

Headlines

- **Total final energy demand in Jersey in 2008 was 184,000 toe¹ (2.14 million MWh), similar to 2007²;**
- final consumption of electricity increased by 1% between 2007 and 2008. Over the same period road fuel use increased by 2% (unleaded up 0.1%, diesel up 7%) heating oil use rose by 2% and consumption of gas oil (excluding electricity generation) fell by 2%;
- in 2008 about two-thirds of all energy used was a type of petroleum product, with road fuels (petrol and diesel) accounting for about a quarter of total final energy demand;
- household energy consumption was 4% higher than in 2007, reflecting increases across all of the fuel types used by domestic consumers;
- in 2008 Jersey's total primary energy supply was 194,000 toe (2.25 million MWh), a decrease of 4% on 2007, a result of oil companies building fuel stocks in 2008 in contrast to 2007 when fuel stocks were consumed;
- essentially all of Jersey's primary energy needs and 96% of electricity were imported;
- average domestic energy bills rose by 27% for electricity and decreased by 10% for gas³ between 2008 and 2009. The cost of heating oil in Spring 2009 was 35% lower than in the same period of 2007;
- provisional data show that energy-related carbon emissions fell by about 17% between 2007 and 2008, due to the lower production of on-island electricity in 2008 compared to 2007. Removing the effect of electricity generation, emissions in 2008 were similar to those in 2005 and 2006.

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 Throughout this report figures for coal and other solid fuel have been excluded due to a lack of available data. Figures for previous years have been revised so that they also exclude coal and other solid fuel to ensure data is comparable. Coal and other solid fuel contributed less than 1% to both total primary energy supply and final energy consumption in 2007.

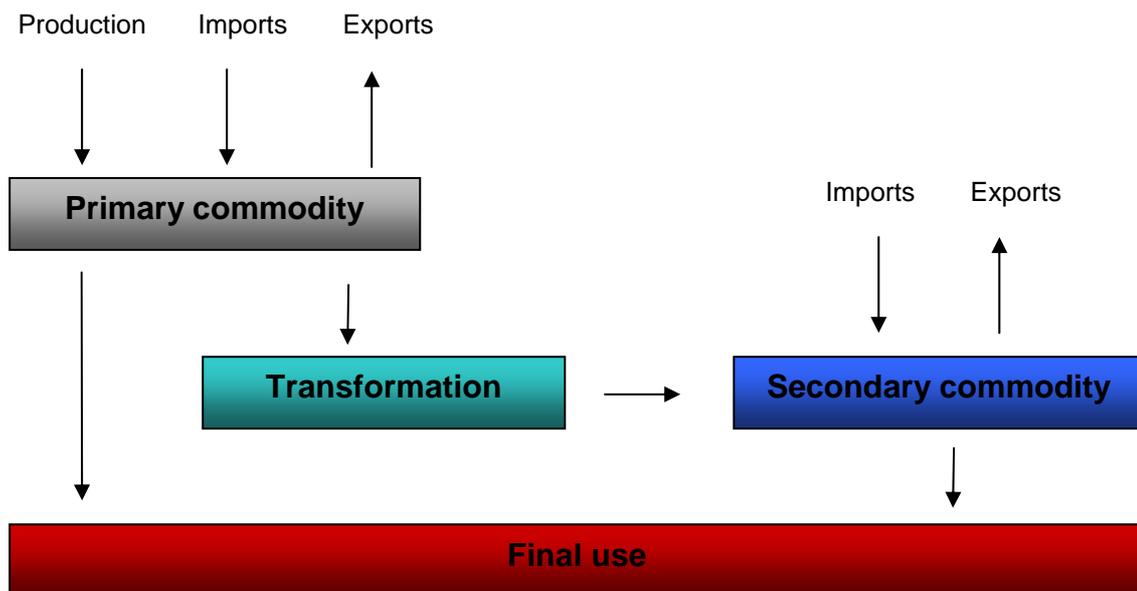
³ Based on tariffs in force up to June 2009.

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Introduction

This report⁴ 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 2007 and 2008 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 2008 Jersey's TPES was 194,000 tonnes of oil equivalent (toe) or 2.25 million MWh, representing a decrease of 4% on 2007. The vast majority of

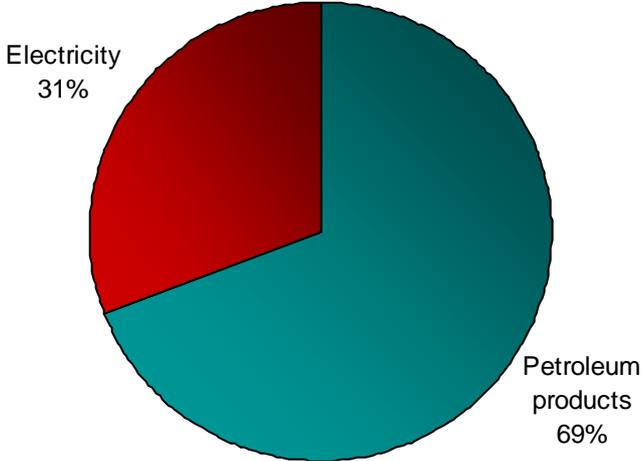
⁴ Data presented here are derived from an annual energy inquiry which was launched in 2004 to replace the former quarterly inquiry. This change was introduced to produce a more accurate measure of energy use in Jersey. To provide a longer-term view of energy demand data going back to 1991 are presented; however, these data are not as accurate as those for 2001 onwards.

