

Jersey Energy Trends 2017

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Overview

This report examines supply and use of energy in Jersey through the importation, distribution and consumption of fuels such as petroleum products and electricity.

The focus of the report is on energy supply and use in 2017. Figures are also presented for calendar years 2013 to 2016. Longer term trends, going back to 1991, are shown for road fuel consumption and for electricity importation and generation.

The energy data presented in this report provides the basis for calculating carbon emissions for Jersey. Through the UK, Jersey is a signatory to the Kyoto Protocol; the document "Pathway 2050: An Energy Plan for Jersey"¹ outlines how the Island intends to reduce its carbon emissions in line with the commitments of the UK and other European nations.

Jersey's energy data is submitted annually to the compilers of the UK's national greenhouse gas inventory, Aether, who independently verify and validate the data using internationally agreed methodologies. The resultant emissions calculated for Jersey are published by Aether² and submitted to the international inventories as part of the UK's national inventory.

Summary - for 2017

Supply

- almost all of Jersey's energy supply was imported; about 2% was produced on-Island as electricity generated by the Energy from Waste Facility
- petroleum products accounted for almost two-thirds (63%) of Jersey's energy supply; electricity (imported and on-Island generated) accounted for the remainder (37%)
- Jersey's total primary energy supply (TPES) was 6% lower than in 2016, driven by a decrease in the importation of petroleum products used for on-Island electricity generation

Use

- total final energy consumption (FEC) was 3% lower than in 2016
- energy consumption per head of resident population was 1.4 toe³ and was below that of the UK (2.1 toe)
- more than a third (38%) of energy used was consumed by households, a similar proportion (34%) was used for transportation (predominantly road transport) and over a quarter (28%) was used by industry and government

¹ www.gov.je/government/pages/statesreports.aspx?reportid=1039

² <https://www.gov.je/Environment/GenerateEnergy/Pages/GreenhouseGasEmissions.aspx>

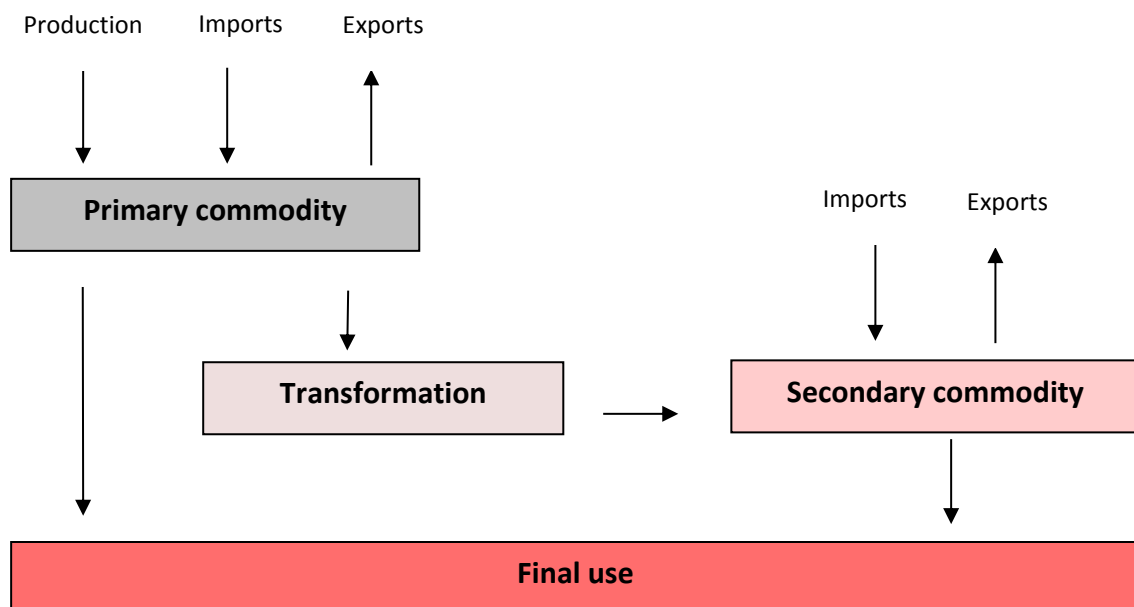
³ A toe (tonne of oil equivalent) is a unit of energy which represents the quantity of energy released through burning one tonne of crude oil; 1 toe = 11,630 kWh or 10 million kilocalories.

Introduction

Energy is supplied to Jersey predominantly through imports; there is also a small amount of on-Island production. The primary supply of energy is either distributed to consumers in its original form or is transformed into different sources of energy; for example, petroleum products can be burned to generate electricity. Some energy is also used in such transformation processes and some is lost during transmission and distribution to consumers. The final uses of energy include consumption by households, industry, government and for transportation.

