

Jersey Energy Trends 2011

Statistics Unit: www.gov.je/statistics

Headlines

- **Total final energy consumption in Jersey in 2011 was 168,000 toe¹ (1.95 million MWh);**
- total final consumption in 2011 was 3% lower than in 2010;
- this decrease in final consumption on an annual basis was predominantly due to a reduction in the use of kerosene for domestic heating purposes; the consumption of gas also decreased;
- in contrast, electricity consumption increased by 2% in 2011 and road fuel consumption increased marginally, by less than 1%;
- almost three-fifths of all energy used in Jersey in 2011 was a type of petroleum product, with road fuels accounting for about a quarter of total final energy demand;
- almost all of Jersey's energy supply is imported, with less than 2% produced on-Island, as electricity generated by the new energy-from-waste (EFW) plant.

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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 mass or 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 equal to 10 million kilocalories or 11,630 kWh.

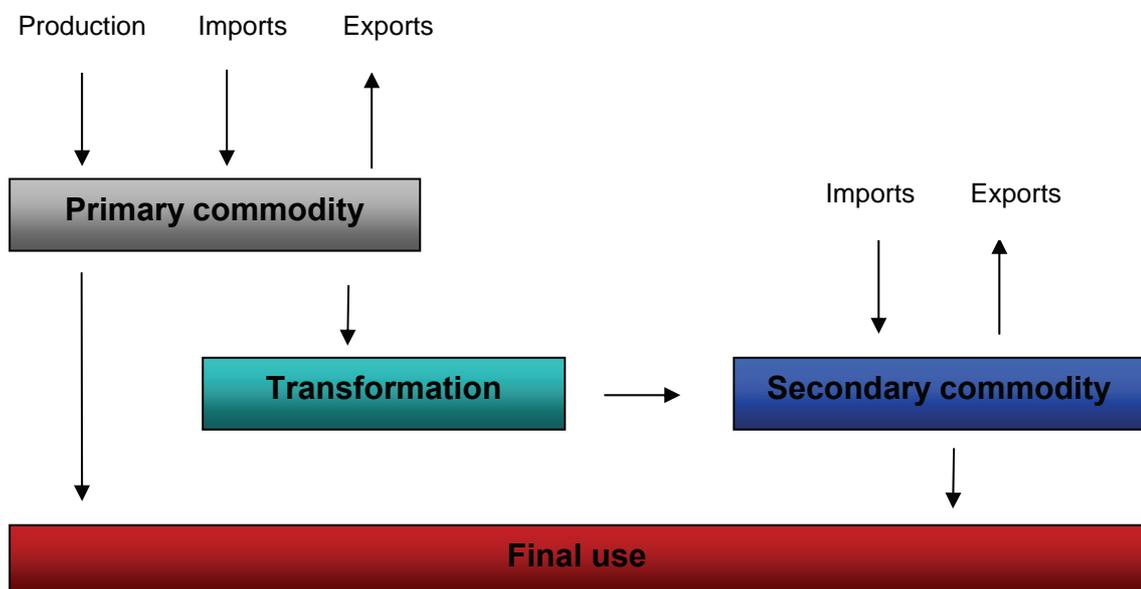
Introduction

This report examines how energy is supplied and used in Jersey, highlighting where the Island's energy comes from and who uses it, and focuses on changes over time.

The overall supply and use of energy in Jersey is described by means of an "energy balance" (see Figure 1). Such a balance describes how raw fuel or "primary energy" is supplied, e.g. through imports and on-Island production, and then demonstrates what happens to this primary energy. Some types of primary energy are distributed in their original form whereas others are transformed into different products (e.g. gas oil and heavy fuel oil can be used to generate electricity). The energy balance goes on to account for how the supply of energy is used by final consumers.

Energy balances for Jersey for 2009, 2010 and 2011 are presented in the Appendix.

Figure 1: Conceptual outline of an Energy Balance



It should be noted that 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. For context, coal and other solid fuel contributed less than 1% to both total primary energy supply and final energy consumption in calendar year 2007.

Units

Throughout this report, energy data is presented in both original units and in terms of tonnes of oil equivalent (toe). Since different fuel types provide different amounts of energy, a pure volume or mass measure such as tonnes will not represent the energy values of the fuels; therefore, each fuel is converted into toe based on its calorific value.

Using toe as the standardised unit of energy enables different fuel types to be compared and aggregated. A toe is a unit of energy which represents the quantity of energy released through burning one tonne of crude oil; 1 toe = 11,630 kWh.