TPES was imported, with only 1% (around 1,500 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 decrease in TPES was largely a result of oil companies building fuel stocks, accumulating 6,900 toe of stock. This is in contrast to 2007 when 3,400 toe of stock were consumed.

As Figure 1 shows, petroleum products (petrol, diesel, heating oil, aviation fuel and liquefied petroleum gas, etc) account for over two-thirds (69%) of Jersey's TPES, with 31% coming from electricity (imports from France and on-Island production at the Bellozanne energy-from-waste plant).

Figure 1: Jersey's total primary energy supply, by fuel type 2008



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. In 2008 5,700 tonnes of oil were used to generate 21,200 MWh of electricity (less than 1% of which was at Bellozanne). This continues the longer term trend, with oil generation accounting for 37% in 1991 compared to 3% in 2008.

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 2008 less than 160 toe was consumed in converting 10,500 toe of LPG to gas.

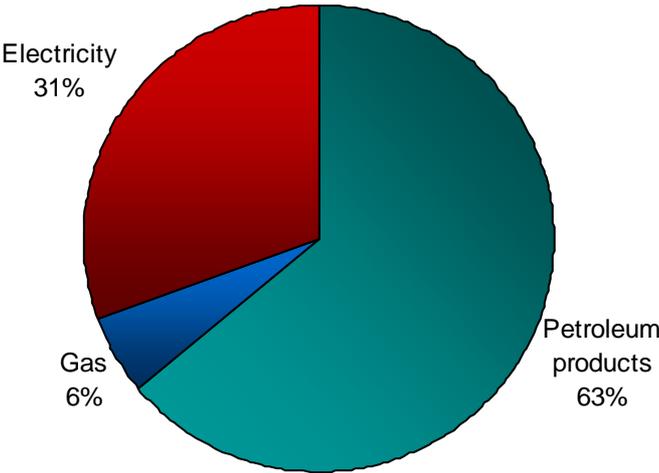
Final Energy Consumption

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 2008 total final energy consumption (FEC) in Jersey was 184,000 toe (2.14 million MWh), similar to that recorded in 2007.

The high degree of dependence on petroleum products in Jersey remains evident, with petroleum products accounting for nearly two-thirds (63%) of final consumption in 2008 (Figures 2 and 3). Electricity accounts for just under a third of final energy consumption, with gas accounting for 6% (7% if the gas consumed as LPG is included).

Figure 2: Jersey’s total final energy consumption, by fuel type 2008



Total final energy consumption has been relatively flat over the past seven 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 fifth (21%) between 2000 and 2008, whilst consumption of road fuels has fallen slightly (by 7%).

Figure 3: Jersey's total final energy consumption, by fuel type (detailed) 2008

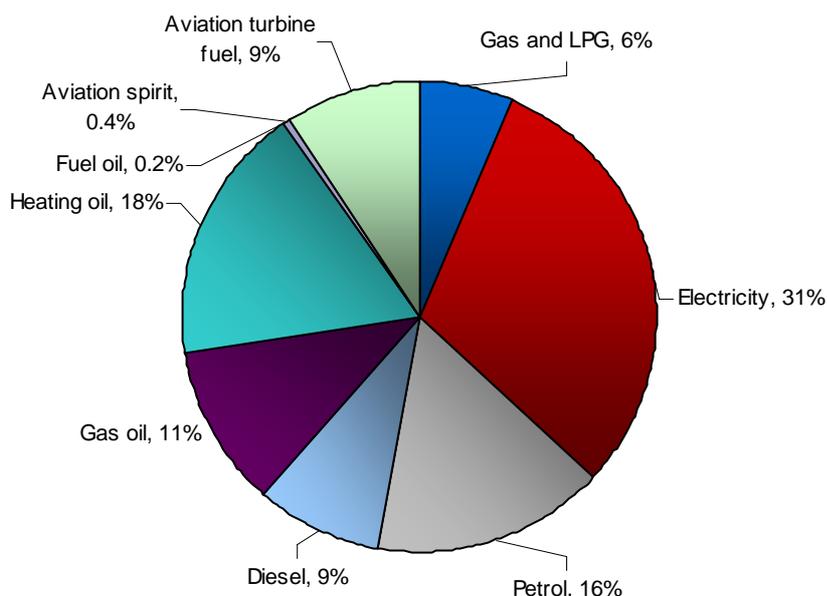


Table 1 and Figure 4 illustrate recent changes in fuel consumption, between 2007 and 2008⁵. The total final energy consumption in 2008 was similar to that in 2007.