The supply and use of each individual type of fuel ('commodity') may be considered by means of a commodity balance. Figure 1 outlines a commodity balance, showing how a primary commodity may be either used directly by consumers or transformed into a secondary commodity before then being used.

Figure 1 - Commodity Balance outline



Energy balance

The overall flow of energy in Jersey may be examined by combining all of the individual commodity balances into an "energy balance" which shows the energy flows from production to final use, including movements between fuel categories.

Units

Since different fuel types provide different amounts of energy, volume or mass measures (such as litres or tonnes) do not enable fuels to be compared directly from the perspective of energy supply and use. In order to compare and aggregate different fuels within a single framework (the energy balance) fuel quantities are converted into a standardised unit based on calorific value (see Glossary).

The standardised unit of energy used in an energy balance is the toe (tonne of oil equivalent). A toe represents the quantity of energy released through burning one tonne of crude oil; 1 toe = 11,630 kWh or 10 million kilocalories.

Total Primary Energy Supply, TPES

Total primary energy supply (TPES) is defined as the total energy which a jurisdiction imports and produces from its own natural resources, accounting for any changes in stock, and subtracting any exports.

TPES for Jersey predominantly consists of imported petroleum products and imported electricity. Imported electricity is treated as a primary energy supply because it is originally generated outside of the Island. There is also a small contribution to TPES from electricity generated within Jersey by the Energy from Waste Facility (EFW), which was 2% of TPES in 2017.

Table 1 shows TPES for each year from 2013 to 2017. Petroleum products accounted for almost two thirds (63%) of Jersey’s TPES in 2017, electricity (imported and on-Island generated) accounted for the remainder (37%), see Figure 2⁴.

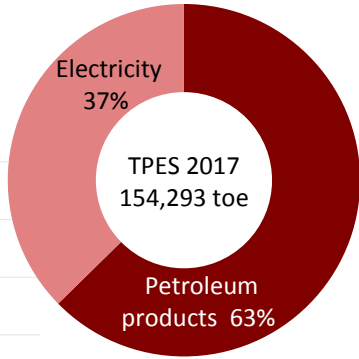
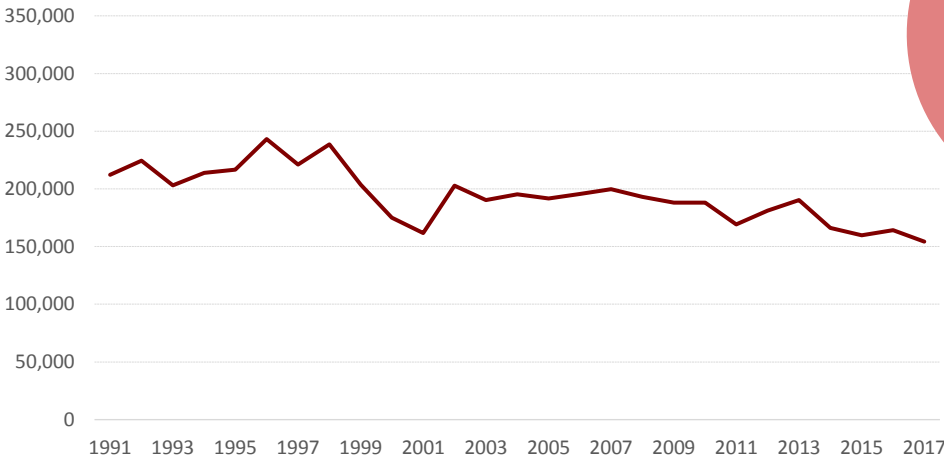
Table 1 - Jersey’s total primary energy supply (TPES) 2013 to 2017; toe

	2013	2014	2015	2016	2017
TPES	190,424	166,287	159,699	164,165	154,293

TPES in 2017 was 6% lower than in the previous year (2016), driven by a decrease in the importation of petroleum products used for on-Island electricity generation. The larger TPES seen in 2013 was predominantly due to increased importation of petroleum products for on-Island electricity generation.

The longer term behaviour of Jersey’s TPES is shown in Figure 2.