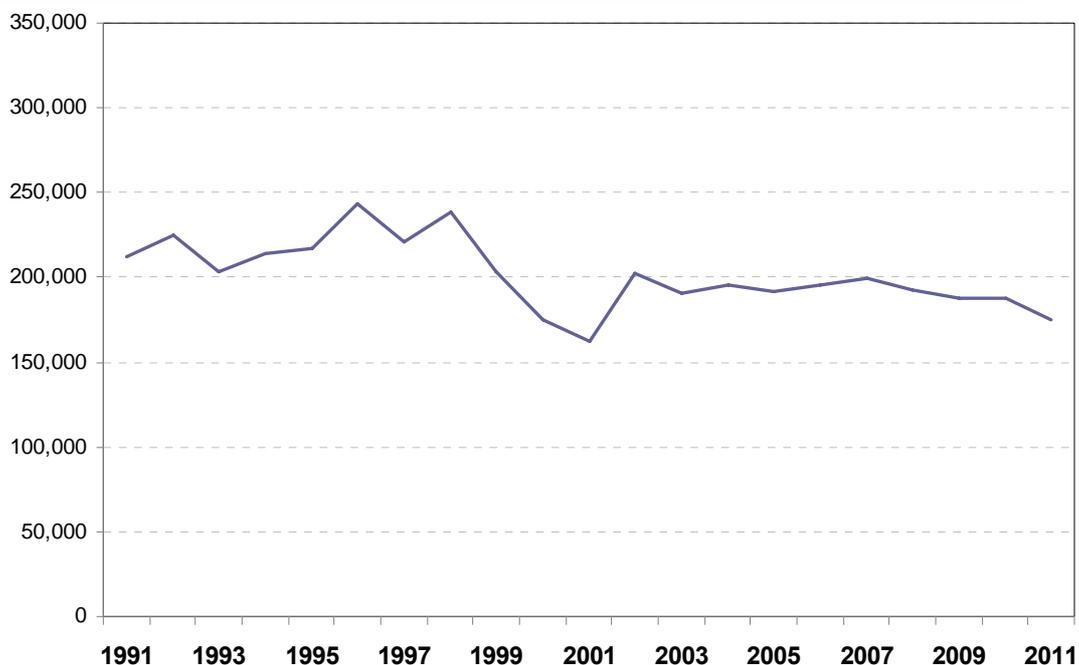
Total Primary Energy Supply

Total primary energy supply (TPES) is the sum of the energy which a jurisdiction produces from its own natural resources and the energy which it imports. For example, oil is a primary energy supply whilst the electricity subsequently produced from burning oil is not. Imported electricity (originally generated in an external exporting jurisdiction) is treated as a primary energy supply.

In 2011 the TPES for Jersey was 174,774 tonnes of oil equivalent (toe) or 2.0 million MWh. The vast majority of Jersey's TPES is imported, with less than 2% being produced on-Island as electricity generated by the new energy-from-waste (EFW) plant.

Jersey's TPES in 2011 was 7% lower than in 2010. This decrease was driven by substantial falls in the import of fuel oil (the import of which almost ceased in 2011) and of kerosene (imports down by a fifth on an annual basis).

Figure 2: Jersey's total primary energy supply (TPES), 1991–2011; toe



Transformation

Transformation (also termed “re-branding”) is the process of turning fuel from one form into another which is easier to use. For example, crude oil contains a great deal of energy but this is harnessed when the oil is refined into other products such as petrol or heating oil.

There is little transformation carried out in Jersey as most fuel is imported in the form which consumers require. Types of transformation which do occur on-Island are:

- the production of electricity from oil, although this is now done at reduced levels since the introduction of the interconnector from France. In 2011 the Jersey Electricity Company (JEC) used some 4,000 toe of oil to generate 13 MWh of electricity;
- the conversion of Liquefied Petroleum Gas (LPG) into a gaseous form which can be piped through the Island's gas network. Compared to generating electricity or refining crude oil, such gas transformation loses little energy; in 2011 about 175 toe were lost in converting more than 8,000 toe of LPG into manufactured gas.

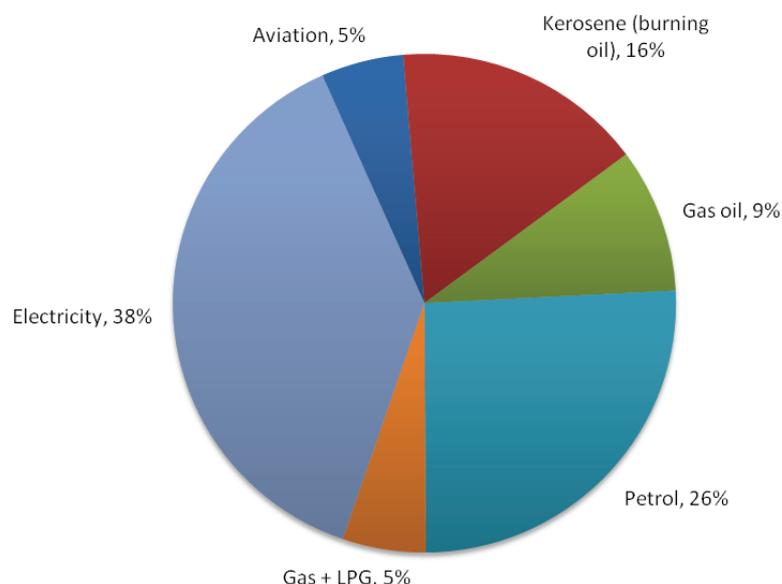
Final Energy Consumption

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

In 2011, total final energy consumption in Jersey was 168,040 toe (1.95 million MWh).

