowances, for their investment in machinery and plant. This relief is normally given at a rate of 25% a year on the reducing balance basis, which spreads the benefit over a number of years (about 95% of the cost is relieved in 8 years). Enhanced capital allowances permit the full cost of the investment in specified technologies to be relieved for tax purposes against taxable income of the period of the investment. Enhanced capital allowances have been granted in other areas before but this is the first time that they have been introduced to support energy efficiency. They bring forward relief, so that it can be set against profits of a period earlier than would otherwise be the case. The benefit to businesses of enhanced capital allowances is thus a cash flow boost resulting from the reduction of the business's tax bill of the year in which the investment is made.

Eligibility criteria are used to help ensure meet the objectives of the scheme, e.g. optimum environmental benefit, cost- effectiveness and innovation. The individual criteria and technologies are built around the following:

- **improving energy efficiency criteria**, by setting technological specifications above what otherwise would be the standard;
- **promoting 'new' technology**, in particular those technologies that have entered the market, but have yet to gain market confidence;

- **increasing market penetration** - there must be scope for an energy efficient technology to increase its relative share of the market;
- **correlation between demand and cost** - enhanced capital allowances should only be available on products where there is a reasonable expectation that the tax-supported cost will increase sales.

There will be an annual review of technologies and criteria.

The scheme is administered by the Carbon Trust (see separate measure in the database) and will be worth £200 million over two years depending on the take-up.

References:
http://www.eca.gov.uk/index.cfm
Climate Change: The UK Programme, Cm4923, The Stationery Office, London

Title of the measure:	The Carbon Trust

The Government set up the Carbon Trust (www.thecarbontrust.co.uk) in April 2001 as a new, independent, non-profit making company that will recycle around £100 million of climate change levy receipts(see separate measure in database) over three years to accelerate the take up of cost-effective low carbon technologies by business and other measures by businesses and levy players, through education, training, and strategic research and development. The Trust's key objectives are:

- to ensure that UK business and the public sector contribute fully to meeting ongoing targets for greenhouse gas emissions;
- to improve the competitiveness of UK business through resource efficiency; and
- to support the development of a UK industry sector that capitalises on the innovation and commercial value of low-carbon technologies nationally and internationally.

It will:

- develop best practice programmes to inform, influence behaviour and build skills and resources;
- co-ordinate and broker between those developing technologies and funding partners;
- invest in the development of low carbon technologies;
- be a leader in the low carbon economy debate; and
- inform policy.

Work is underway at The Carbon Trust to design and implement

- a programme to accelerate the take up of existing energy efficiency and other low carbon technologies building on the successful Energy Efficiency Best Practice Programme (EEBPP) the enhanced capital allowances scheme, and other incentive schemes as necessary (see separate measures in database;
- a Low Carbon Innovation Programme (LCIP) deploying a range of financial instruments and support for new and emerging technologies to the point where they are self-sustaining. LCIP will draw in other funding partners to create a "funding continuum" across the innovation chain; and

- other programmes and studies to inform The Carbon Trust and hence enable it to carry out its roles and deliver its remit and objectives.

The Low Carbon Innovation Programme **(**LCIP) will be the principal vehicle for developing new low carbon technologies over the short, medium and long term. LCIP is currently being developed with the intention of a launch early in 2002, subject to State Aids approval. Under LCIP, The Carbon Trust will act as:

- an informed investor; and
- a co-ordinator of support for low carbon technologies drawing in partners and other sources of funding, and operating throughout the innovation process.

LCIP is being designed to provide a flexible support framework to accommodate a range of applications from blue sky research to near-market exploitation. Financial instruments, from grants, guarantees and loans, to equity, convertible debt and carbon credits, will be tailored to meet the specific needs of applicants and partners at different stages in the innovation chain.

Through LCIP, The Carbon Trust will act in part like a venture capital company seeking a carbon return rather than a financial return. The Carbon Trust's aim is to develop a balanced, actively managed, portfolio of low carbon projects which will deliver carbon savings over the short, medium or long term. Short term savings are likely to come from existing technologies.