Figure 2 - Jersey’s total primary energy supply (TPES), 1991 to 2017; toe



⁴ Throughout this report:

- coal and other solid fuels are not included due to the lack of available data. In 2007, the last year for which such data was compiled, the contribution from coal and other solid fuels to TPES was less than 1%
- electricity generated from private generators (wind, solar etc.) is not included

Figure 2 shows that there are two principal features in the longer term behaviour of Jersey's TPES:

- a reduction in level, from between 200,000 and 250,000 toe during most of the 1990s to between 150,000 and 200,000 toe since the turn of the millennium. A key factor in this reduction in the level of TPES has been the increase in imported electricity and the complementary decrease in imported petroleum products for on Island electricity generation
- a generally downward trend in TPES since around 2007 due to a range of factors, including a reduction in the use of kerosene for domestic heating and of motor fuels for transportation

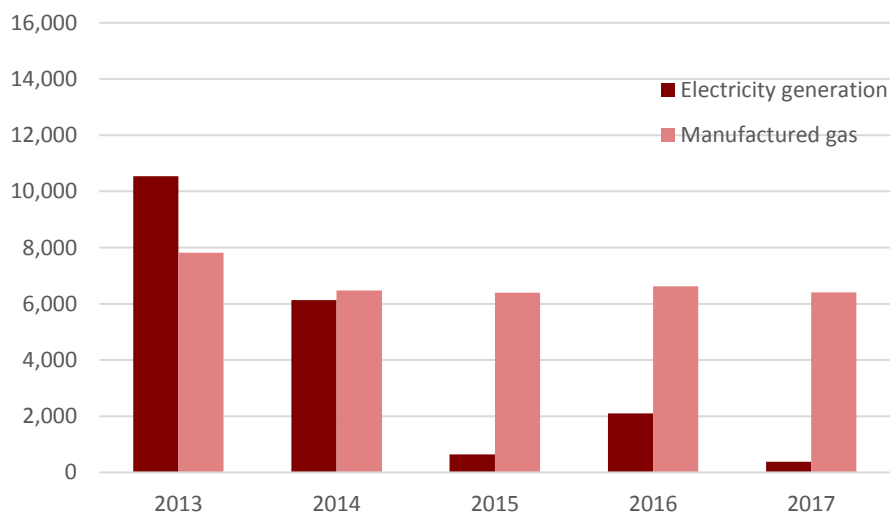
Transformation

Transformation is the process of converting fuel from one form into another which is better suited for specific uses. There is little transformation carried out in Jersey since most fuel is imported in the form that the consumer requires. Transformation processes that do occur in Jersey are:

- the generation of electricity from petroleum products
- the conversion of Liquefied Petroleum Gas (LPG) into a gaseous form (referred to as "manufactured gas") which can then be piped through the Island's gas network

The supply of energy produced by on-Island transformation in each year from 2013 to 2017 is shown in Figure 3.

Figure 3 - Energy supply produced by transformation processes, 2013 to 2017; toe



Greater amounts of electricity were generated on-Island in 2013 and 2014, through the burning of petroleum products. This reflects the reduction of imported electricity during these years. More recently, in 2017, Jersey Electricity (JE) used 1,397 toe of petroleum products to generate 380 toe of electricity.

The quantity of manufactured gas produced in 2017 was almost a fifth (18%) lower than in 2013 (6,406 toe produced in 2017, compared with 7,816 toe in 2013). During the previous decade (2001 to 2010), the quantity of manufactured gas produced each year in Jersey was around 10,000 to 11,000 toe.

Final Energy Consumption

Final energy consumption (FEC) refers to the use of energy by final consumers, either as a primary commodity or as a secondary commodity after any transformations have occurred. The use of energy by the energy industry itself and losses due to transmission and distribution of energy are excluded from FEC.

Table 2 shows Jersey’s FEC for each year from 2013 to 2017 and FEC per head of resident population (FEC per capita).

Table 2 - Jersey’s final energy consumption (FEC) and per capita 2013 to 2017; toe

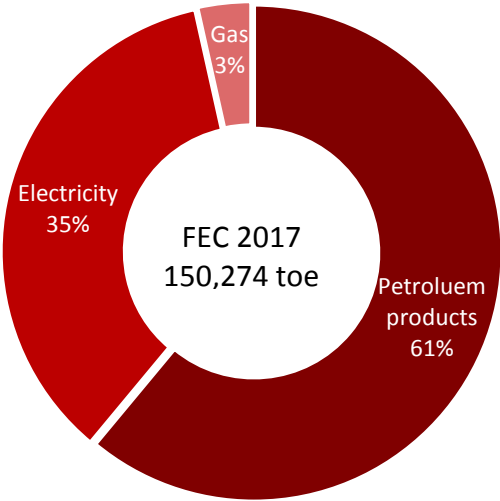
	2013	2014	2015	2016	2017
FEC	160,043	148,824	152,491	154,969	150,274
FEC per capita	1.60	1.47	1.48	1.49	1.42

In 2017 final energy consumption in Jersey was 3% lower than in 2016. However, over the 5 years from 2013 to 2017, FEC has been relatively flat at around 150,000 to 160,000 toe, especially if allowance is made for warmer or colder winters (see Appendix Table A5).