Table1: Jersey's total final energy consumption, by fuel type, 2006 to 2008

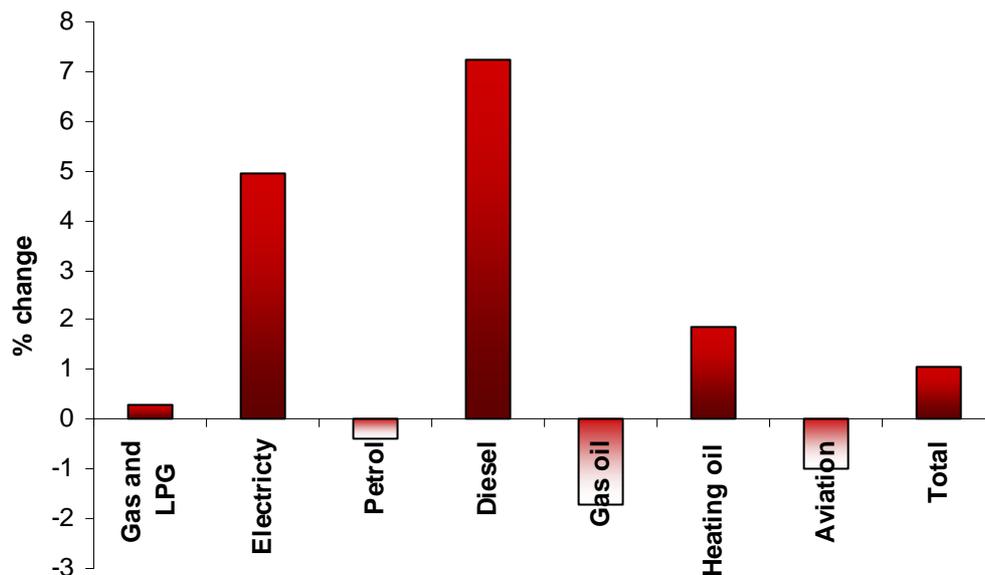
Tonnes of oil equivalent (toe)

Fuel	2006	2007	2008	% change 07 - 08
Road fuels	43,380	42,170	42,970	2
Gas oil	20,400	22,600	22,180	-2
Heating oil	34,380	32,170	32,780	2
Other petroleum products	21,060	19,730	17,920	-9
Gas	12,690	11,820	11,860	0.3
Electricity	55,030	53,400	56,050	5
Total	186,950	183,890	183,750	-0.1

In 2008 road fuels were split as: Lead Replacement 100 toe, Unleaded 29,300 toe, Diesel 13,600 toe. Gas includes manufactured and final consumption of LPG. Electricity includes final consumption at the Bellozanne site.

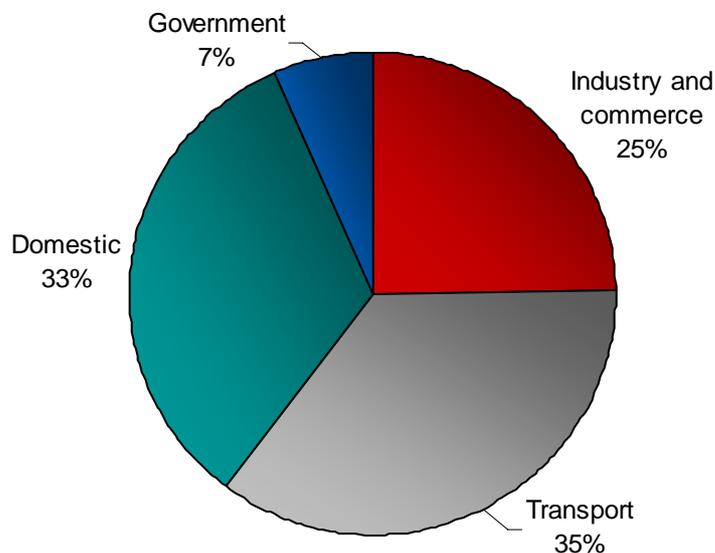
⁵ Fuel oil consumption fell from 1,800 tonnes in 2007 to 300 tonnes in 2008 owing to declining use in both agriculture and manufacturing.

Figure 4: Change in final energy consumption 2007 - 2008



Final energy consumption can also be considered in terms of who uses the energy⁶. In 2008 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, air⁷, and marine) with industry consuming a quarter (25%) and government about 7% (Figure 5).

Figure 5: Jersey's total final energy consumption, by user 2008



Compared to 2007, each sector has accounted for about the same percentage of Jersey's total final energy consumption. Within the domestic sector, 50% of domestic energy use was petroleum products, 41% electricity and 9% gas in 2008.

⁶ 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.

⁷ Air only covers fuel that is consumed in Jersey i.e. supplied to airlines and for private use whilst in Jersey.