Projects which are supported in order to deliver savings in the long term will, by definition, be based on new and emerging technologies. Other projects will address capacity building issues like education and training. LCIP will also support projects which may not deliver a carbon return in their own right but which maintain and extend the low carbon knowledge base.

The Carbon Trust initially will allocate its resources as follows, reflecting the strategy conclusion that both existing energy efficiency and new low carbon technologies have key roles to play:

- maintain the current allocation (around £15-20m or a third of the total) for the accelerated deployment of existing energy efficiency measures;
- allocate about a half of the budget (around £20-25m) to the development and commercialisation of new and emerging low carbon technologies; and
- hold the remainder (after accommodation, staff etc., costs) for corporate marketing, activities related to leading and informing the low carbon debate.

References:
www.thecarbontrust.co.uk

Title of the measure:	Integrated Pollution Prevention and Control (IPCC)

The Integrated Pollution Prevention and Control (IPPC) Directive (96/61/EC of 24 September 1996) provides a regulatory basis for improving the energy efficiency of most of the energy intensive sectors of industry. The requirements apply to industrial sites that account for about 60% of the energy use of the manufacturing industry as well as energy supply industries such as electricity generators and oil refineries. IPCC applies to any new or substantially changed installation immediately. It will be phased in by 2007 for existing installations.

In the UK the Pollution Prevention and Control Act 1999 provides powers to make regulations to implement the Directive, Regulations for England and Wales (The Pollution Prevention and Control (England and Wales) Regulations 2000) came into force on 1st August 2000, and Regulations for Scotland have also been laid. Regulations for Northern Ireland are being developed. The regulator for IPCC permits in the UK is the Environment Agency.

References:
www.defra.gov.uk/environment/ppc/ippc.htm
www.environment-agency.gov.uk/business/techguide/ippc

Domestic sector

Title of the measure:	Revised Building Regulations (2001)

The Building (Amendment) Regulations 2001 raises the performance standards for building insulation, and introduces new ones for airtightness and solar shading. The standards are significantly higher than those introduced in 1995 (see Measures AI UK1, UK2, UK 3 and UK5). The regulations state that reasonable provision shall be made for the conservation of fuel and power in dwellings by:

- limiting the heat loss through the fabric of the building, from hot water pipes and hot air ducts used for space heating , from hot water vessels;
- providing space heating and hot water systems which are energy-efficient;
- providing lighting systems with appropriate lamps and sufficient controls (for external lighting) so that energy can be used efficiently;
- providing sufficient information with heating and hot water services so they can be operated and maintained to use no more energy than is reasonable.

Guidance on how to meet the regulations is set out in an Approved Document, L1 – Conservation of Fuel and Power in Dwellings (2002 Edition). Three methods can be use to demonstrate heat loss has been limited:

- an elemental method: construction elements must meet the U values specified in Table 1, the boiler must have a minimum efficiency, and the area of windows, doors and roof windows must be ≤ 25% of the floor area;
- a target U-value method: the average U value of the dwelling is calculated and adjusted for boiler efficiency and solar gain, and must be less than the target U value of the building; this is based on the area of the building;
- a carbon index method: this is calculated using the Standard Assessment Procedure (SAP) and must be ≥ 8 (see measure A1UK 5)

Table 1 U values for construction elements in Elemental Method

Exposed element	U-value (W/m^2K)

Pitched roof with insulation between rafters	0.2
Pitched roof with integral insulation	0.25
Pitched roof with insulation between joists	0.16
Flat roof	0.25
Walls	0.35
Floors	0.25
Windows, doors and rooflights (metal frames)	2.2
Windows, doors and rooflights (wood/PVC frames)	2.0

The building regulations were amended in October 2001 and come into force in April 2002. It is estimated they may reduce heating bills in new dwellings of 25%.

Title of the measure:	***Replacement of Community Heating***

Many existing community-heating schemes are in urgent need of attention. The heating is often inadequate and expensive, the infrastructure is in a poor state and heat production is inefficient. If brought up to modern standards it can provide heating efficiently and at lower cost than individual heating. There is also scope for installing CHP in many more schemes.