FEC per capita in Jersey has declined slightly between 2013 and 2017, from approximately 1.6 to 1.4 toe respectively. Energy consumption per head of population in Jersey in 2017 was below that of the UK (2.1 toe⁵).

In 2017, petroleum products (such as road fuels and heating oil) accounted for three fifths (61%) of Jersey’s FEC (see Figure 4). Electricity accounted for over a third (35%) and manufactured gas the remainder (3%).

Figure 4 - Jersey’s total final energy consumption (FEC) by fuel type, 2017; toe



⁵ FEC per capita for the UK has been derived from:

- FEC: “Energy Consumption in the UK”, Department for Business, Energy & Industrial Strategy, July 2018
- Population: 2017 mid-year estimate, Office for National Statistics, June 2018.

Jersey’s FEC broken down by fuel type for each year from 2013 to 2017 is shown in Table 3.

Table 3 - FEC by fuel type, 2013 to 2017; toe

	2013	2014	2015	2016	2017
Petroleum products	96,321	90,005	92,799	94,585	91,720
Gas	7,309	5,985	6,217	5,636	5,252
Electricity	56,414	52,835	53,475	54,748	53,303
Total FEC	160,043	148,824	152,491	154,969	150,274

Numbers have been rounded independently to the nearest integer. Hence, columns may not sum to totals.

FEC may also be considered in terms of final end use sectors such as households, industry, government and transportation, as shown in Table 4.

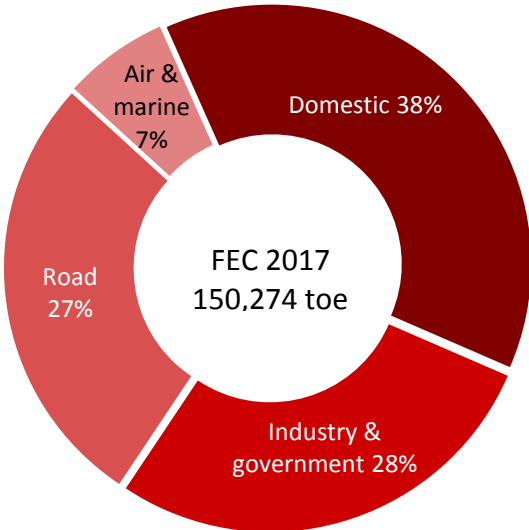
Table 4 - FEC by final end use sector, 2013 to 2017; toe

	2013	2014	2015	2016	2017
Industry and government	44,946	42,963	42,786	43,843	41,872
Air and marine	11,938	11,323	11,779	11,735	9,839
Road	41,784	41,396	41,787	41,931	41,194
Domestic	61,375	53,143	56,140	57,460	57,370
Total FEC	160,043	148,824	152,491	154,969	150,274

Numbers have been rounded independently to the nearest integer. Hence, columns may not sum to totals.

In 2017, more than a third (38%) of Jersey’s energy was consumed by households (the domestic sector), a similar proportion (34%) was used for transport (road, air and marine⁶) and over a quarter (28%) was consumed by industry and government, see Figure 5.

Figure 5: FEC by final end use sector, 2017; toe



⁶ ‘Air & marine’ covers fuel that is supplied in Jersey, i.e. supplied to commercial airlines and also for private air or marine use whilst in Jersey. The category ‘marine’ includes both marine diesel and petrol. ‘Air’ accounts for almost three quarters of the final energy consumption of the ‘Air & marine’ sector shown in Table 4 and Figure 5.

Energy Balance

An energy balance shows the flows of all forms of energy within a jurisdiction, from supply to final consumption. This includes transformations, losses and the energy industry's own use⁷, presented in one common unit of measurement (toe).

Table 5 shows the energy balance for Jersey for 2017. Energy balances for each year from 2013 to 2016 are presented in Appendix Tables A1 to A4.

Table 5 - Energy Balance for Jersey, 2017; toe

	Gas and Petroleum products	Electricity	Total
Production	0	3,818	3,818
Imports	98,977	53,787	152,764
Stock change	-2,289	0	-2,289
Primary supply	96,688	57,605	154,293
Statistical difference ⁸	-1,671	88	-1,583
Primary demand	98,359	57,517	155,876
Transformations			
Electricity Generation	-1,397	380	-1,016
Gas supply	106	0	106
Energy industry own use and losses	96	4,594	4,690
Final consumption	96,972	53,303	150,274
Industry and government	16,141	25,731	41,872
Air and marine	9,839	0	9,839
Road ⁹	41,194	0	41,194
Domestic	29,798	27,572	57,370

Numbers have been rounded independently to the nearest integer. Hence, rows and columns may not sum to totals.