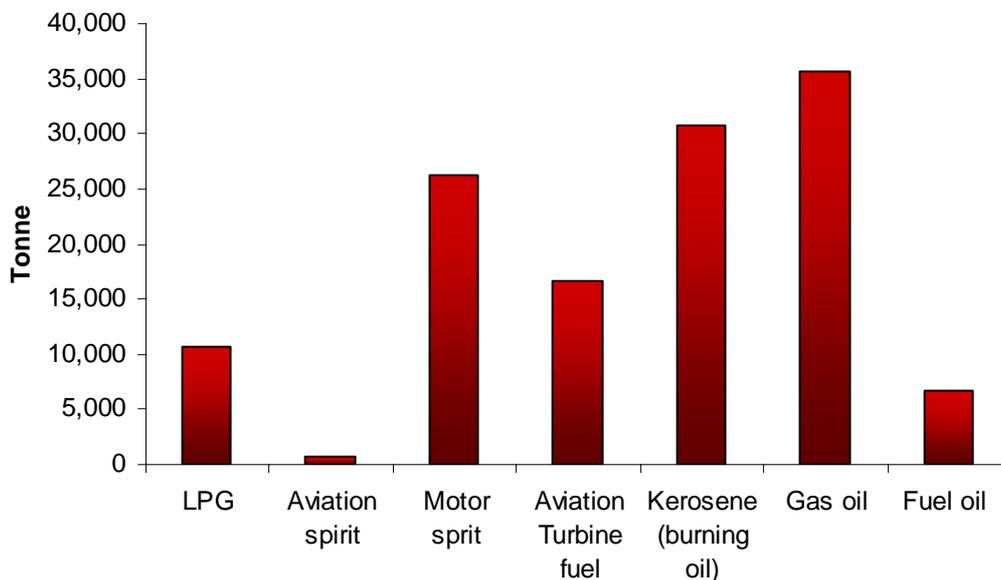
Individual Fuel Types in more detail

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 2008. 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 lower in 2008 than in 2007 (140,900 toe compared to 144,800 toe).

Figure 6: Imports of Petroleum products in 2008



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 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 previous years. In 2008, 5,700 tonnes of oil were used for electricity generation over the year, a similar level to that seen between 2003 and 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 - 2008

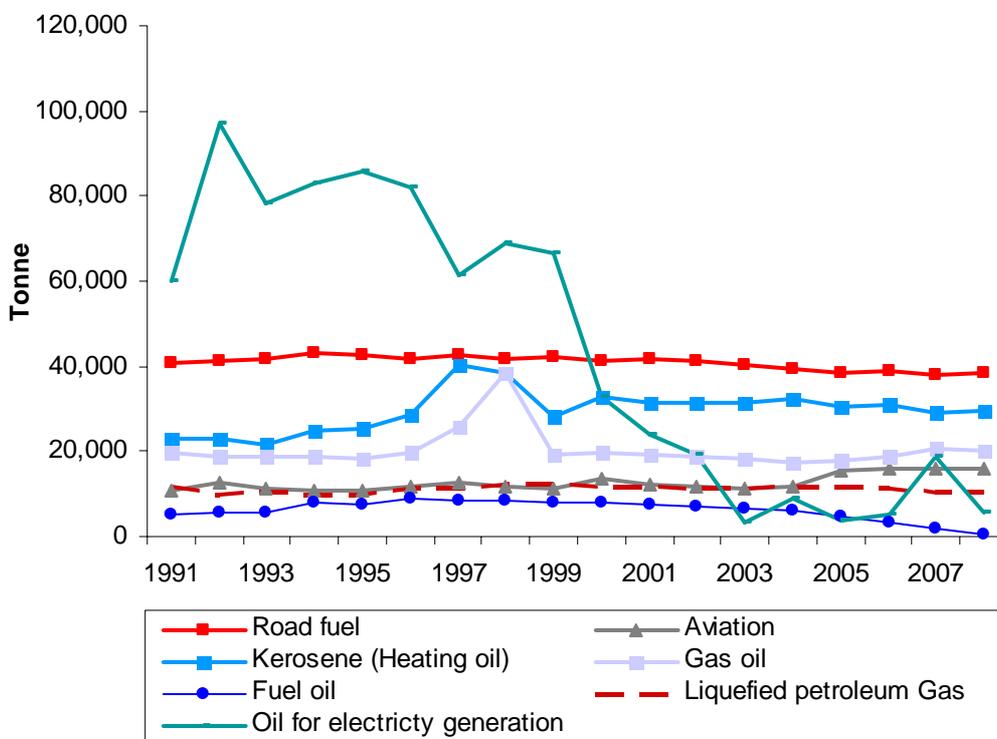


Table 2: Final consumption of petroleum products 2008 and % change on 2007

Fuel	2008 (tonnes)	% change on 2007
Aviation	16,000	-1
Petrol	26,100	-0.4
Diesel	12,500	7
Heating oil	29,700	2
Gas oil	20,400	-2
Oil for electricity generation	5,700	-69