The Government has identified the community heating installations that could be cost-effectively modernised in this way and is encouraging local authorities and other landlords to consider this. It is providing support though local government and social housing resources and through grants under the new Home Energy Efficiency Scheme (see separate measure in database). The Finance Act 2000 tax provisions on leasing arrangements significantly help investment in community heating projects. Transco are actively encouraging local authorities, social and private landlords to use the Affordable Warmth Programme (see separate measure in database) to support both new installation and upgrading of community heating measures.

The Government has estimated that upgrading community heating schemes and carrying out accompanying improvements such as installing heating controls and insulation, incorporating CHP where appropriate and linking buildings together in a heating network to provide a diverse heat load will bring a potential carbon saving of 0.9Mt C per year by 2010.

Title of the measure:	New Home Energy Efficiency Scheme

The Government launched the New Home Energy Efficiency Scheme (HEES) in England in June 2000, following a review of fuel poverty policy and of the existing HEES Scheme (see separate entry in database). There were at least 4.3 million fuel poor households in England in 1996, and HEES has been designed to provide comprehensive packages of heating and insulation improvements, for the most vulnerable. It is targeted at owner-occupiers and the private rented sector.

Grants of up to £1000 are available for households living on low incomes for a range of heating improvements and insulation measures including:

- loft insulation
- draughtproofing of windows and doors
- cavity wall insulation
- hot water tank insulation
- compact fluorescent lamps
- gas room heaters with thermostat controls
- electric storage heaters
- closed solid fuel fire cassette
- electric dual immersion water heater with insulated tank
- timer controls for electric space and water heaters

For households where occupiers are over 60 and on a low income, a grant of up to £2000 is available for the above measures and, where appropriate, high efficiency central heating systems for the main living areas (New HEES Plus). Work is done by a network of approved installers.

The total HEES budge is £613 million for 2000-2004, during which time is its expected to help around 800,000 households, of which 480,000 will be low income over –60s.

In Scotland, a similar scheme operates - the 'Warm Deal' initiative. This has a budget of 10.5 million in 1999/2000, and £13 million in 2000/01. It provides a £500 package of insulation measures for low-income households for about 25,000 homes per year. A £350 million scheme to install free central heating and insulation in the homes of around 790,000 pensioners and 1,000 tenants in local authority and housing association stock began in April 2001. Similar schemes also run in Wales and Northern Ireland.

This scheme replaced the existing HEES scheme which had been running since 1991. This improved over 3 million homes, each of which had a potential average reduction of £45/y in fuel costs.

Title of the measure:	Transco Affordable Warmth Campaign

Transco (a gas utility) has developed an Affordable Warmth Programme which aims to facilitate the installation of new, energy efficient, gas fired central heating systems in up to a million homes by the end of 2005 through the use of operation lease finance, for properties owned by local authority and registered social landlords and private sector dwellings.

Under the programme, Transco would underwrite the residual value of each system at the end of the lease, enabling the finance provider to reduce the lease charge. Transco has committed £10 million for training to provide 10,000 newly skilled people to deliver the programme and £20 million to manage the programme.

Changes to the tax rules, so that equipment installed under the Programme attracts capital allowances, were announced in the Budget 2000.

References:
www.affordablewarmth.co.uk

Title of the measure:	"Are You Doing Your Bit?" Campaign

This is a four-year (1998-2002) publicity campaign run by the government to raise people's awareness and stimulate action. It focuses on four priority areas: transport, climate change, energy efficiency, waste and water and has the following objectives:

- promote awareness of actions which individuals can take to protect the local/global environment;
- build/reinforce the link between individual action and climate change;
- mainstream the environment;
- create a strong campaign activity.

The campaign strategy and funding has been

Year 1: 1998/99	£3.4M	Educate and inform via press and magazine advertisements. Provide incentives
Year 2:1999/2000	£7M	Inform and motivate via TV, radio and press advertisement. Build national and local partnerships Use roadshow and regional media to carry messages locally
Year 3&4: 2000/02	£9M each year	Motivate via TV, press ad magazines Extend partnerships Provide consumer incentives via commercial sponsorship

The campaign has focused on no/low cost measures in its TV and press advertising, but in its literature has signposted people to wider actions and particularly to the work of the Energy Savings Trust (see separate entry in database).