The high level of dependence on petroleum products of final consumers in Jersey is evident from Figure 3, with such fuels accounting for 56% of FEC in 2011; electricity accounted for almost two-fifths (38%) and gas (including LPG) for the remaining 5%.

Figure 3: Jersey's total final energy consumption, by fuel type 2011



As is apparent from Table 1, total final energy consumption in Jersey has decreased on annual basis for each of the last two calendar years.

Table 1: Jersey's total final energy consumption by fuel type 2009 - 2011; toe

Fuel	2009	2010	2011	Change 2011 - 2010
Road fuels	44,980	42,950	43,190	240
Gas oil	18,495	16,769	15,742	-1,027
Kerosene	32,007	32,372	27,194	-5,178
Aviation	12,016	8,846	8,937	90
Gas	10,081	10,476	9,027	-1,449
Electricity	62,163	62,429	63,949	1,520
Total	179,742	173,844	168,040	-5,803

In 2011 road fuels comprised: unleaded 27,107 toe; diesel 16,041 toe; lead replacement 43 toe. Gas includes manufactured gas and LPG; electricity includes the JEC (2009-2011), EFW (2011) and Bellozanne (2009-10).

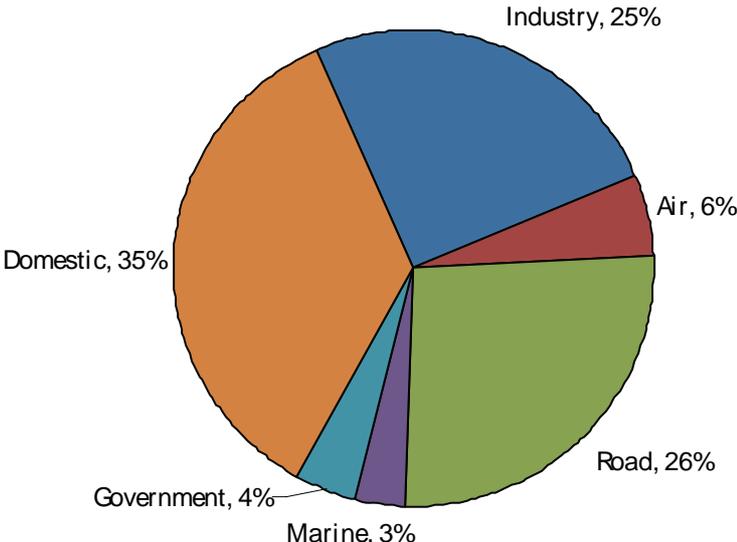
The latest overall annual decrease in Jersey's FEC, of almost 6,000 toe, represents a decrease of 3% compared with 2010.

This decrease was driven by a fall of 16% in the consumption of kerosene in 2011 (down by more than 5,000 toe compared with 2010) and reflects the complementary fall in the supply (through imports) of this particular fuel. Over the same period the consumption of gas declined by almost 1,500 toe, a fall of 14% compared with 2010.

In contrast, electricity consumption increased by more than 2% in 2011 compared with 2010 and the consumption of road fuels also increased marginally, up by less than 1%.

Final energy consumption may also be considered in terms of the users of the energy. In 2011, more than a third (35%) of Jersey's energy was consumed by people in their homes (the domestic sector in Figure 4); a similar proportion (35% in total) was used for transport (road, air², and marine); and around a quarter (25%) was consumed by industry.

Figure 4: Jersey's total final energy consumption, by user 2011



Domestic users consumed approximately equal proportions of petroleum products and electricity in 2011, each fuel type accounting for 46% of domestic consumption; gas + LPG accounted for the remaining 8%.

These proportions of domestic consumption reflect an increase in the use of electricity by households in 2011 (up by 2% compared with 2010) and a decrease in use of petroleum products (down by 12%) and gas + LPG (down by 17%).

² Air only covers fuel that is consumed in Jersey i.e. supplied to commercial airlines and for private use whilst in Jersey.