⁷ See Glossary for definition of terms. For methodology used to construct the energy balance see "Energy Balance: methodology note", UK Department Business, Energy and Industrial Strategy, 2010 at: <https://www.gov.uk/government/publications/energy-balance-methodology-note>.

⁸ Statistical difference is defined as Primary supply minus Primary demand (see Glossary).

⁹ Electricity consumed in charging electric vehicles is included under Domestic and Industry & government consumption; it is not included under road consumption.

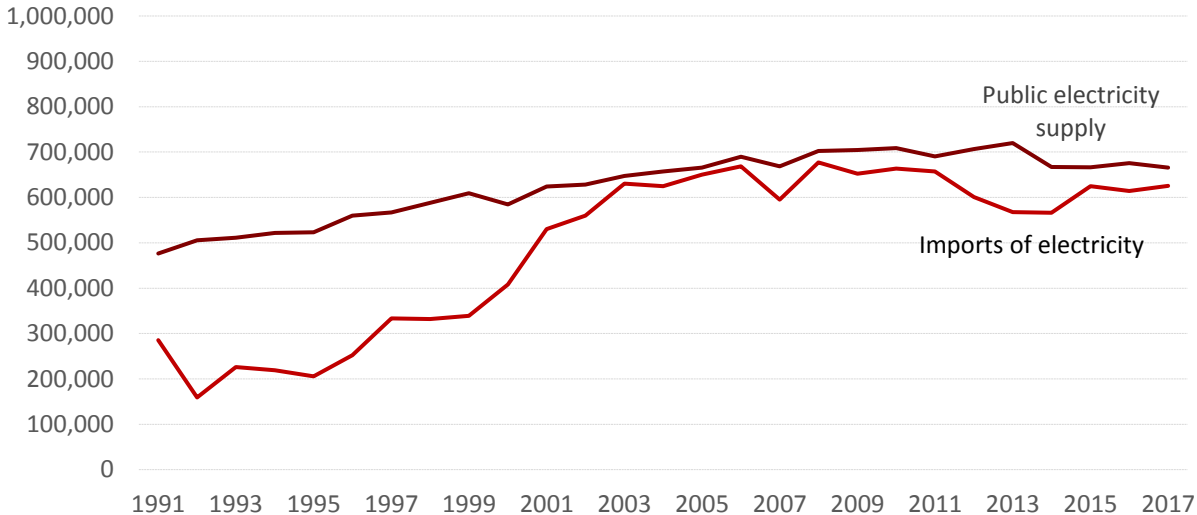
Individual fuel types

This section looks at individual fuels in more detail and in units which are specific to each type of fuel, e.g. electricity in MWh and petroleum products in tonnes.

Electricity

Since 1991, the overall public electricity supply¹⁰ and the proportion of electricity imported into Jersey have increased, see Figure 6.

Figure 6 - Public electricity supply and imports of electricity, 1991 to 2017; MWh



Throughout the 1990s imported electricity accounted for between 40% and 60% of Jersey’s public electricity supply. In 2017, this proportion was 94%.

Petroleum products

The category ‘petroleum products’ covers a range of fuels derived from crude oil. Such products accounted for three fifths (61%) of Jersey’s final energy consumption (FEC) in 2017, see Figure 4.

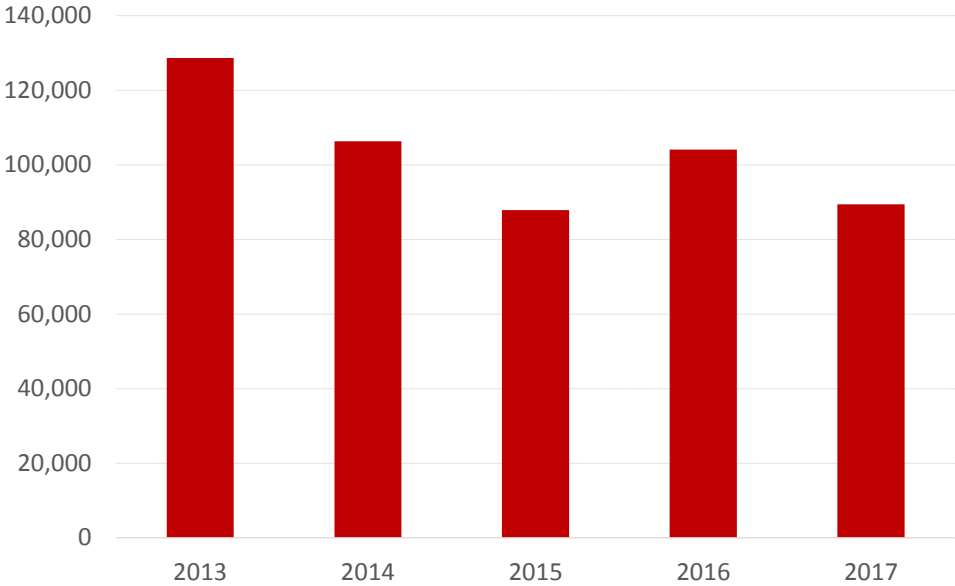
All of the petroleum products supplied and used in Jersey are imported; some 89,000 tonnes of petroleum products were imported in 2017¹¹. This total was 14% lower than in 2016 and was at a similar level as that in 2015.

