

Jersey Energy Trends 2007

Statistics Unit: www.gov.je/statistics

Headlines

- **Total final energy demand in Jersey in 2007 was 183,000 toe (2.13 million MWh), a decrease of 3% on 2006;**
- final consumption of electricity decreased by 3% between 2006 and 2007. Over the same period road fuel use fell 3% (unleaded down 5%, diesel up 4%) heating oil use fell by 6% and consumption of gas oil (excluding electricity generation) grew by 11%. Consumption of aviation fuel was up 2% whilst that of heavy fuel oil (excluding electricity generation) fell by 47%;
- in 2007 about two-thirds of all energy used was a type of petroleum product, with road fuels (petrol and diesel) accounting for nearly a quarter of total final energy demand;
- household energy consumption was 6% lower than in 2006, reflecting a decrease of 5% in heating oil and a decrease of 18% in coal and other solid fuels;
- in 2007 Jersey's total primary energy supply was 202,000 toe¹ (2.35 million MWh), an increase of 2% on 2006;
- essentially all of Jersey's primary energy needs and 89% of electricity were imported;
- average domestic energy bills remained unchanged for electricity and rose by 7% for gas² between 2007 and 2008. The cost of heating oil in Spring 2008 was 47% higher than in the same period of 2007;
- provisional data show that energy-related carbon emissions increased by about 6% between 2006 and 2007;
- work is currently underway to produce an energy policy for Jersey; an energy policy consultation document "Fuel for thought" has been released by the Planning and Environment department.

¹ A toe (tonne of oil equivalent) is a unit of measurement used when aggregating different energy sources. As different fuel sources provide different amounts of energy, a pure volume measure such as tonnes will not represent the energy values of the fuels; instead, each fuel is converted into toe based on its calorific value. A toe is a measure of energy = 10 million kilocalories or 11,630 kWh.

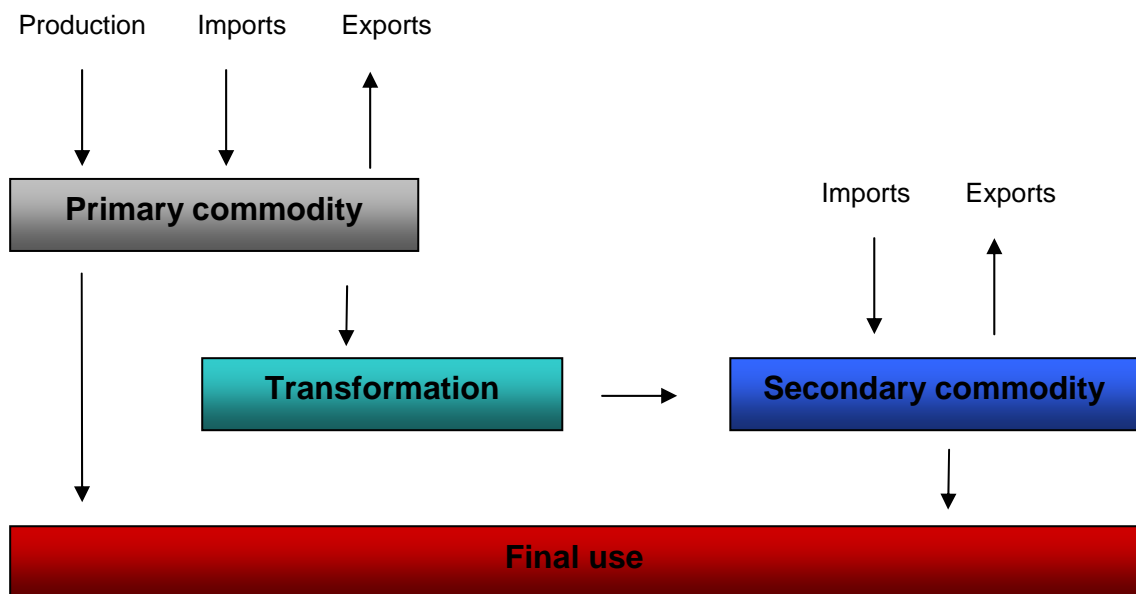
² Based on tariffs in force up to June 2008.

Contents

	Page
Headlines	1
Introduction	3
Total Primary Energy Supply	3
Transformation	4
Final Energy Consumption	5
Individual fuel types in more detail:	8
Petroleum products and gas	8
Electricity	10
Coal	11
Energy use in homes	12
Energy prices	12
Energy-related carbon emissions	15
Annex A: Jersey Energy Balances for 2006 and 2007	18

Introduction

This report³ examines how energy is used in Jersey, highlighting where the Island's energy comes from and who uses it, illustrating changes in energy supply and consumption over time. The report describes the overall use of energy in Jersey using an "energy balance". The balance describes how raw fuel or "primary energy" is supplied (e.g. through imports and on-Island production). It then demonstrates what happens to this primary energy; some types of primary energy can be transformed into different products (e.g. gas oil and heavy fuel oil can be used to generate electricity) whereas others are distributed in their original form. The balance then describes how the energy is used by the final consumers.



Energy balances for Jersey in 2006 and 2007 are presented in Annex A. The report also looks at the supply and consumption of individual fuels in more detail as well as the cost of energy and energy-related carbon emissions. Throughout the report energy data is presented in both original units and in terms of tonnes of oil equivalent (toe). A toe is a unit of energy, representing the amount of energy released by burning one tonne of crude oil. This common unit of energy enables different fuels to be compared and aggregated.

Total Primary Energy Supply

Total primary energy supply (TPES) is the energy which a country makes from its own natural resources and includes any energy imported. For example, coal (whether burnt by households or in power stations) is a primary energy, whilst the electricity subsequently produced from burning coal is not. Imported electricity (originally generated in the exporting country) is a primary energy.

In 2007 Jersey's TPES was 202,000 tonnes of oil equivalent (toe) or 2.35 million MWh, representing an increase of 2% on 2006. The vast majority of

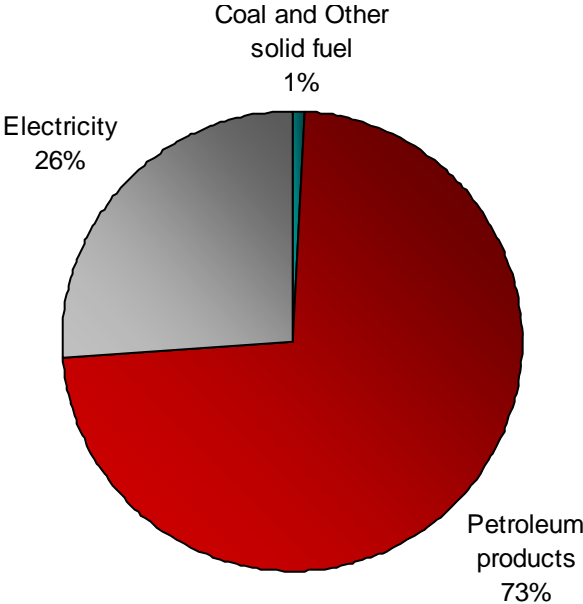
³ Data presented here are derived from an annual energy inquiry which was launched in 2004 to replace the former quarterly inquiry. This change was introduced to produce a more accurate measure of energy use in Jersey. To provide a longer-term view of energy demand data going back to 1991 are presented; however, these data are not as accurate as those for 2001 onwards.