Gas oil excludes consumption for electricity generation

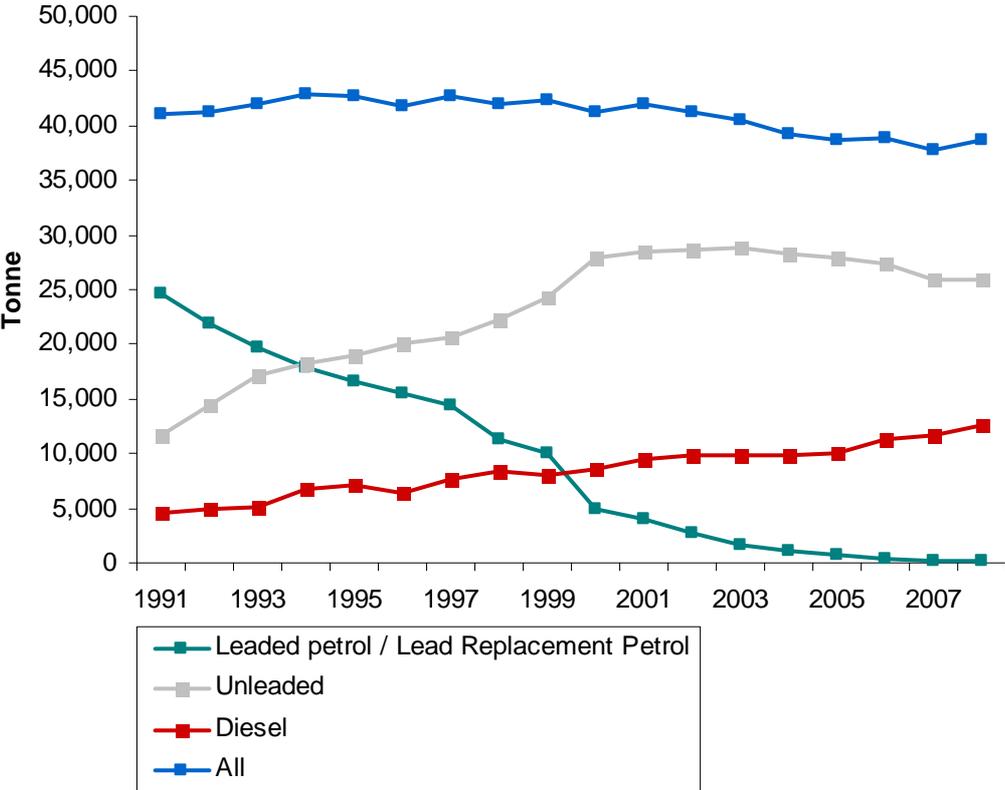
A specific feature of the Jersey energy market is that the gas used is all sourced from LPG (a petroleum product). In 2008 11,900 toe of gas was consumed, similar to that consumed in 2007. Of the total, about 88% (corresponding to 122,000 MWh or 10,500 toe) is supplied as manufactured gas (via pipes) with the remaining 12% supplied as LPG (1,300 tonnes or 1,600 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 2008 unleaded accounted for about 67%, diesel for 32% and leaded (lead replacement fuel) just 1%.

Between 2001 and 2008 there has been a decrease of around 3,300 tonnes (8%) in total consumption, comprising of falls in LRP and unleaded of 3,900 tonnes and 2,500 tonnes, respectively, and an increase in diesel of 3,100 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 2008, Jersey consumed 38,600 tonnes of motor spirit: 100 tonnes of LRP, 2,200 super unleaded, 23,800 unleaded and 12,500 tonnes of diesel. This total represents an increase of 2% on 2007, with an increase of 7% in diesel.

Figure 8: Road fuel consumption, 1991 - 2008

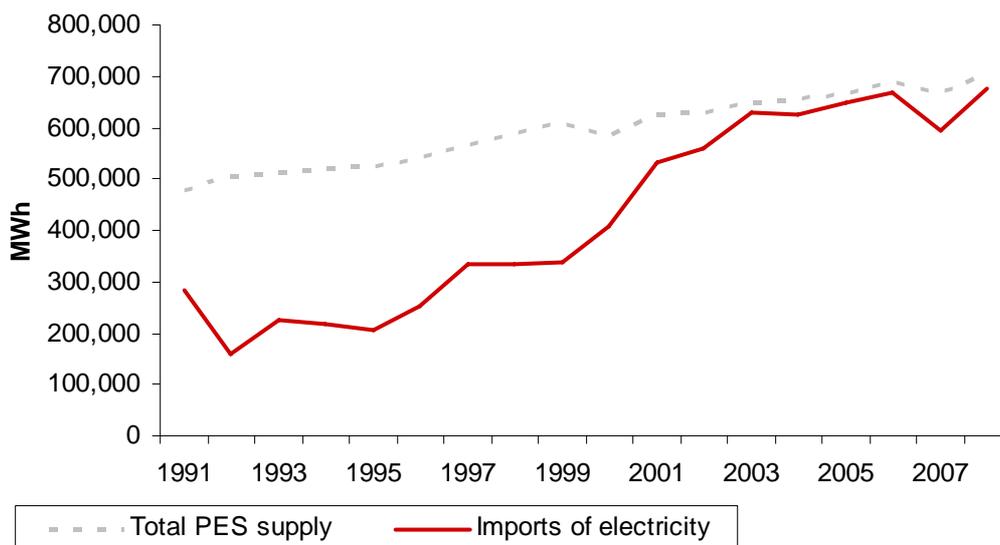


Electricity

Electricity demand in Jersey has grown steadily over the past 17 years, by an average of about 2% per year, and consumption in 2008 was some 44% 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 supply⁸; by 2008 this had risen to 96%.

⁸ Public electricity supply (PES) is electricity provided through the JEC network and excludes consumption at Bellozanne.

Figure 9: Total public electricity supply (PES) and imports, 1991 - 2008



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

Of all electricity consumed in 2008, almost half (292,200 MWh) was used within private homes⁹. This is similar to 2007 when the domestic component accounted for 282,200 MWh. Total government consumption in 2008 was about 11%, comprising 61,600 MWh from the JEC and around 13,200 MWh at Bellozanne.

Table 3: Electricity consumption, 2008

Sector	Consumption (MWh)
Domestic (Private households)	292,000
Industry	285,000
Government	75,000
Total	652,000

Government includes consumption at Bellozanne.

⁹ Includes power for heat supplied to States housing.