Title of the measure:	Energy Efficiency Commitment

Under the Utilities Act 2000, the Government places an obligation on the energy utilities to encourage or assist domestic consumers to take up energy saving opportunities (such as cavity wall insulation, loft insulation, energy efficient lighting, appliances and boilers). After initial consultations in 2000, the Government has set out proposals for the level and shape of the Energy Efficiency Commitment (EEC) for 2002-2005 (*Energy Efficiency Commitment 2002-2005 Consultation Proposals:*
http://www.defra.gov.uk/environment/consult/energy/eec0801/index.htm

The EEC focuses on energy savings which suppliers must help customers to gain, and allows companies the freedom to develop their own programmes and ways to stimulate consumer interest to achieve this. There will be a focus on helping lower income consumers, including those in receipt of income and disability benefits. The EEC is a successor to the three Energy Efficiency Standards of Performance Schemes (EESOPs) which have been running sine 1994. After considering the responses to the consultation, the Government will lay a Statutory Order in the autumn so that the EEC can commence in April 2002.

The Government proposes that the total EEC obligation in all suppliers should be about 64 TWh of fuel-weighted energy benefits. This includes a ‘deadweight' component (sales of measures that would have gone ahead anyway without the stimulus of EEC). Without this, the obligation would be about 34 TWh. Consumer benefits from the scheme are estimated to be:

Low income consumers	£14/year by 2000
Other consumers	£8/year by 2005
Average for all consumers	£10/year

The cost of the EEC to utilities should not be more than £3.60 per customer per fuel per year.

This scheme replaces the Energy Efficiency Standards of Obligation on energy utilities. The bills of three million customers who had benefited from the scheme were reduced by an average of £120 each.

Transport sector

Title of the measure:	Company Car Taxation

About 16% of the estimated 375 billion miles of car travel in the UK each year are driven for business use, and companies buy over 50 per cent of new cars. Budget 2000 introduced a broadly revenue neutral reform of company car taxation based on CO_2 emissions to provide an incentive for company car drivers to chose more fuel efficient vehicles. The reform will remove the perverse incentive in the previous system to reduce the tax due on company cars by driving unnecessary business miles. (A certain business mileage was required to obtain a reduction in tax).

From April 2002, company cars first registered after January 1998 are to be taxed on a percentage of their price list according to one of 21 CO_2 emission bands. Older company cars will be taxed on the basis of engine size. The charge will build up from 15 per cent of the car's price to a maximum of 35 per cent - in 1 per cent steps for every 5g/km CO_2 above a specified level. Diesel cars will pay a supplement of 3 per cent of the car's price compared to petrol cars (up to a maximum of 35 per cent) to take account of their higher emission of particulates and pollutants which have adverse impacts on local air quality.

The Government has published draft regulations to waive this diesel supplement for clean diesel cars achieving Euro IV emission standards to encourage their early introduction. The regulations also introduce discounts for cars powered by electricity or gas, and hybrid petrol/electric cars which can reduce the car benefit tax below the normal minimum of 15 per cent of the car's price, providing further incentives to choose more environmentally friendly company cars.

Title of the measure:	EU CO_2 from Cars Strategy

The European Commission[1] has set out a strategy, endorsed by European Environment ministers[2], to reduce CO_2 emissions from cars, with a target of reducing average carbon dioxide emissions from new cars to 120 g CO_2/km by 2005, or 2010 at the latest. This represents an improvement of about one-third over 1995. The main elements of the strategy are:

- voluntary agreements between the European Commission and car manufacturers to reduce average CO_2 emissions from cars by means of improved vehicle technology
- fuel economy labelling scheme
- market –orientated measures to influence motorists choice towards more fuel efficient cars

The **voluntary agreements** which the European Commission has reached with the car manufacturers are:

Association	Intermediate Target	Final Target
ACEA (European Car Manufacturers)[3]	165-170 g/km in 2003	140g/km in 2008
JAMA (Japanese Car Manufacturers)	165-175 g/km in 2003	140g/km in 2009
KAMA (Korean)	165-170 g/km in 2004	140g/km in 2009

The final target for emissions represents a reduction from 1995 levels for European cars of 25%, and of more than 25% for Japanese and Korean cars. Average CO_2 emissions from new cars sold in the UK in 2000 were about 185 g/km.