TPES was imported, with only 1% (around 1,400 toe) produced in Jersey, through electricity generated from the energy-from-waste plant at Bellozanne. As Jersey has no known natural resources of fossil fuel it is not surprising that imports account for almost all of the primary energy supply.

The increase in TPES in 2007 was largely a result of companies consuming a greater amount of fuel stocks (around 3,400 toe compared with about 1,900 toe in 2006) combined with higher levels of importation.

As Figure 1 shows, petroleum products (petrol, diesel, heating oil, aviation fuel and liquefied petroleum gas, etc) account for nearly three-quarters (73%) of Jersey's TPES, with 26% coming from electricity (imports from France and on-Island production at the Bellozanne energy-from-waste plant) and about 1% from coal.

Figure 1: Jersey's total primary energy supply, by fuel type 2007



Transformation

Transformation means turning energy from one form into another. Such processes are usually carried out in order to turn energy into a form that is easier to use. For example, crude oil contains a great deal of energy but this can only be harnessed when the oil is refined into other products such as petrol or heating oil.

In Jersey itself, there is little transformation as most of the fuel is imported in the form that consumers require. One form of transformation that does occur on-Island is the production of electricity from oil, although this is now done at reduced rates since the introduction of the French interconnector means that the majority of electricity is now directly imported. In 2007 18,600 tonnes of oil were used to generate 70,400 MWh of electricity (less than 1% of which was at Bellozanne). Although this does represent an increase compared to 2006 (when 5,300 tonnes of oil were used to produce 18,600 MWh of electricity) the longer term trend is one of decline with oil generation accounting for 37% in 1991 compared to 10% in 2007.

The other form of energy transformation which occurs in Jersey is converting Liquefied Petroleum Gas (LPG) into a gaseous form so it can be piped through the

Island's gas network. Compared to generating electricity or refining crude oil, such gas transformation loses very little energy; in 2007 less than 150 toe was consumed in converting 9,900 toe of LPG to gas.

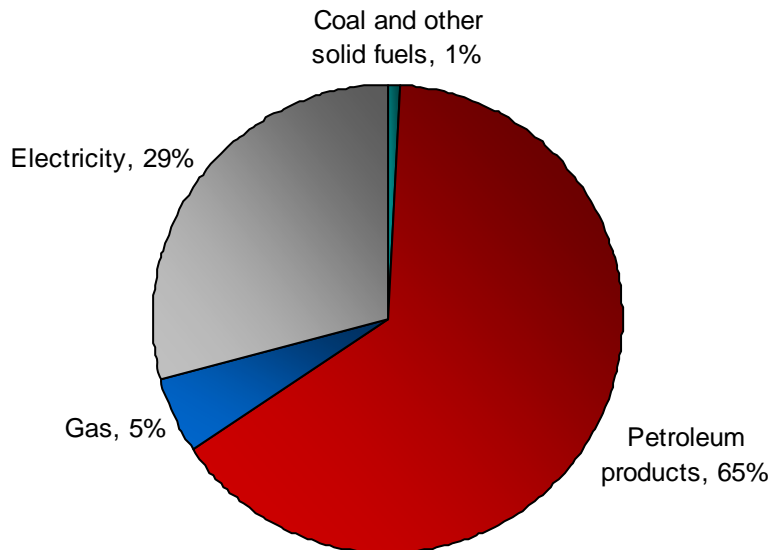
Final Energy Consumption

As the name suggests, final energy consumption refers to the use of energy in its final form (i.e. after any transformation has occurred) by the ultimate consumer for heating their home, lighting a shop, powering a computer, driving a car, etc.

In 2007 total final energy consumption (FEC) in Jersey was 183,000 toe (2.13 million MWh), representing a decrease of 3% on 2006.

The high degree of dependence on petroleum products in Jersey remains evident, with petroleum products accounting for about two-thirds (65%) of final consumption in 2007 (Figures 2 and 3). Electricity accounts for over a quarter of final energy consumption, with gas 5% (6% if the gas consumed as LPG is included), and coal 1%.

Figure 2: Jersey's total final energy consumption, by fuel type 2007



Total final energy consumption has been relatively flat over the past six years, especially if allowance is made for warmer or colder winters. However, consumption of individual fuels has differed. For example, electricity consumption has increased by about a seventh (15%) between 2000 and 2007, whilst consumption of road fuels has fallen slightly (by 8%) and coal by over a half (56%).

Figure 3: Jersey's total final energy consumption, by fuel type (detailed) 2007

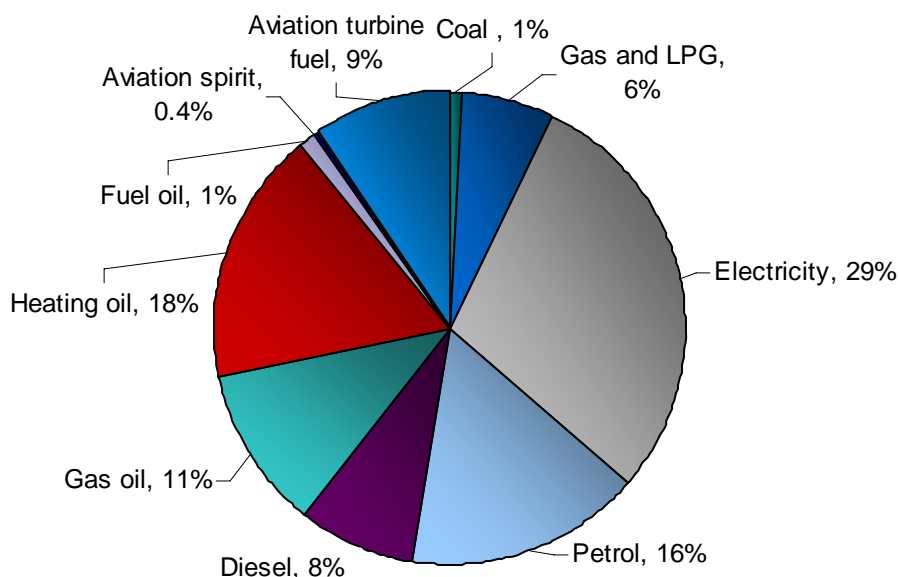


Table 1 and Figure 4 illustrate recent changes in fuel consumption, between 2006 and 2007. The total final energy consumption in 2007 was slightly lower than in 2006, down by 3%. This was reflected in the individual fuel types with consumption of most fuels falling between 2006 and 2007.