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 2008
Electricity - all domestic consumers	292,200 MWh
Gas - all homes	63,500 MWh
Heating oil (kerosene)	29,200 tonnes (37 million litres)

Overall, household energy consumption was 4% higher than in 2007, reflecting increases across all of the fuel types used by domestic consumers.

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 derivative 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 2008 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 – 2008

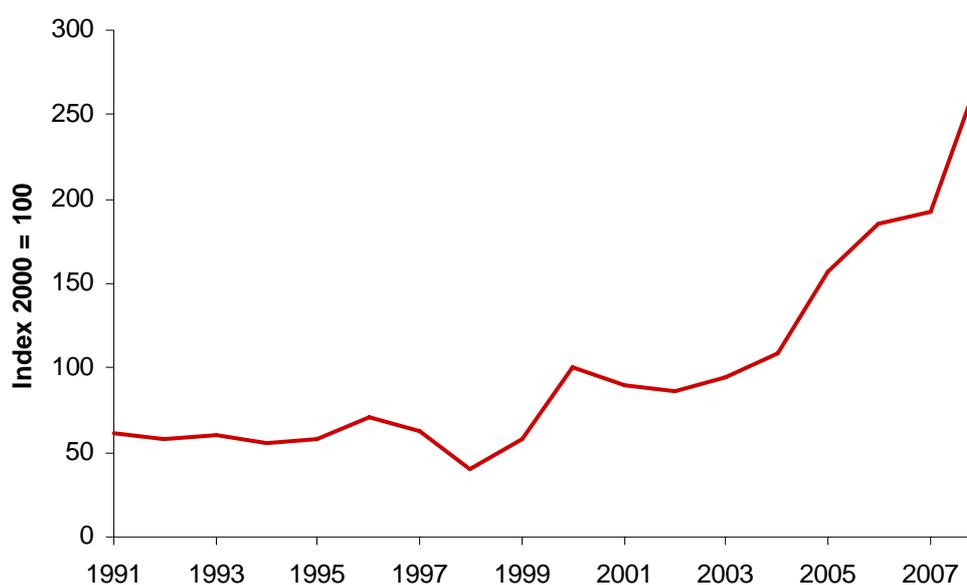
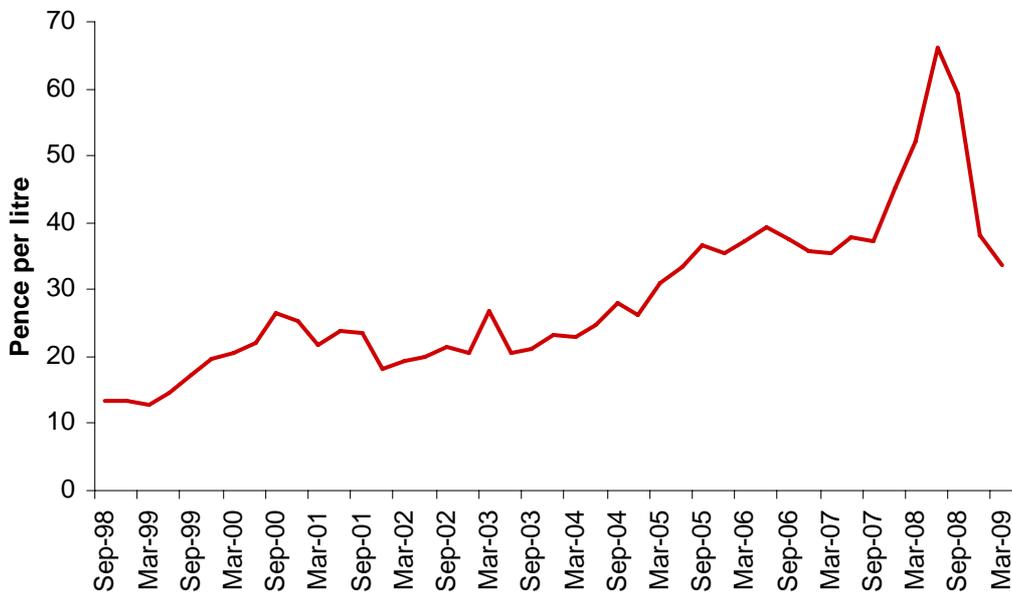