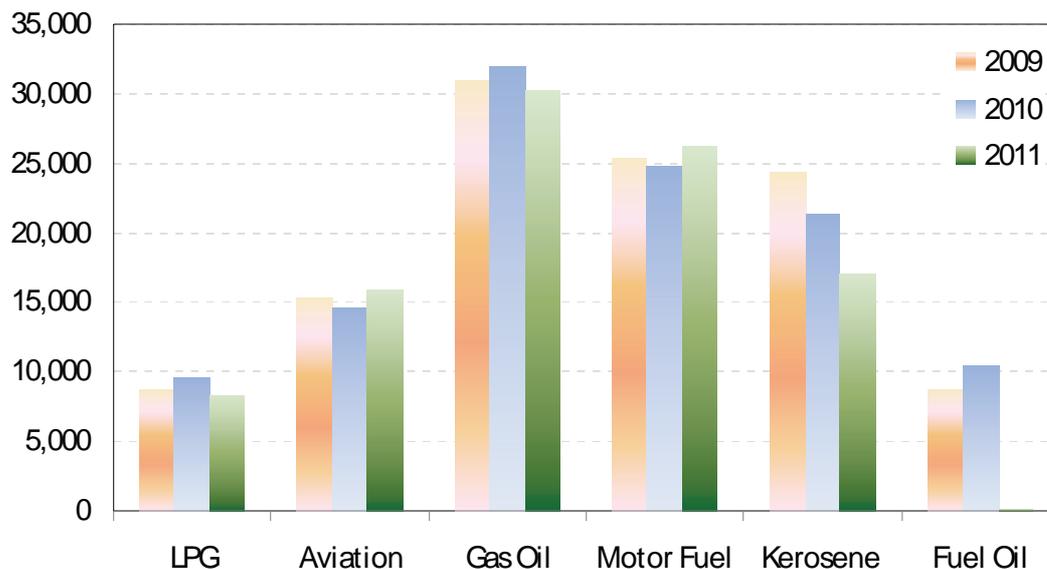
Individual fuel types

Petroleum products and gas

Petroleum products cover a range of fuels which are derived from crude oil. All the petroleum products used in Jersey are imported and, as previously described, these products constitute a considerable share of Jersey's energy use (56% in 2011).

Figure 5 shows the imports of petroleum products in 2011. Three categories account for the majority of the fuel imported, each at around 20,000 to 30,000 tonnes per year: motor fuel (petrol); kerosene (heating oil for use in homes); and gas oil (diesel and oil used by industry).

Figure 5: Imports of petroleum products in tonnes; 2009-2011



Overall, total imports of petroleum products were almost 14% lower in 2011 than in 2010 (98,028 tonnes in 2011 compared with 113,545 tonnes in 2010).

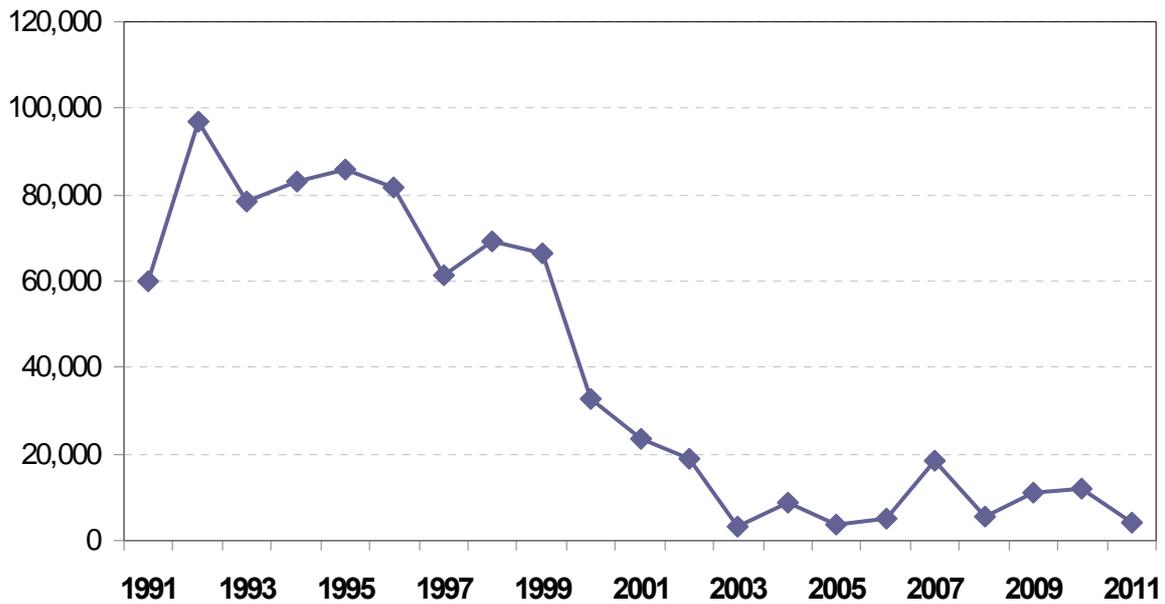
The greatest change within the overall importation of petroleum products was the decline in the import of fuel oil. As of 2011 Jersey has almost ceased importing fuel oil, which historically was used to generate electricity on-Island. A further significant change is the ongoing decrease in the importation of kerosene, which recorded falls on an annual basis of 20% and 13% in 2011 and 2010, respectively.

Increased imports in 2011 were recorded for aviation (comprising 97% aviation turbine fuel and 3% aviation spirit) and motor fuel (comprising 91% ULSP and 9% SU)³. These categories saw imports rise by 9% and 5%, respectively, in the latest year.

From the perspective of consumption, the greatest change within the overall use of petroleum products in Jersey over the past two decades has been the decline in oils (fuel oil and gas oil) used to generate electricity on-Island (see Figure 6) as a consequence of the introduction of the interconnector from France for importing electricity. In the early 1990s around 80,000 tonnes of oil were used to generate electricity on Island; in recent years only a few thousand tonnes of oil have been used for this purpose, and in 2011 some 4,000 tonnes were used.