In addition ACEA have agreed to:

- bring to the market individual car models with CO_2 emissions of 120 g/km or less by 2000
- to review (in 2003) the potential for additional improvements with a view to moving the new car fleet average towards 120 g/km by 2012.

Fuel saving technologies which manufacturers could use to achieve the agreement include engine improvements, weight reduction, reduced rolling resistance and aerodynamic improvements. The effect of the agreements is monitored by the EC, under the CO_2 Monitoring Decision which requires Member States to supply the EC with detailed information on the number and characteristics (manufacturer, fuel type, CO_2 emissions, mass, maximum net power and engine capacity) of new passenger cars registered.

Under an EU Directive[4] implemented in January 2001, labels giving information about fuel consumption and CO_2 emissions will be attached to new cars, information will be contained in posters displayed at point of sale and in other promotional literature, and a guide will be

[1] A community strategy to reduce CO_2 emissions from passenger cars and improve fuel economy (COM/95/0689 FINAL)

[2] Council Conclusions of 25.6.1996

[3] Implementing the Community strategy to reduce CO_2 emissions from cars: an environmental agreement with the European automobile industry (COM/98/0495)

[4] Directive 1999/94/EC relating to the availability of consumer information on fuel economy and CO_2 emissions in respect of the marketing of new passenger cars

produced for all the car models on sale. In the UK, the Government has set up a searchable web site which provides information on fuel consumption, CO_2 emissions and other emissions for all makes of car (www.vcacarfueldata.org.uk.default.htm).

Title of the measure:	Fuel Duty Levels

The fuel duty escalator (annual fuel duty increases above the rate of inflation) was introduced in 1993, first at an annual rate of 3% above inflation and then at 5%. It was increased to 6% in July 1997. In the 1999 Pre-Budget report, it was announced that the appropriate level of fuel duties would be set on a Budget by Budget basis, and that revenues from any real increases in fuel duty would in future go into a fund to be ring-fenced for improving public transport and modernising the road network. Since then high oil prices have meant that in the Budget 2000, there was no real increase in fuel duty, and in Budget 2001, fuel duty was frozen in cash terms.

In Budget 2001, the Government announced that for the immediate future and the short to medium-term, it will make reductions in duty on bio-diesel and road fuel gases - compressed natural gas (CNG) and liquefied petroleum gas (LPG). Specifically:

- a new duty rate for bio-diesel set at 20 pence per litre below the Ultra Low Sulphur Diesel rate to be introduced in Budget 2002. This will offset the additional production costs of bio-diesel and permit the UK to benefit from the reduced greenhouse gas emissions that this fuel can offer. Bio-diesel sourced from waste vegetable oils will also provide a useful outlet for oils which may otherwise be poured away into landfill sites or disposed of down the drain; and
- duty on road fuel gases was cut by 29 per cent in Budget 1999, followed by a duty freeze in Budget 2000, In order to maintain the existing duty differential between road fuel gases and the most commonly available petrol and diesel, Budget 2001 cuts duty on road fuel gases to 9 pence per kilogramme. Furthermore, to provide the stability needed to encourage growth in the road fuel gas market, duty on road fuel gases will not be increased in real terms until 2004 at the earliest.

Title of the measure:	Graduated Vehicle Excise Duty

Since March 2001, the rate of annual car tax (Vehicle Excise Duty) in the UK has been determined by the CO_2 emissions of the vehicle, using a banding scheme. Bands are set according to CO_2 emissions and fuel type, as shown in the table below (based on £1 = 1.6 Euro) (www.dvla.gov.uk/newved.htm.)