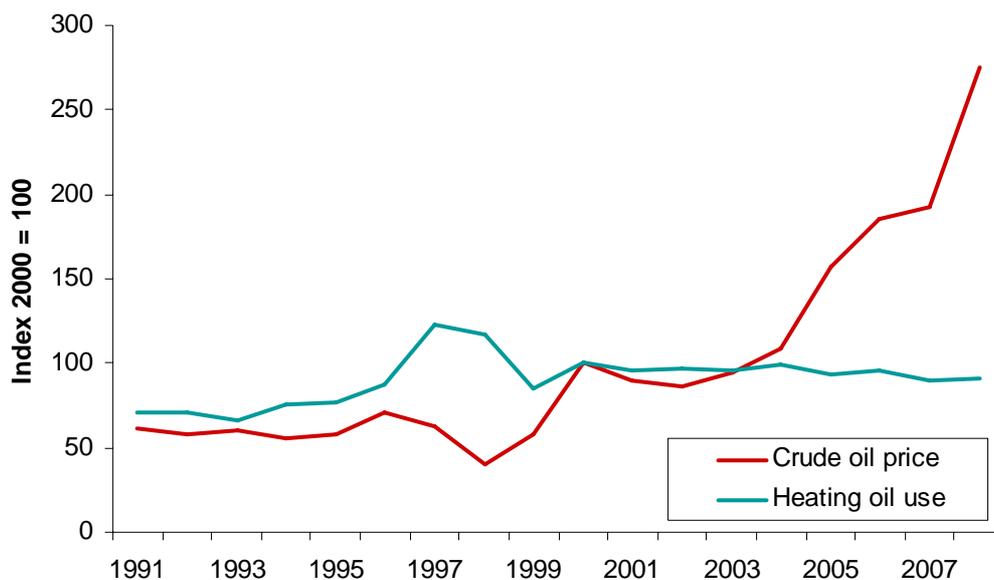
Figure 12 shows how the price of domestic heating oil has moved in Jersey. Prices peaked in June 2008, and although prices in March 2009 were 35% lower than in March 2008 they were some 65% higher than in March 2000. To put these prices into context, a household buying 1,000 litres of fuel would be paying around £338 in March 2009 compared to £523 in March 2008 and £205 in March 2000.

Figure 12: Average domestic heating oil prices in Jersey, 1998 - 2009



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 - 2008



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.

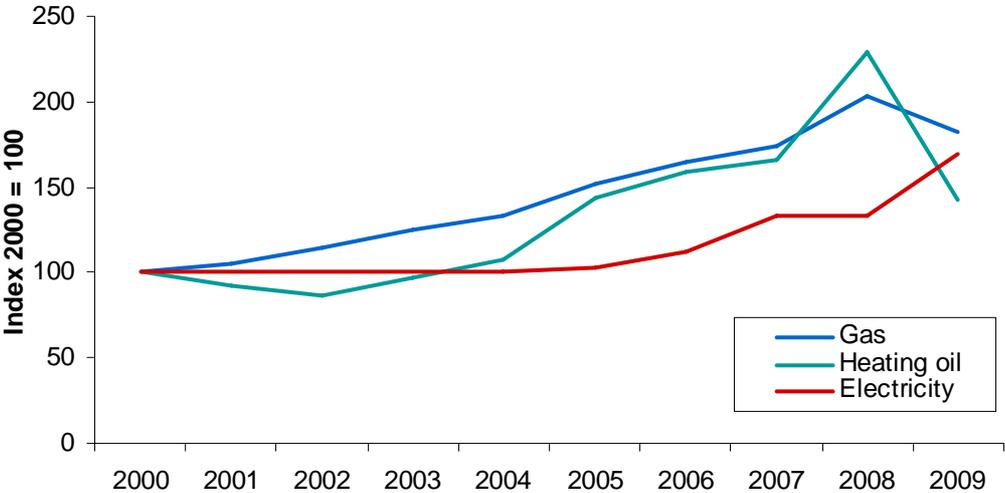
Most recently, an average consumer will be paying about £679¹⁰ in 2009, 10% lower than in 2008 (£758), reflecting the lower tariff introduced in December 2008.

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. There were no price increases in January 2008 but this was followed by a 27% increase between January 2008 and January 2009¹¹.

The bill for a standard credit consumer using 6,500 kWh increased from £713 in 2008 to £908 in 2009, whilst that for a Comfort heat consumer on 9,000 kWh increased from £600 to £760.

Figure 14: Domestic energy costs, 2000 - 2009



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, electricity and oil the trend in prices has been upward since 2000. Both gas and heating oil prices have fallen most recently, whilst electricity prices have risen.

¹⁰ Based on annual bills for a Super Economy consumer using 8,000 kWh.
¹¹ Based on the general domestic tariff (unit charge 13.11p/kWh and standing charge 15.17p/day in January 2009).

Energy-related carbon emissions

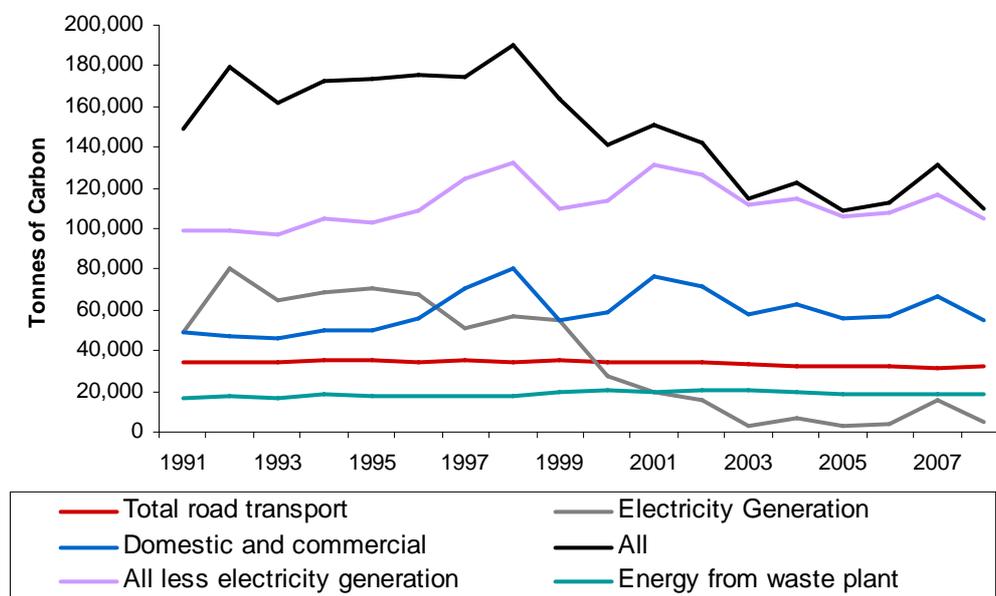
Across Europe, and indeed in most countries, greater attention is being placed on the impact our activity has on the environment and in particular on efforts to reduce carbon emissions. Recently, the Kyoto Protocol has been extended to Jersey, although Jersey's emissions will form a part of the UK's 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 2008 (from 149,000 tonnes to 110,000 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.