³ ULSP: ultra low sulphur petrol; SU: super-unleaded petrol.

Figure 6: Oil used for electricity generation 1991–2011; tonnes

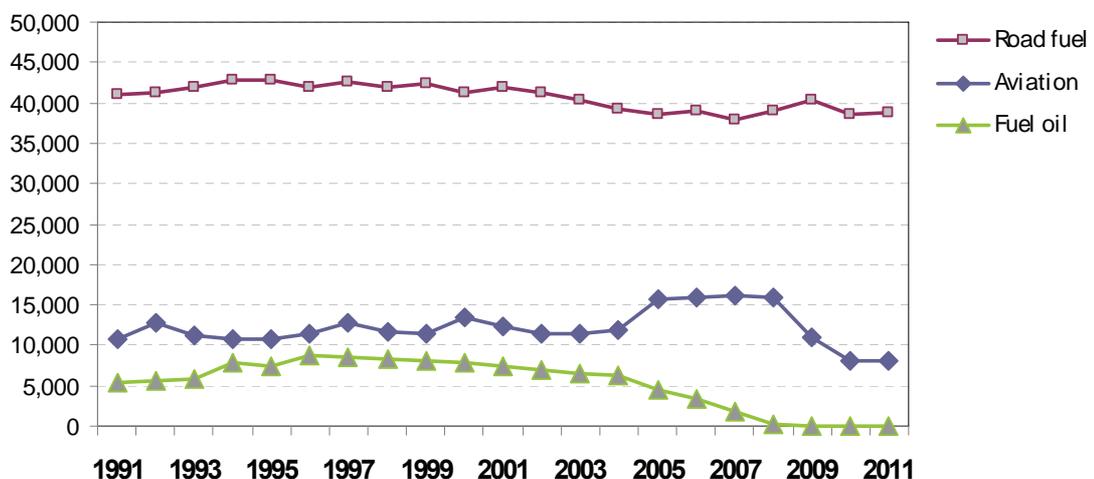


Includes fuel oil used by the JEC and gas oil by the EFW plant.

Since 2011, the EFW plant no longer uses gas oil in generating its power and now only burns waste. In 2011 the EFW plant burnt some 62,900 tonnes of waste and produced 32,900 MWh of electricity.

Figures 7a and 7b show that, aside from electricity generation (excluded from these plots), there has been little change in the consumption of petroleum products in Jersey during the past two decades; for example, kerosene consumption in 2011 was only 7% greater than in 1991; whilst the consumption of road fuel has fallen by only 5% over the same period.

**Figure 7a - Final consumption of petroleum products, 1991–2011
road fuel; aviation fuel and fuel oil; tonnes**



**Figure 7b - Final consumption of petroleum products, 1991–2011
kerosene; gas oil and LPG; tonnes**

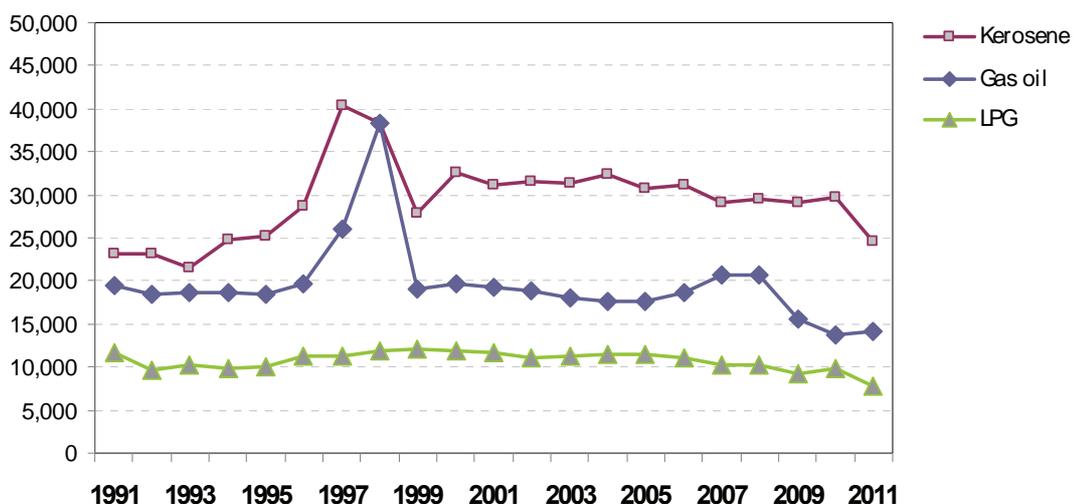


Table 2: Final consumption of petroleum products 2009-2011; tonnes

Fuel	2009	2010	2011	Change 2011-2010
Aviation	10,898	8,023	8,116	93
Petrol	40,414	38,620	38,862	242
Heating oil	29,006	29,626	24,656	-4,970
Gas oil	16,981	15,397	14,539	-858
Oil for electricity generation	10,971	11,982	3,446	-8,537