	Band A	Band B	Band C	Band D
CO_2 emissions (g/km)	Up to 150	151 - 165	166 - 185	Over 185
Annual tax for petrol cars (Euro)	160	192	224	248
Annual tax for diesel cars (Euro)	176	208	240	256
Annual tax for alternative fuelled cars (Euro)	144	176	208	240

These rates are for 2001/02 and are only applicable to new cars registered after 1 March 2001. For older cars, there is a simple two-tier system based on engine size where cars under 1549cc are taxed at one rate and all other cars at another (higher) rate. CO_2 emissions are measured over the standard EURO combined cycle.

The aim of the scheme is to encourage private and fleet car buyers to choose vehicles with lower CO_2 emissions by offering a financial incentive. The scheme also raises public awareness of the environmental characteristics of different cars and the availability of lower emission vehicles. The scheme is complemented by a new scheme for taxing individuals on the "Benefit in Kind" value of company cars (see separate measure in database).

The UK Government's Driver and Vehicle Licensing Agency (DVLA) administers the scheme and collects the annual tax. The Vehicle Certification Agency (VCA) provides information on the CO_2 emissions rating and the taxation band for each model of car on sale in the UK, in a searchable web-based database (www.vcacarfueldata.org.uk); and in a printed booklet. This database provides a look-up facility for individual models but not a ranking. The web site of the Society of Motor Manufacturers and Traders (SMMT) and various car magazines also carry information on CO_2 emissions ratings for different models. (e.g. CarNet new car guide: www.carnet.co.uk/guide/)

Title of the measure:	Greener Fleet Certification Scheme - Motorvate

In June 2000, as a response to the publication of "Driving the agenda" - the first report of the Cleaner Vehicles Task Force (July 1999), the Government launched Motorvate, a greener fleet certification scheme **(**www.greenerfleet.org.uk)**.** It is designed to help companies cut their fleet travel costs and at the same time help the environment. Motorvate sets simple targets for improving fleet fuel efficiency and reducing fleet mileage. The core target is a reduction of 12% in the fleet's total carbon dioxide emissions over a 3-year period, 3% of this must be achieved through reduced business mileage. These targets can be modified in recognition of any previous efficiency gains or to reflect significant changes to core business activities, which affect business mileage. For example, variations in travel and fuel use that occur because of expansion or contraction of parts of the business or because of the transfer of business mileage from company-provided cars to other cars.

The scheme is based on an annual assessment of companies' vehicle inventory, mileage patterns and fuel use, and progress towards meeting the 3-year targets. Certification is awarded through a five star system. These stars are awarded to each member as they demonstrate progress towards their targets.

*	Participant has signed up to the scheme and provided the necessary data to be assessed.	0
**	Participant has established its baseline and has made demonstrable progress towards achieving savings	1
***	Participant continues to make demonstrable progress towards their target.	2

****	Participant meets their target.	3
*****	*Participant demonstrates excellence in ways not measured by the core 3 year target	3

*The fifth star can be awarded for any of the following:

- CO_2 savings that significantly exceed the target - 20% savings must be achieved
- Mileage savings that significantly exceed the mileage target - at least 10% mileage savings must be achieved.
- At least 10% of the fleet consists of alternative fuel vehicles (e.g. CNG, LPG, electric or hybrids)

Fleets that have already made significant improvements can be **fast-tracked**: a participant that can demonstrate that it has the management systems in place and hence has the necessary data available, showing savings from previous years, can enter at year 0 with 2 or 3 stars.

After the initial 3-year period companies will continue to be monitored on a yearly basis to ensure that improvement continues in subsequent years. To remain in the scheme the reductions achieved must at least be maintained for each subsequent year, and at the very least continuous improvement must keep in step with fuel efficiency improvements of new cars. In the case of fleets where there is still room for efficiency improvements, a little bit more will be required.

Motorvate is primarily run as a self-certification scheme, although to ensure standards are maintained on-site audits can be undertaken.

Motorvate is strongly promoted within the public and private sectors, and in the media, to gain wide recognition as a significant environmental award.