The imported quantities of various petroleum products in each year from 2013 to 2017 are shown in Figure 7 (see Glossary for description of products included in each category).

¹⁰ Public electricity supply (PES) is electricity provided to consumers through the JE network. PES is the sum of imported electricity (pre-transmission losses) and electricity produced in Jersey (both by JE and EFW).

¹¹ Quantities of commodities that pass through Jersey on their way to a final destination in another jurisdiction are excluded from import totals.

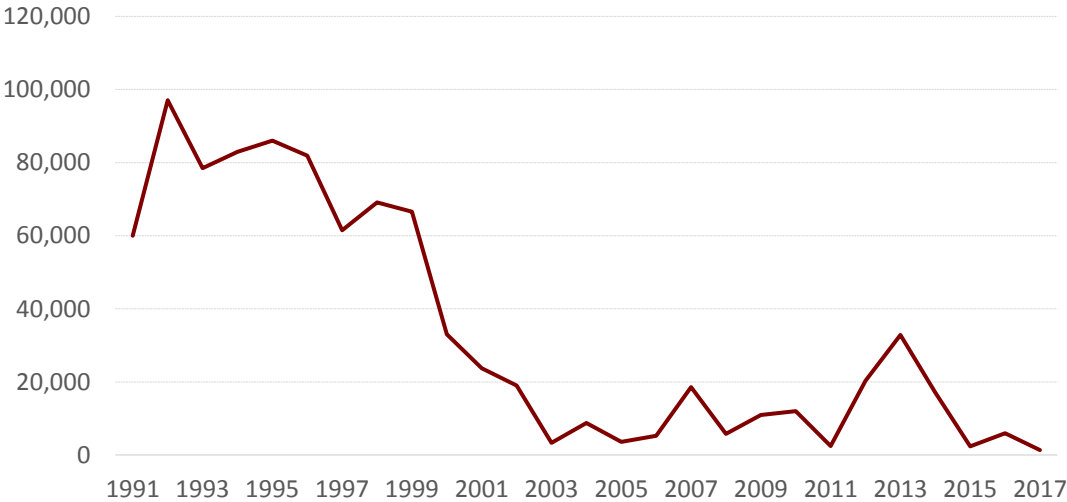
Figure 7 - Imports of petroleum products, 2013 to 2017; tonnes



In 2017, gas oil (which includes motor diesel used as a road fuel), kerosene and petrol accounted for more than 84% of final consumption of petroleum products.

Since the 1990s, there has been a considerable reduction in the use of petroleum products (specifically of fuel oil and gas oil) to generate electricity in Jersey. This was a result of the increased importation of electricity through submarine cables, see Figure 8.

Figure 8 - Oil used for electricity generation, 1991 to 2017; tonnes



Includes fuel oil and gas oil used JE and EFW.

In the early 1990s around 80,000 tonnes of oil were used each year to generate electricity on-Island. In 2017 this figure had reduced to 1,344 tonnes.