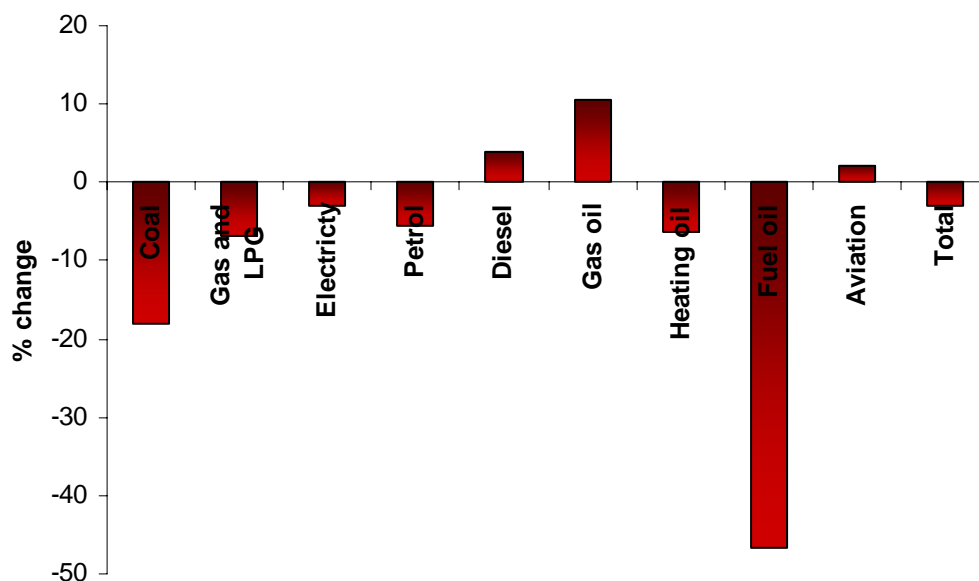
Table1: Jersey's total final energy consumption, by fuel type, 2006 and 2007

Tonnes of oil equivalent (toe)

Fuel	2006	2007	% change
Road fuels	43,380	42,170	-3
Gas oil	20,400	22,600	11
Heating oil	34,380	32,170	-6
Other petroleum products	21,060	19,730	-6
Gas	12,690	11,820	-7
Coal and other solid fuel	1,890	1,540	-19
Electricity	55,030	53,400	-3
Total	188,841	183,398	-3

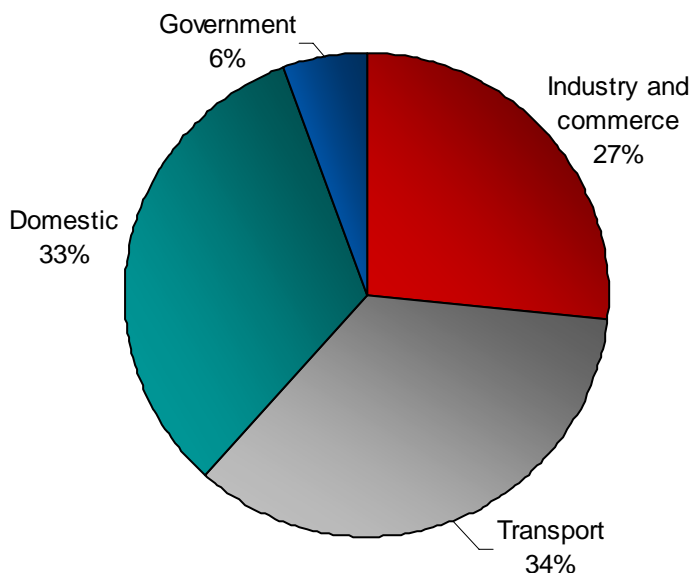
In 2007 road fuels were split as: Lead Replacement 250 toe, Unleaded 29,190 toe, Diesel 12,720 toe. Gas includes manufactured and final consumption of LPG. Electricity includes final consumption at the Bellozanne site.

Figure 4: Change in final energy consumption 2006 - 2007



Final energy consumption can also be considered in terms of who uses the energy⁴. In 2007 around a third of Jersey's energy was consumed in each of domestic (i.e. the energy we use in our homes) and transport uses (road, air⁵, and marine) with industry consuming over a quarter (27%) and government about 6% (Figure 5).

Figure 5: Jersey's total final energy consumption, by user 2007



⁴ Most energy suppliers classify customers by volume of energy consumed (i.e. small, medium, large etc) as such an accurate sectoral classification between industry and government is not possible for all suppliers. Similarly there may be slight definitional issues between the classification of small industrial users and domestic consumers.

⁵ Air only covers fuel that is consumed in Jersey i.e. supplied to airlines and for private use whilst in Jersey.

Compared to 2006, each sector has accounted for about the same percentage of Jersey's total final energy consumption. Within the domestic sector, 48% of domestic energy use was petroleum products, 40% electricity, 9% gas and 3% coal in 2007.

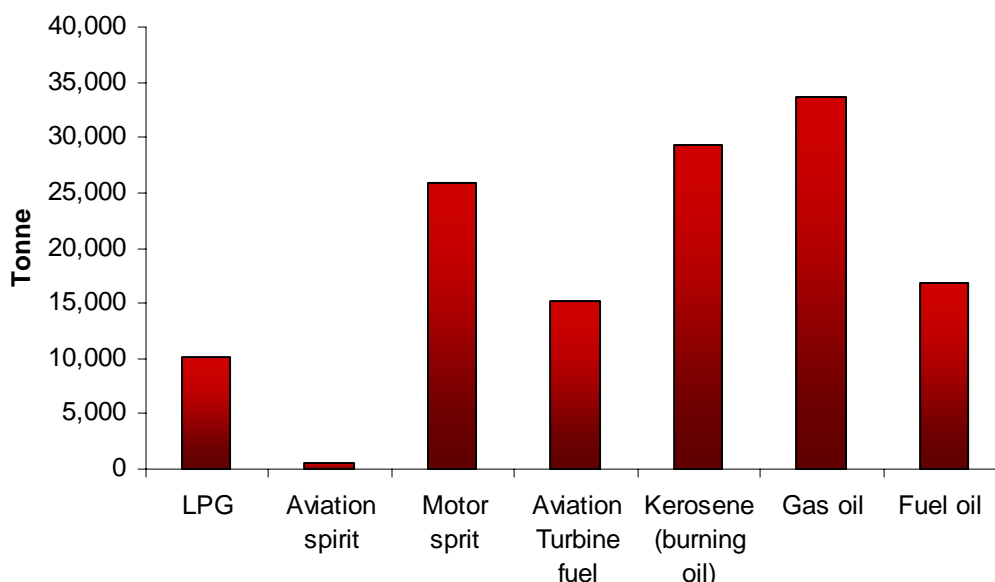
Individual Fuel Types in more detail

Petroleum products and gas

Petroleum products cover a range of fuels that are all made from crude oil. All of the petroleum products used in Jersey are imported and, as described above, these products make up a large share of Jersey's energy use.