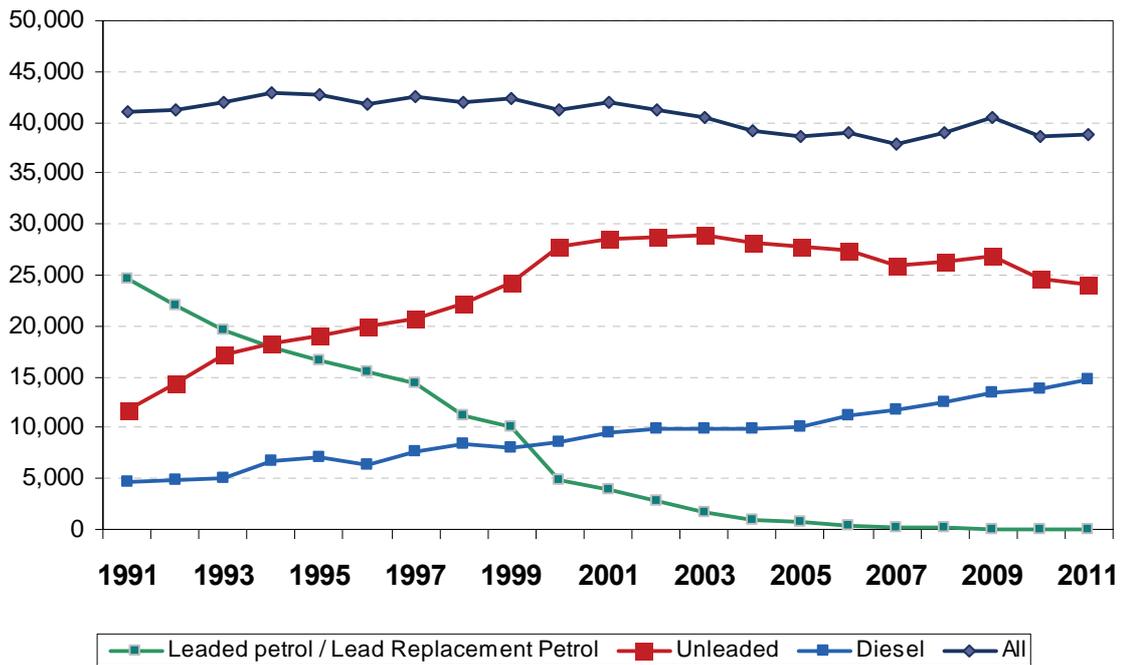
Gas oil excludes consumption for electricity generation

A specific feature of the Jersey energy market is that the gas used is all sourced from LPG (a petroleum product). In 2011, some 9,027 toe of gas (manufactured + LPG) was consumed, representing a 14% decrease compared with 2010. Of the total supply of gas in 2011, 88% (92,388 MWh or 7,944 toe) was supplied as manufactured gas (through pipes) and the remaining 12% (12,595 MWh or 1,083 toe) was supplied as LPG.

Total consumption of road fuels has been broadly flat for the past decade, although there has been considerable change in its makeup. As Figure 8 shows, the relative importance of leaded and unleaded petrol has reversed. In 1991 leaded fuel accounted for 60% of all road fuel used, whilst unleaded accounted for about 30% and diesel for 10%. By 2011, unleaded accounted for 62%, diesel for 38% and leaded (lead replacement fuel, LRP) for less than 1%.

Between 2001 and 2011 there has been a net decrease of around 3,000 tonnes (7%) in the total consumption of road fuel in Jersey, comprising falls for LRP and unleaded of about 3,900 tonnes and 4,400 tonnes, respectively, and an increase in diesel of 5,300 tonnes. Such changes highlight the phasing out of leaded fuel and the increased efficiency in engine design as well as diesel-fuelled vehicles becoming more widely used. In 2011, Jersey consumed 38,862 tonnes of road fuel: 22,331 tonnes of unleaded; 1,765 tonnes of super unleaded, 14,728 tonnes of diesel; and 38 tonnes of LRP. This total represents a total increase of less than 1% on 2010.