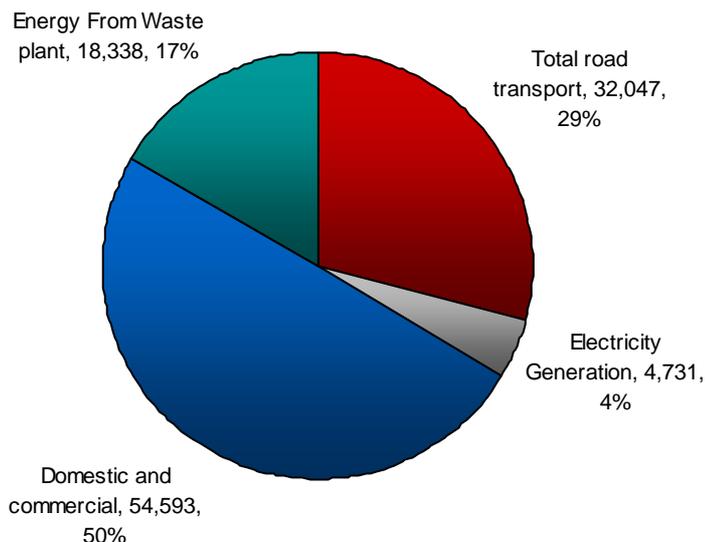
Excluding electricity generation, whilst there have been year on year fluctuations, overall there has been little change in carbon emissions over the past 17 years, the 2008 level being about 6% higher than the 1991 level.

Figure 15: Energy related carbon emissions, 1991 - 2008



Energy-related carbon emissions fell by about 17% between 2007 and 2008 due to the lower production of on-island electricity in 2008 compared to 2007. Removing the effect of electricity generation, emissions in 2008 were similar to those seen in 2005 and 2006.

Figure 16: Energy related carbon emissions by source, 2008



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.

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 underway to produce an energy policy for Jersey. An energy policy consultation document has been produced¹² 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 2009

¹² “Fuel for thought” issued by the Planning and Environment department 24th September 2007.

Annex A

Table A1: Jersey Energy Balance 2008

Tonnes of oil equivalent (toe)

	Petroleum products	Gas	Electricity	Total
Production			1,478	1,478
Imports	140,900		58,225	199,125
stock change	-6,904		0	-6,904
Primary supply	133,996		59,702	193,698
Transfers				
Electricity generation	-5,989		1,823	-4,166
Gas supply	-10,605	10,454		-151
Available supply	117,402	10,454	61,526	189,381
Energy industry own use and losses		157	5,232	5,389
Consumption				
Industry and government	21,756	4,835	30,919	57,510
Air and marine	22,257			22,257
Road	42,971			42,971
Domestic	30,419	5,462	25,128	61,008
Final consumption	117,402	10,297	56,047	183,745

To avoid disclosure some cells have been aggregated.

Table A2: Final energy consumption in original units 2008

	Petroleum products (tonnes)	Gas (MWh)	Electricity (MWh)	Total (MWh)
Industry and government	19,182	56,229	359,584	
Air and marine	17,894			
Road	38,596			
Domestic	26,914	63,522	292,238	
Final consumption	102,586	119,751	651,821	2,136,959

Table A3: Jersey Energy Balance 2007¹³

Tonnes of oil equivalent (toe)

	Petroleum products	Gas	Electricity	Total
Production			1,396	1,396
Imports	144,788		51,188	195,976
stock change	3,390		0	3,390
Primary supply	148,178		52,584	200,761
Transfers				
Electricity generation	-19,377		6,057	-13,320
Gas supply	-10,144	9,949		-194
Available supply	118,657	9,949	58,641	187,246
Energy industry own use and losses		149	4,992	5,141
Consumption				
Industry and government	25,361	4,561	31,170	61,092
Air and marine	21,909			21,909
Road	42,169			42,169
Domestic	29,218	5,239	24,265	58,722
Final consumption	118,657	9,800	55,435	183,891

To avoid disclosure some cells have been aggregated.

Table A4: Final energy consumption in original units 2007

	Petroleum products (tonnes)	Gas (MWh)	Electricity (MWh)	Total (MWh)
Industry and government	22,126	53,048	362,505	
Air and marine	17,982			
Road	37,857			
Domestic	25,835	60,925	282,199	
Final consumption	103,799	113,973	644,704	2,138,656

¹³ Some figures for 2007 have been revised.