Figure 6 shows imports of petroleum products in 2007. Three categories: motor spirit (petrol); kerosene (heating oil used in homes); and gas oil (diesel and oil used by industry) make up the majority of fuel imported, each at around 30,000 tonnes per year. Overall, as noted above, total imports of petroleum products were higher in 2007 than in 2006 (144,800 toe compared to 135,800 toe).

Figure 6: Imports of Petroleum products in 2007



The largest change within the overall consumption of petroleum products in Jersey has been the decline in oils (fuel oil and gas oil) used to generate electricity, as shown in Figure 7. During the early 1990's around 80,000 tonnes of oil were used per year to generate electricity; however, with the introduction of an enhanced interconnector to France for importing electricity this had fallen to 19,000 tonnes by 2002 and further to a low of a little over 3,000 in 2003. There was an increase to nearly 9,000 tonnes in 2004, followed by a decrease to 3,600 tonnes in 2005 and an increase to 5,300 in 2006.

In 2007 18,600 tonnes of oil were used for electricity generation. This latest increase was due to the cost of oil being relatively favourable compared with electricity importation costs; hence there was a higher level of on-Island generation compared to 2006. Such fluctuations in oil use are likely to be a feature of future trends, with generation in Jersey being determined by the combination of electricity prices in the

Jersey and European markets, global oil prices as well as availability through the interconnectors.

Figure 7 also shows that, electricity generation aside, there has been little change in total consumption of other oil products.

Figure 7: Final consumption of petroleum products, 1991 - 2007

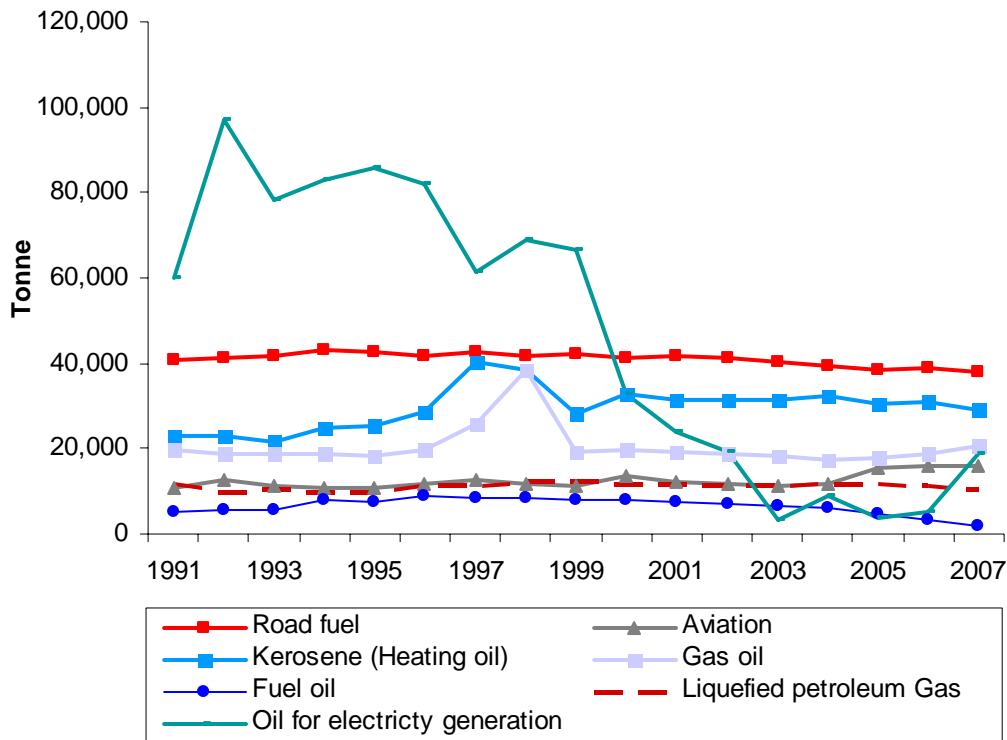


Table 2: Final consumption of petroleum products 2007 and % change on 2006

Fuel	2007 (tonnes)	% change on 2006
Aviation	16,100	2
Petrol	26,200	-5
Diesel	11,700	4
Heating oil	29,200	-6
Gas oil	20,700	11
Fuel oil	1,800	-47
Oil for electricity generation	18,600	254

Gas oil and fuel oil excludes consumption for electricity generation

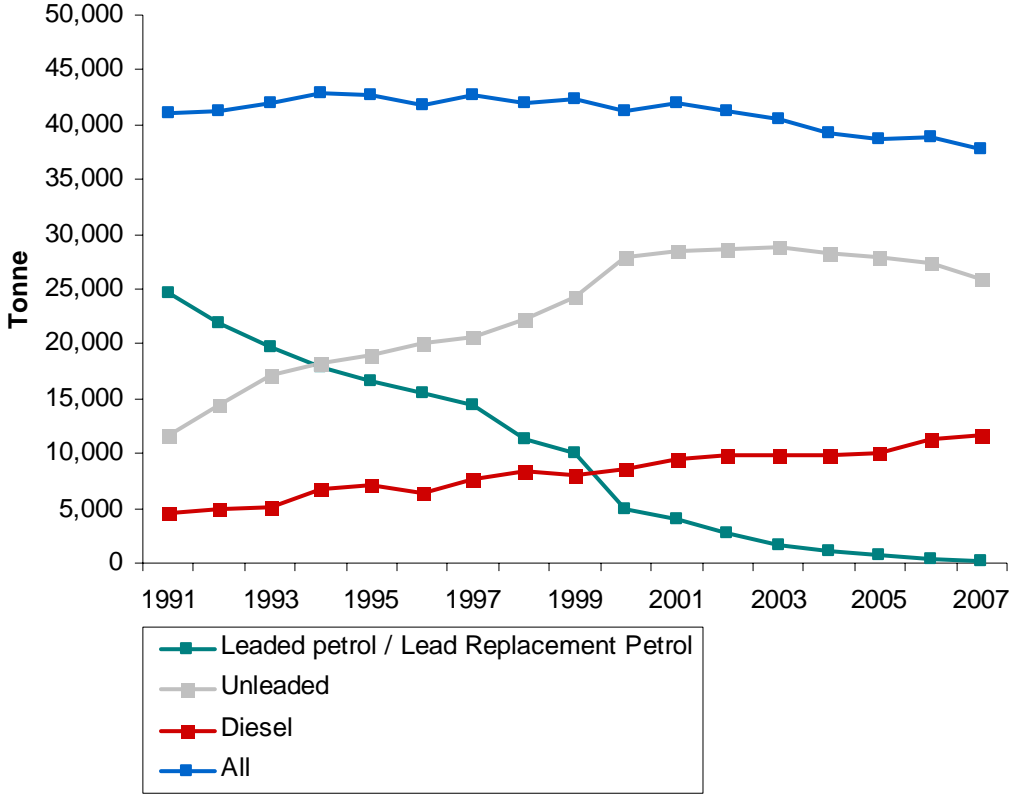
A specific feature of the Jersey energy market is that the gas used is all sourced from LPG (a petroleum product). In 2007 11,800 toe of gas was consumed, a decrease of 7% on 2006. Of the total, about five-sixths (83%, corresponding to 114,000 MWh or 9,800 toe) is supplied as manufactured gas (via pipes) with the remaining 17% supplied as LPG (1,700 tonnes or 2,000 toe).