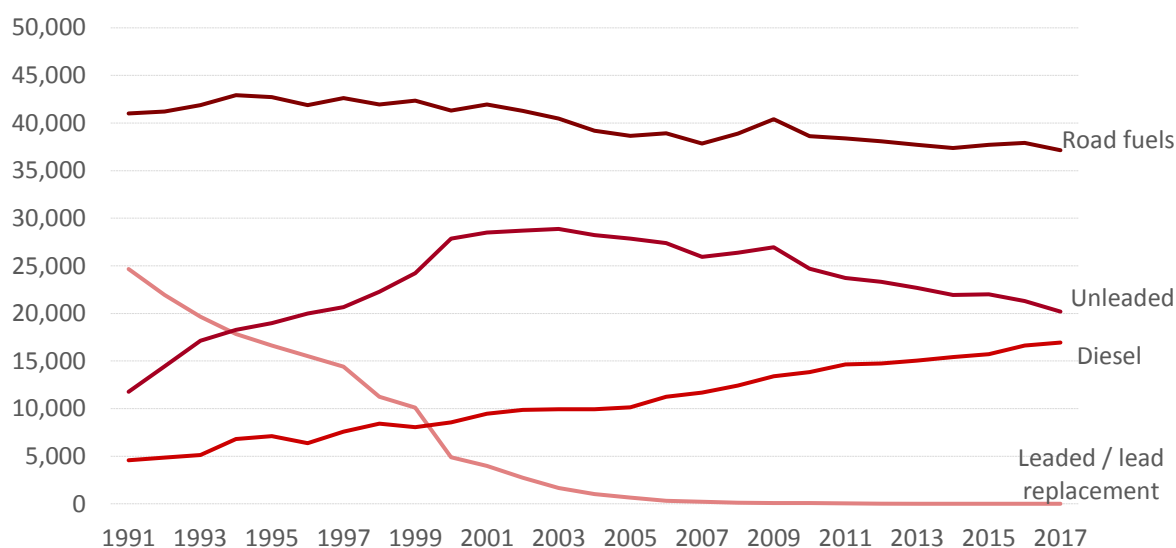
A generally downward trend in the consumption of petrol since 2013 is apparent in Table 6, which also shows a complementary increase in the consumption of diesel as a road fuel during this period.

Table 6 - Road fuel consumption, 2013 to 2017; tonnes

	2013	2014	2015	2016	2017
Unleaded petrol	22,667	21,946	21,997	21,303	20,205
Motor diesel	15,035	15,425	15,731	16,612	16,938
Total road fuels	37,702	37,371	37,728	37,915	37,143

The short term changes in consumption of petrol and motor diesel, reflect the general downward trend in overall consumption of road fuel since the mid-1990's (Figure 9).

Figure 9 - Road fuel consumption, 1991 to 2017; tonnes



Energy use in homes

Table 7 shows final energy consumption by households in Jersey over the period from 2013 to 2017, broken down by fuel type. Variations in average monthly winter temperatures are a factor in annual fluctuations.

Table 7 - Household final energy consumption, 2013 to 2017; toe

	2013	2014	2015	2016	2017
Petroleum products	29,282	24,337	26,050	27,089	27,129
Manufactured gas	3,869	3,009	2,984	2,829	2,669
Electricity	28,224	25,796	27,107	27,542	27,572
Total household consumption	61,375	53,143	56,140	57,460	57,370

Numbers have been rounded independently to the nearest integer. Hence, columns may not sum to totals.

In 2017 electricity consumption accounted for approximately half of total domestic consumption (48%); petroleum products accounted for 47% and gas accounted for the remainder.

Appendix

Table A1 - Jersey Energy Balance, 2016; toe

	Gas and Petroleum products	Electricity	Total
Production	0	3,884	3,884
Imports	114,503	52,811	167,314
Stock change	-7,033	0	-7,033
Primary supply	107,470	56,695	164,165
Statistical difference	938	32	970
Primary demand	106,532	56,663	163,195
Transformations			
Electricity Generation	-6,185	2,099	-4,086
Gas supply	-26	0	-26
Industry own use and losses	99	4,014	4,113
Final consumption	100,221	54,748	154,969
Industry and government	16,637	27,206	43,843
Air and marine	11,735	0	11,735
Road	41,931	0	41,931
Domestic	29,918	27,542	57,460

Table A2 - Jersey Energy Balance, 2015; toe

	Petroleum products	Electricity	Total
Production	0	3,497	3,497
Imports	97,139	53,743	150,881
Stock change	5,320	0	5,320
Primary supply	102,459	57,239	159,699
Statistical difference	750	-94	656
Primary demand	101,709	57,334	159,043
Transformations			
Electricity Generation	-2,453	636	-1,817
Gas supply	-144	0	-144
Industry own use and losses	96	4,494	4,590
Final consumption	99,016	53,475	152,491
Industry and government	16,417	26,369	42,786
Air and marine	11,779	0	11,779
Road	41,787	0	41,787
Domestic	29,033	27,107	56,140

Table A3 - Jersey Energy Balance, 2014; toe

	Gas and Petroleum products	Electricity	Total
Production	0	3,141	3,141
Imports	116,720	48,686	165,406
Stock change	-2,260	0	-2,260
Primary supply	114,460	51,827	166,287
Statistical difference	540	-8	532
Primary demand	113,921	51,835	165,755
Transformations			
Electricity Generation	-17,718	6,132	-11,587
Gas supply	-116	0	-116
Industry own use and losses	97	5,131	5,229
Final consumption	95,989	52,835	148,824
Industry and government	15,924	27,039	42,963
Air and marine	11,323	0	11,323
Road	41,396	0	41,396
Domestic	27,347	25,796	53,143