Title of the measure:	Ten Year Plan for Transport

In July 2000, the Government published its 10 year plan for transport, (Transport 2010: The 10 Year Plan, DETR, http://www.dtlr.gov.uk/trans2010/plan/). This built on the Integrated Transport White Paper (A New Deal for Transport: Better for Everyone, July 1998, Cm 3950) to set out a long term strategy for delivering a quicker, safer, more reliable transport system that has less of an impact on the environment.

The Plan sets out the resources that will be committed to improving transport and sets the strategic framework. Individual projects and programmes will flow from decisions taken by a variety of agencies, the private sector, and through Regional Transport Strategies and Local Transport Plans. The Government has also developed a sustainable distribution strategy (Sustainable Distribution: A Strategy, March 1999, DETR.)

The broad package of improvements planned by 2010 is:

Rail:

- 50% increase in use, measured by passenger kilometres; a quarter of this is estimated to come form users switch in to rail because of reductions in fares ands service quality improvements.
- 80% increase in rail freight
- improvements in service quality: more punctual and reliable trains, less overcrowding
- installation of new train safety systems
- modern trains and more attractive, secure stations
- modernisation and increased capacity on the West Coast and East Coast Main Lines
- the high speed Channel Tunnel Rail Link, also serving Kent and the Thames Gateway
- improved commuter services in London and other cities
- upgrading of freight routes to major ports
- better integration with cars, buses, taxis, bicycles and better links to airports.

Roads:

- congestion reduced below current levels, particularly in large urban areas
- bottlenecks eased by targeted widening of 360 miles of the strategic road network
- 80 major trunk road schemes to improve safety and traffic flow at junctions
- 100 new bypasses on trunk and local roads to reduce congestion and pollution in communities
- 130 other major local road improvement schemes
- completion of the 40 road schemes in the Highways Agency Targeted Programme of Improvements
- 60% of the trunk road network given lower-noise surfaces
- elimination of the maintenance backlog for local roads, bridges and lighting as part of a £30 billion programme
- HGV lanes on congested strategic routes to provide priority for lorries and safer lanes for cars
- smarter management of the trunk road network, giving drivers better information on traffic conditions
- 40% reduction in the number of people killed or seriously injured in road accidents
- accelerated take-up of cleaner vehicles to reduce air pollution and CO_2 emissions.

London *(s*ubject to the Mayor's transport strategy)

- improved quality of service on the Underground, with more capacity and fewer delays, through the Public-Private Partnership
- higher standards of bus service ('quality plus') on all major bus routes
- improved bus frequencies and enhanced off-peak and night bus services
- extension to City Airport of Docklands Light Railway
- new tram/guided bus systems
- new East Thames river crossings for road and rail
- a new east-west rail link, such as CrossRail
- Thameslink 2000, East London Line extensions, upgrading of major stations and commuter rail services.

Locally across England:

- up to 25 new rapid transit lines in major cities and conurbations, more than doubling light rail use
- 10% increase in bus passenger journeys

- extensive bus priority schemes, including guided bus systems and other infrastructure improvements, also benefiting coaches
- new Urban Bus Challenge Fund to improve links to deprived urban areas
- more cities and towns with park and ride schemes
- extension of Rural Bus Subsidy Grant to cover more journeys serving market towns
- extension of fuel duty rebate to more community transport services, and more support for flexible transport in rural communities
- half fare or better on the buses for elderly and disabled people
- modern and integrated transport information, booking and ticketing services
- safer cycling and walking routes, more 20mph areas and Home Zones for safer roads, particularly around schools

Congestion charging schemes are assumed to be introduced in central London and eight other cities and workplace parking levy schemes in 12 cities. All net revenues are assumed to be recycled in the urban areas concerned.

Total private investment and public expenditure is expected to be £180 billion, made up as follows:

Public investment	£64.7bn
Private investment	£56.3bn
Total	£121.0bn
Public resource/revenue	£58.6bn
Total	£179.7bn

The forecast allocation of capital investment is:

	Private	Public
Rail	£34.3bn	£14.7bn
Strategic roads	£2.6bn	£13.6bn
London	£10.4bn	£7.5bn
Local transport	£9.0bn	£19.3bn
Other		£9.7bn
Total	£56.3bn	£64.7bn