At a broad level total consumption of road fuels has been fairly flat for the past decade, although there has been considerable change in its make up. As Figure 8

shows, the relative importance of leaded and unleaded petrol has been reversed. In 1991 leaded fuel made up 60% of all road fuel used with unleaded around 30% and diesel 10%. By 2007 unleaded accounted for 69%, diesel for 31% and leaded (lead replacement fuel) less than 1%.

Between 2001 and 2007 there has been a decrease of around 4,100 tonnes (10%) in total consumption, comprising of falls in LRP and unleaded of 3,800 tonnes and 2,600 tonnes, respectively, and an increase in diesel of 2,200 tonnes. Such changes highlight the phasing out of leaded fuel and the increased efficiency in engine design as well as the growth in diesel as diesel-fuelled vehicles become more widely used. In 2007, Jersey consumed 37,900 tonnes of motor spirit: 200 tonnes of LRP, 2,400 super unleaded, 23,600 unleaded and 11,700 tonnes of diesel. This total represents a fall of 3% on 2006, comprising a fall of 5% in unleaded and an increase of 4% in diesel.

Figure 8: Road fuel consumption, 1991 - 2007



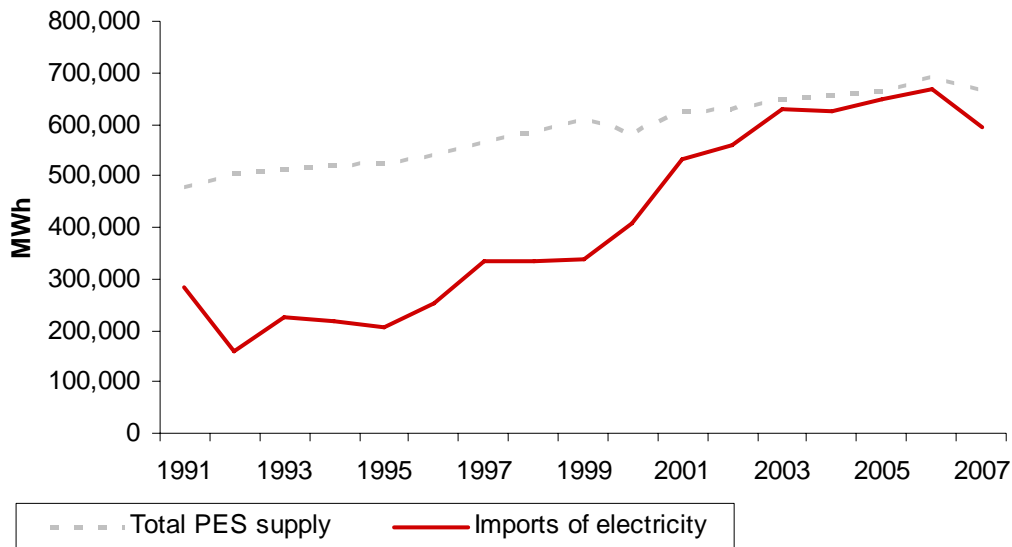
Electricity

Electricity demand in Jersey has grown steadily over the past 16 years, by an average of about 2% per year, and consumption in 2007 was some 37% higher than in 1991. As Figure 9 illustrates, the most dramatic change within the electricity sector has been the growth in importation. Throughout most of the 1990’s imported electricity accounted for between 40% and 60% of public electricity supply⁶; by 2007 this had risen to 89%.⁷

⁶ Public electricity supply (PES) is electricity provided through the JEC network and excludes consumption at Bellozanne.

⁷ According to the JEC the decrease in electricity imports between 2006 and 2007 was due to the cost of oil being unexpectedly lower than import costs; hence there was a higher level of on-Island generation. Import levels have increased during 2008 to date.

Figure 9: Total public electricity supply (PES) and imports, 1991 - 2007



Note: Public electricity supply only, excludes own generation and use at Bellozanne

Of all electricity consumed in 2007, almost half (282,200 MWh) was used within private homes⁸. This is similar to 2006 when the domestic component accounted for 296,900 MWh. Total government consumption in 2007 was about 9%, comprising 40,800 MWh from the JEC and around 13,100 MWh at Bellozanne.

Table 3: Electricity consumption, 2007

Sector	Consumption (MWh)
Domestic (Private households)	282,000
Industry	285,000
Government	54,000
Total	621,000

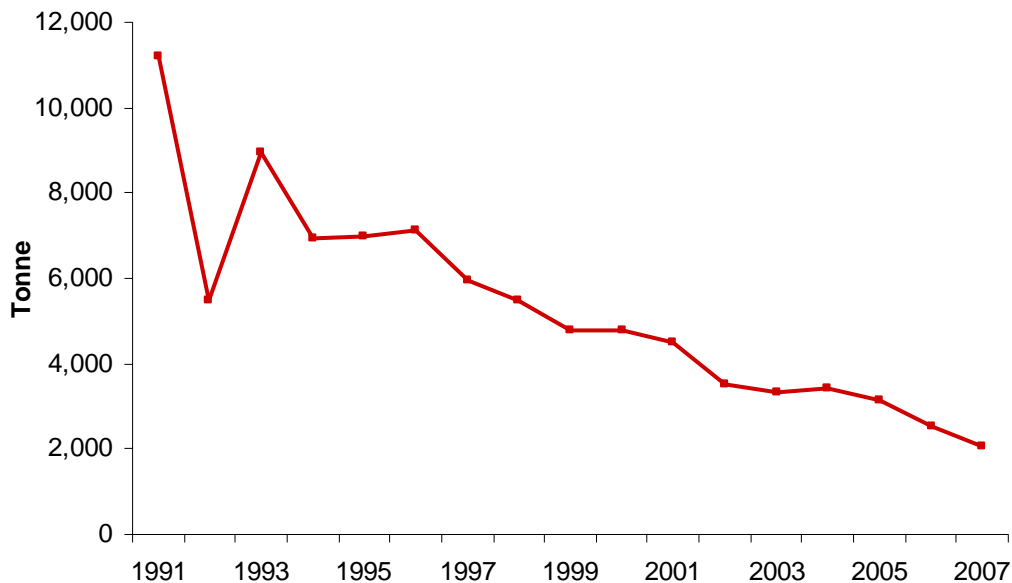
Government includes consumption at Bellozanne.