Figure 8: Road fuel consumption, 1991–2011; tonnes

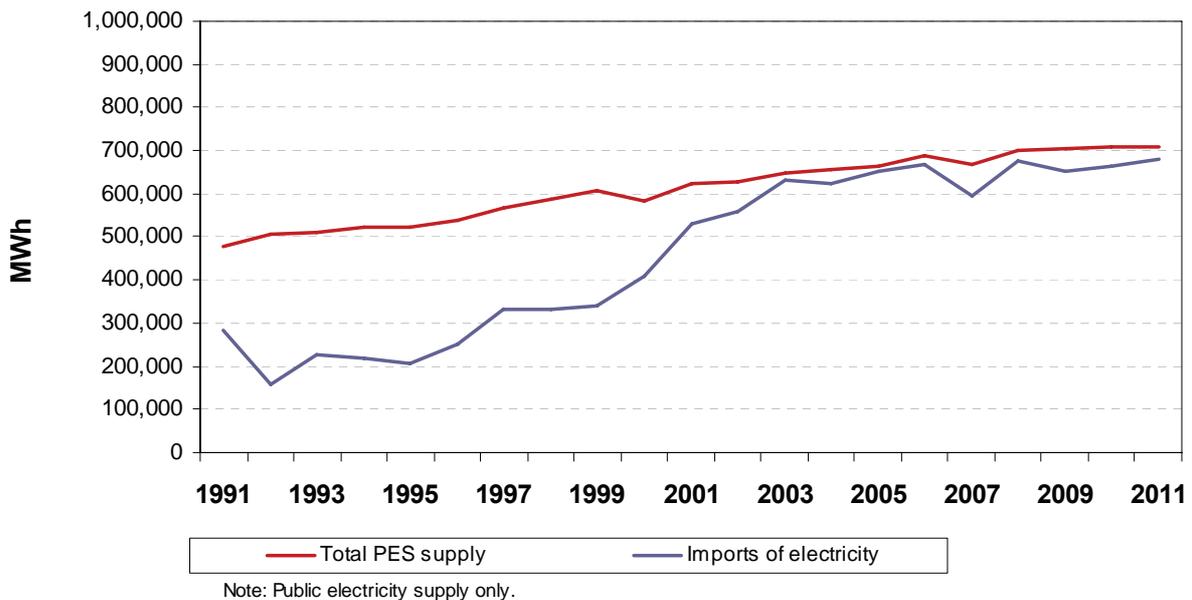


Electricity

Electricity demand in Jersey has increased during the past 20 years, by an average of about 2% per annum, such that consumption in 2011 was almost 50% higher than in 1991.

As Figure 9 illustrates, the most dramatic change within the electricity sector in Jersey has been the growth in importation. Throughout most of the 1990s imported electricity accounted for between 40% and 60% of public electricity supply⁴; in recent years this has risen to more than 90%.

Figure 9: Total public electricity supply (PES) and imports, 1991–2011; MWh



⁴ Public electricity supply (PES) is electricity provided through the JEC network.

Almost half (47%) of the Island's total electricity consumption in 2011 was used by domestic consumers (households). As Table 3 indicates, domestic electricity consumption in 2011 was almost 2% higher than in 2010.

Table 3: Electricity consumption 2009- 2011; MWh

Sector	2009	2010	2011
Domestic (households)	297,202	300,596	305,461
Industry	286,104	284,522	297,061
Government	71,465	63,554	73,999
Total	654,770	648,672	676,521

Energy use in homes

Overall, household energy consumption in Jersey in 2011 was 7% lower than in 2010 (see Table 4), reflecting decreases in consumption of both heating oil and gas (12% and 18%, respectively) whilst incorporating an increase in electricity consumption (2%).

Table 4: Household energy consumption; toe

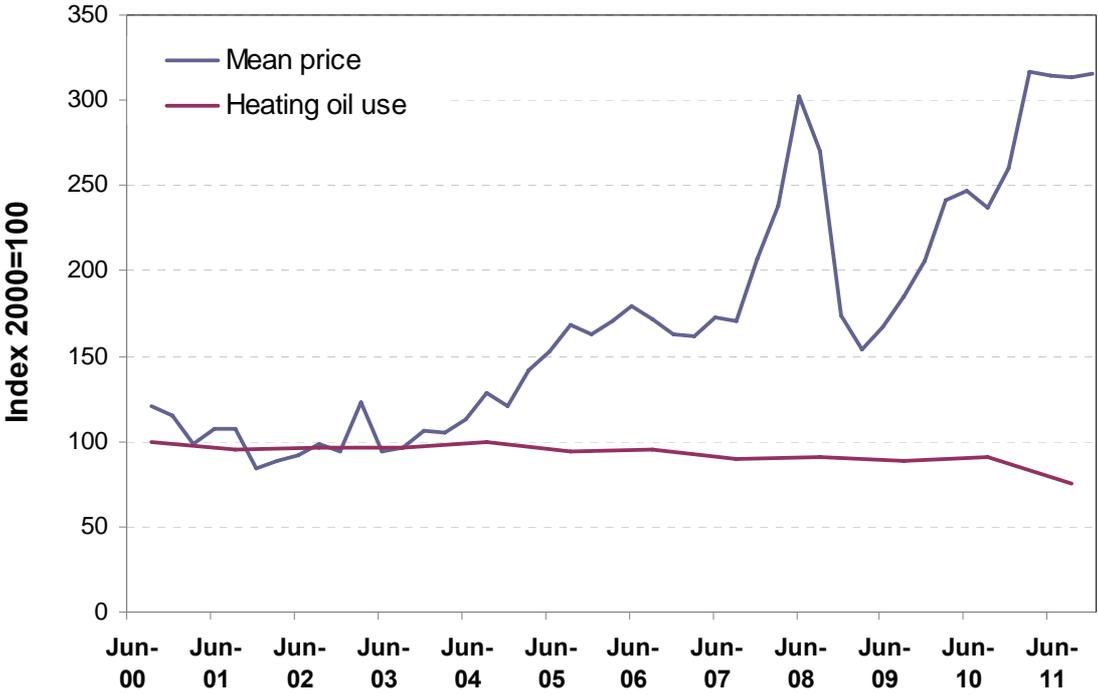
Sector	2009	2010	2011
Electricity - all domestic consumers	25,555	25,847	26,265
Gas - all homes	4,901	4,901	4,041
Heating oil (kerosene)	28,828	29,719	26,242
Other petroleum products	1,010	1,003	826
Total	60,294	61,470	57,374