Coal

Coal use in Jersey has declined during the past 10 years (Figure 10) mirroring that seen in the UK. In 2007 some 2,100 tonnes of coal and other solid fuel were consumed by domestic households, 60% of which was coal. This total is over five times lower than in 1991 (when total consumption was some 11,200 tonnes) and represents a 18% decrease on 2006.

⁸ Includes power for heat supplied to States housing.

Figure 10: Final coal consumption, 1991 - 2007



Energy use in homes

The availability of fuel in Jersey will of course determine the energy sources that people use in their homes. As a result, average electricity consumption is higher in Jersey than in the UK, whilst average gas consumption is considerably lower in Jersey. Although it is more difficult to measure average consumption of heating oil, average consumption is likely to be somewhat higher in Jersey than in the UK due to the higher prevalence of gas use in the UK.

Table 4: Household energy consumption

Fuel	Total domestic consumption 2007
Electricity - all domestic consumers	282,200 MWh
Gas - all homes	60,900 MWh
Heating oil (kerosene)	25,500 tonnes (32 million litres)

Energy prices

Oil

A consequence of Jersey's dependence on imports of energy is that the Island is an energy "price taker" (i.e. the price in Jersey is largely determined by global energy markets, although local suppliers are still responsible for local costs). Specifically, given that around 70% of primary energy is a derivate of crude oil, the price of oil has a major impact on household and business energy costs in Jersey. As Figure 11 illustrates, the past few years have seen crude oil prices far higher than they have been for over a decade and during 2007 they reached levels not seen in real terms since the oil crisis of the early 1970's.

Figure 11 Crude oil index (Average price of crude oil purchased by UK refineries), 1991 - 2007

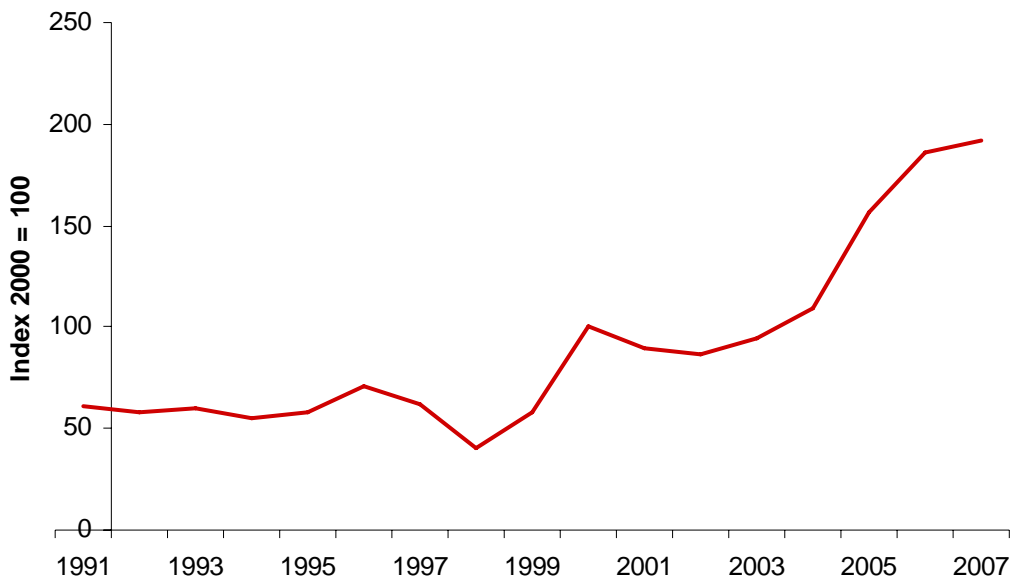
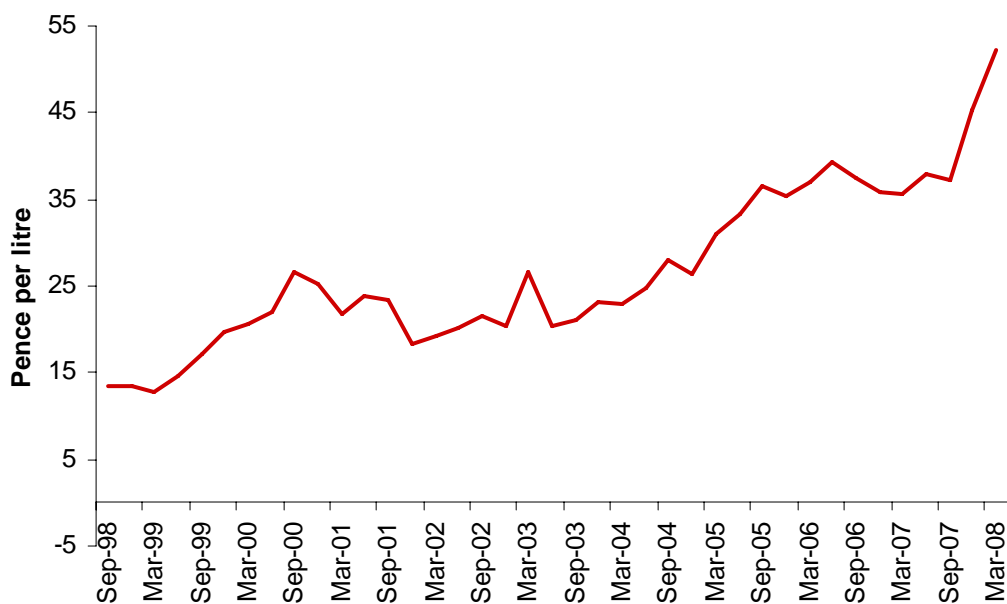