Price and consumption of domestic heating 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 responsible for local costs). Specifically, given that around three-fifths of the Island's energy supply is a derivative of crude oil, the price of oil has a major impact on household and business energy costs in Jersey.

Given the increases in oil prices in recent years, it may be expected that consumers would seek to use energy more efficiently in order to reduce their exposure to rising costs. However, Figure 10 shows that Jersey's consumption of heating oil has, historically, been somewhat independent of price. For example, in spite of a spike in oil prices in 2008, consumption of heating oil by households rose by 1% on an annual basis.

Figure 10: Heating oil price and domestic consumption, 2000 - 2011



*Statistics Unit
June 2012*

Table A1: Jersey Energy Balance 2009

Tonnes of oil equivalent (toe)

	Petroleum products	Gas	Electricity	Total
Production	0	0	1,531	1,531
Imports	127,220	0	56,809	184,029
Stock change	2,408	0	0	2,408
Primary supply	129,627	0	58,340	187,968
<u>Transfers</u>				
Electricity Generation	-11,448	0	3,960	-7,489
Gas supply	-9,829	9,630	0	-199
Available supply	108,350	9,630	62,300	180,280
Industry own use and losses	0	144	6,392	6,536
<u>Consumption</u>				
Industry and government	16,978	4,091	30,216	51,285
Air and marine	17,868	0	0	17,868
Road	43,757	0	0	43,757
Domestic	29,838	4,901	25,555	60,294
Final consumption	108,442	9,137	62,163	179,742

Table A2: Final energy consumption in original units 2009

	Petroleum products (tonnes)	Gas (MWh)	Electricity (MWh)	Total (MWh)
Industry (inc. own use and losses) and government.	14,389	49,259	425,749	672,462
Air and Marine	15,144	0	0	207,809
Road	37,086	0	0	508,896
Domestic	25,289	57,000	297,202	701,217
Final Consumption	91,908	106,259	722,951	2,090,396

Table A3: Jersey Energy Balance 2010

Tonnes of oil equivalent (toe)

	Petroleum products	Gas	Electricity	Total
Production	0	0	1,322	1,322
Imports	126,722	0	57,517	184,239
Stock change	2,510	0	0	2,510
Primary supply	129,232	0	58,839	188,071
<u>Transfers</u>				
Electricity Generation	-12,508	0	3,526	-8,982
Gas supply	-10,450	10,215	0	-235
Available supply	106,274	10,215	62,365	178,853
Industry own use and losses	0	153	6,653	6,806
<u>Consumption</u>				
Industry and government	13,334	4,334	29,929	47,597
Air and marine	16,016	0	0	16,016
Road	41,955	0	0	41,955
Domestic	30,722	4,901	25,847	61,470
Final consumption	102,026	9,388	62,429	173,844

Table A4: Final energy consumption in original units 2010

	Petroleum products (tonnes)	Gas (MWh)	Electricity (MWh)	Total (MWh)
Industry (inc. own use and losses) and government.	11,301	52,182	425,451	632,706
Air and Marine	13,574	0	0	186,267
Road	35,558	0	0	487,928
Domestic	26,038	57,000	300,596	714,888
Final Consumption	86,470	109,182	726,047	2,021,800

Table A5: Jersey Energy Balance 2011

Tonnes of oil equivalent (toe)

	Petroleum products	Gas	Electricity	Total
Production	0	0	2,829	2,829
Imports	108,999	0	60,213	169,212
Stock change	2,734	0	0	2,734
Primary supply	111,733	0	63,041	174,774
<u>Transfers</u>				
Electricity Generation	-4,108	0	1,108	-3,000
Gas supply	-8,146	7,971	0	-175
Available supply	99,480	7,971	64,149	171,600
Energy industry own use and losses	0	120	5,778	5,898
<u>Consumption</u>				
Industry and government	11,884	3,783	31,906	47,573
Air and marine	14,549	0	0	14,549
Road	42,646	0	0	42,646
Domestic	27,068	4,041	26,265	57,374
Final consumption	96,147	7,944	63,949	168,040

Table A6: Final energy consumption in original units 2011

	Petroleum products (tonnes)	Gas (MWh)	Electricity (MWh)	Total (MWh)
Industry (inc. own use and losses) and government.	10,072	45,391	438,262	621,866
Air and Marine	12,330	0	0	169,200
Road	36,144	0	0	495,969
Domestic	22,941	47,000	305,461	667,260
Final Consumption	81,487	92,391	743,723	1,954,306