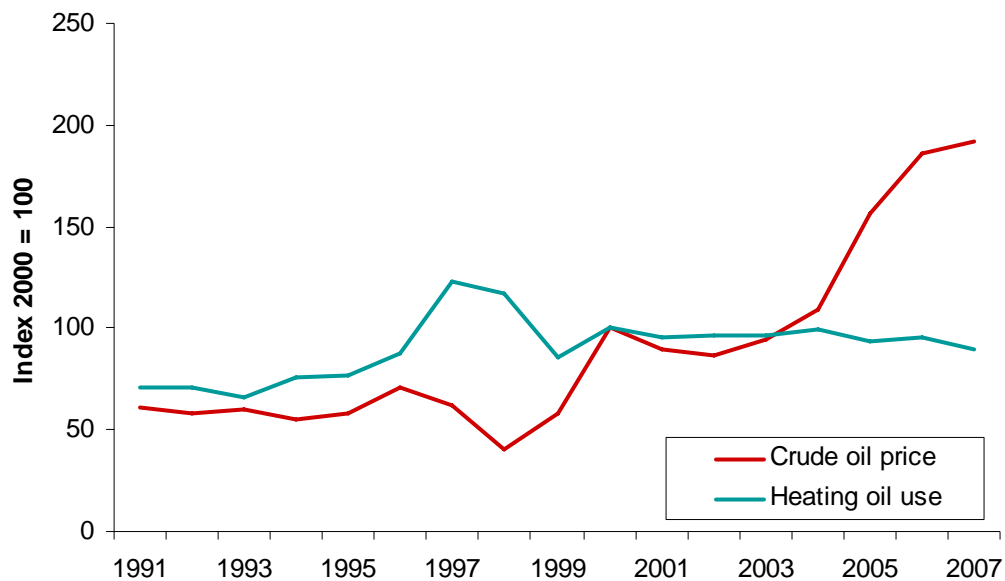
Figure 12 shows how the price of domestic heating oil has moved in Jersey. Prices were 47% higher in March 2008 than in March 2007 and some 155% higher than in March 2000. To put these prices into context, a household buying 1,000 litres of fuel would be paying around £523 in March 2008 compared to £355 in March 2007 and £205 in March 2000.

Figure 12: Average domestic heating oil prices in Jersey, 1998 - 2008



Given the increases in oil prices in recent years, it may be expected that consumers would have sought to use energy more efficiently and thus reduce their exposure to rising costs.

Figure 13: Crude oil prices and heating oil consumption, 1991 - 2007



Taking crude oil as an indicator for heating oil prices (to maximise the run of data which can be considered) Figure 13 shows that when oil prices were low (in the mid to late 1990's) oil consumption increased. However, as oil prices started to rise there was an initial reduction back to around trend level whilst recent large increases in costs have had little impact on consumption.

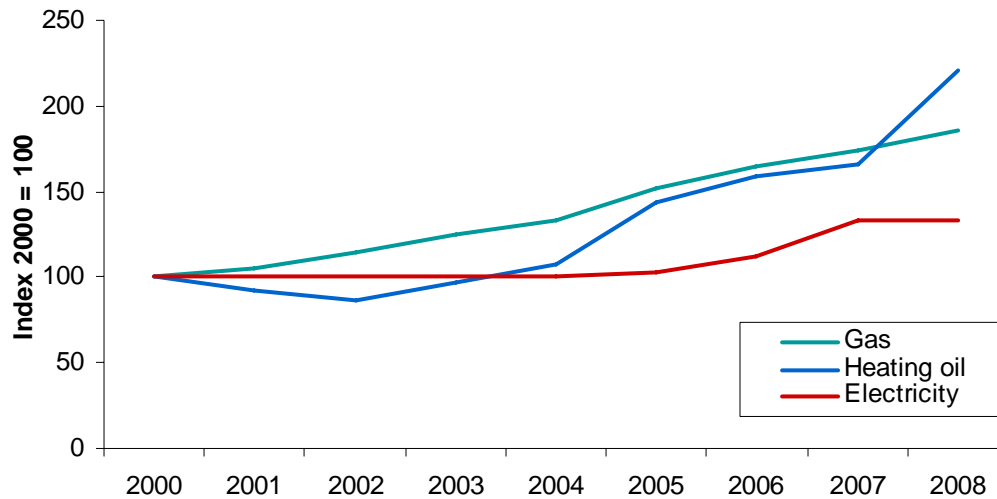
Gas

Since LPG is a petroleum product, increases in oil prices also feed through into the cost of gas (whether it is supplied directly as LPG or, as is the case in Jersey, it is manufactured.) Thus, as the cost of LPG has increased so have gas tariffs in Jersey. As a result, an average consumer will be paying about 7% more in 2008 than they would have been in 2007 (£692 compared to £648 based on annual bills for a Super Economy consumer using 8,000 kWh, reflecting tariff changes occurring up to May 2008).

Electricity

Electricity prices remained unchanged between October 2000 and January 2005, however from January 2005 to January 2006, prices for all consumers rose by about 10%, followed by a 19% increase from January 2006 to January 2007, meaning that the bill for a standard credit consumer using 6,500 kWh increased from £602 in 2006 to £713 in 2007, whilst that for a Comfort heat consumer on 9,000 kWh increased from £504 to £600. There were no price increases in January 2008.

Figure 14: Domestic energy costs, 2000 - 2008



Electricity is annual bill for credit consumer using 6,500kWh, Gas Super economy consumer using 8,000 kWh, Heating oil is average p/litre for deliveries of 2250litres.

As can be seen from Figure 14, for all (domestic and commercial) consumers of gas and electricity, the situation is similar to that of oil i.e. the trend in prices has been upward since 2000. The importance of using energy efficiently as a means of limiting exposure to increased costs thus becomes more important.

Energy-related carbon emissions

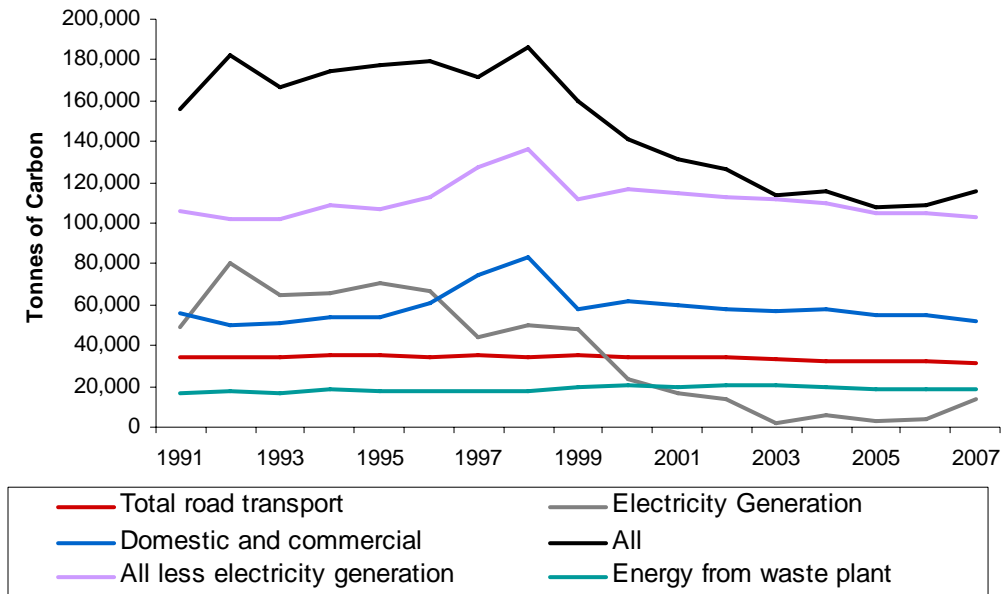
Across Europe, and indeed in most countries, greater attention is being placed on the impact our activity has on the environment and in particular on efforts to reduce carbon emissions. Recently, the Kyoto Protocol has been extended to Jersey, although Jersey's emissions will form a part of the UK's allowance and so there is no specific carbon reduction target set for the Island.

In a global sense carbon emissions in Jersey are tiny, but with the energy data available it is possible to calculate the carbon emissions produced as a result of energy consumption on the Island. Carbon emissions resulting from changes in land use (e.g. conversion of countryside to building use), and from agriculture are not included. Furthermore, since there is currently no international agreement on the treatment of aviation emissions, these are also excluded. It is also important to keep in mind that the energy data for 1991 to 2000 is not as accurate as that for the most recent years.

However, acknowledging such caveats, overall *provisional* energy related carbon emissions for Jersey have fallen by about a quarter (26%) between 1991 and 2007 (from 156,000 tonnes to 116,000 tonnes). The main cause of this reduction is the switch from on-Island electricity generation to the importation of electricity from France, as shown by Figure 15.

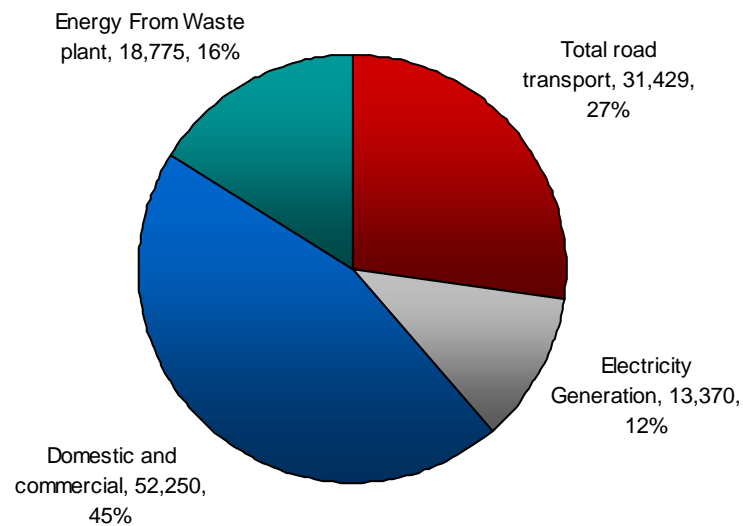
Excluding electricity generation, whilst there have been year on year fluctuations, overall there has been little change in carbon emissions over the past 16 years, the 2007 level being about 4% below the 1991 level.

Figure 15: Energy related carbon emissions, 1991 - 2007



The reduction in emissions resulting from the change in electricity generation is a one-off reduction i.e. now that the change has occurred and the reduction has been achieved, this cannot happen again.

Figure 16: Energy related carbon emissions by source, 2007



Figures show tonnes of carbon and percentage of total

The largest sources of energy related emissions are now road transport and domestic and commercial energy use which includes marine transport (Figure 16). Road emissions have decreased very gradually over the past decade as a result of greater efficiencies in engines, the phasing out of older less efficient cars and the growth in diesel (which is marginally less carbon intensive than petrol, but does cause other emissions). However, there is no evidence of significant behavioural change.

Emissions from domestic and commercial energy use decreased by 4% between 2006 and 2007 and road emissions decreased slightly by 3%. However, despite the peaks in the late 1990's, driven by increased use of cheap oil products, the overall picture of these emissions is again one of relative stability.

The fact that Jersey relies heavily on importation to meet its energy requirements means that the Island is vulnerable to global energy trends. Fossil fuels are a finite resource and the pressure on reserves is set to increase as the population rises and more countries become industrialised. Additionally, it is a well recognised scientific fact that the way in which energy has been used has resulted in environmental issues such as climate change. To tackle such problems energy policy is being developed on a global scale. The aim of energy policy is to “achieve secure affordable and sustainable energy”.

Work is currently underway to produce an energy policy for Jersey. An energy policy consultation document has been produced⁹ which describes Jersey's current situation and considers the various options that are available to ensure a secure future for the island. The consultation paper can be viewed and downloaded from: www.gov.je/PlanningEnvironment/Environment/From+global+to+local+policy/

Statistics Unit: June 2008

⁹ “Fuel for thought” issued by the Planning and Environment department 24th September 2007.

Annex A

Table A1: Jersey Energy Balance 2007

Tonnes of oil equivalent (toe)

	Coal and Other Solid Fuel	Petroleum products	Gas	Electricity	Total
Production				1,396	1,396
Imports	1,545	144,788		51,188	197,521
stock change		3,390		0	3,390
Primary supply	1,545	148,178		52,584	202,306
Transfers					
Electricity generation		-19,377		6,057	-13,320
Gas supply		-10,144	9,949		-194
Available supply	1,545	118,657	9,949	58,641	188,791
Energy industry own use and losses			149	4,992	5,141
Consumption					
Industry and government		25,361	4,561	29,132	59,054
Air and marine		21,909			21,909
Road		42,169			42,169
Domestic	1,545	29,218	5,239	24,265	60,267
Final consumption	1,545	118,657	9,800	53,397	183,398

To avoid disclosure some cells have been aggregated.

Table A2: Final energy consumption in original units 2007

	Coal and Other Solid Fuel (tonnes)	Petroleum products (tonnes)	Gas (MWh)	Electricity (MWh)	Total (MWh)
Industry and government		22,126	53,048	338,803	
Air and marine		17,982			
Road		37,857			
Domestic	2,085	25,835	60,925	282,199	
Final consumption	2,085	103,799	113,973	621,002	2,132,922

Table A3: Jersey Energy Balance 2006¹⁰

Tonnes of oil equivalent (toe)

	Coal and Other Solid Fuel	Petroleum products	Gas	Electricity	Total
Production				1,572	1,572
Imports	1,888	135,826		57,494	195,209
stock change		1,926		0	1,926
Primary supply	1,888	137,753		59,066	198,707
Transfers					
Electricity generation		-5,482		1,596	-3,887
Gas supply		-10,818	10,631		-188
Available supply	1,888	121,452	10,631	60,662	194,632
Energy industry own use and losses			159	5,393	5,553
Consumption					
Industry and government		27,597	4,649	29,497	61,742
Air and marine		19,550			19,550
Road		43,378			43,378
Domestic	1,888	30,927	5,822	25,533	64,170
Final consumption	1,888	121,452	10,471	55,029	188,841

To avoid disclosure some cells have been aggregated.

Table A4: Final energy consumption in original units 2006

	Coal and Other Solid Fuel (tonnes)	Petroleum products (tonnes)	Gas (MWh)	Electricity (MWh)	Total (MWh)
Industry and government		24,110	54,065	343,046	
Air and marine		17,722			
Road		38,917			
Domestic	2,548	27,347	67,715	296,943	
Final consumption	2,548	108,096	121,780	639,989	2,196,217

¹⁰ Some figures for 2006 have been revised slightly due to the availability of more recent data.