Table A4 - Jersey Energy Balance, 2013; toe

	Gas and Petroleum products	Electricity	Total
Production	0	2,943	2,943
Imports	140,259	48,799	189,058
Stock change	-1,577	0	-1,577
Primary supply	138,682	51,742	190,424
Statistical difference	703	-231	472
Primary demand	137,980	51,973	189,953
Transformations			
Electricity Generation	-34,130	10,546	-23,584
Gas supply	-103	0	-103
Industry own use and losses	117	6,106	6,223
Final consumption	103,630	56,414	160,043
Industry and government	16,756	28,190	44,946
Air and marine	11,938	0	11,938
Road	41,784	0	41,784
Domestic	33,152	28,224	61,375

Previously published figures for calendar years 2013 to 2014 have been re-analysed based on revised return periods.

Table A5 - Average (mean) daily air temperature in Jersey, 2000-2017; degrees Celsius, °C

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Jan	6.9	6.6	7.5	6.4	8.0	8.0	5.6	8.8	8.1	4.5	4.4	6.6	8.2	6.3	8.3	7.7	7.8	5.9
Feb	8.6	7.3	8.8	6.2	7.0	5.8	5.4	9.0	7.8	6.1	6.0	8.5	5.7	5.3	8.3	6.3	7.6	8.0
Mar	9.2	8.8	9.9	10.0	7.8	8.6	7.0	9.0	8.3	8.8	7.8	9.0	10.3	6.1	9.5	8.8	7.8	10.4
Apr	9.7	10.0	11.9	11.6	10.7	10.9	10.3	13.4	10.3	11.2	11.3	13.8	9.7	9.2	11.8	12.4	9.8	11.1
May	13.9	13.9	14.1	13.5	13.9	13.3	13.6	13.9	15.8	13.5	13.0	14.0	13.3	12.0	13.8	13.4	13.9	14.7
Jun	16.5	16.3	15.9	17.8	17.1	17.4	17.5	16.5	16.1	16.8	16.7	15.6	16.1	14.7	17.1	16.6	16.0	18.0
Jul	17.2	18.6	17.5	19.2	17.3	18.5	20.8	17.0	18.1	18.1	18.7	17.0	18.1	19.2	19.1	18.4	17.8	18.5
Aug	18.6	19.1	18.2	20.9	19.0	18.2	18.0	17.4	17.7	18.3	17.5	17.5	18.6	18.7	17.4	18.0	18.9	17.7
Sep	17.2	15.8	17.2	17.6	17.2	17.5	18.3	16.1	15.3	16.8	16.1	17.5	15.7	16.6	18.5	15.4	18.1	15.4
Oct	12.9	15.5	13.8	12.4	13.3	15.5	15.7	13.2	12.3	14.2	13.6	14.6	13.3	14.9	15.7	13.5	13.1	14.4
Nov	9.7	9.6	11.5	10.9	10.7	9.6	11.3	10.1	9.9	11.4	9.0	12.4	9.4	9.6	11.7	12.6	9.8	10.3
Dec	8.7	6.4	8.6	7.6	7.2	6.5	8.1	7.0	6.2	6.9	4.2	9.0	8.3	8.5	8.8	11.6	8.2	8.2
Year	12.4	12.3	12.9	12.8	12.4	12.5	12.6	12.6	12.2	12.2	11.5	13.0	12.2	11.8	13.3	12.9	12.4	12.7

Glossary of terms

Petroleum products

Aviation spirit - a light hydrocarbon oil product used to power piston-engine aircraft.

Aviation turbine fuel – used in aircraft jet and gas-turbine engines, consisting of either kerosene or a mixture of naphtha and kerosene; also known as ‘jet fuel’.

Fuel oil - used in furnaces and boilers of power stations and in industry.

Gas oil - used in industry, diesel engines and as marine diesel, burned in central heating systems.

Kerosene - known as burning oil or heating oil, used for lighting and heating.

Ultra low sulphur Petrol (ULSP) - motor spirit with a sulphur content of less than 0.005 per cent.

Ultra low sulphur Diesel (ULSD) – motor diesel which has a sulphur content of less than 0.005 per cent.

Lead Replacement Petrol (LRP) - contains an additive different to lead for lubrication.

Gas

LPG – liquefied petroleum gas; a mixture of gaseous hydrocarbons that is changed into liquid form under pressure. LPG may be converted (transformed) into a gaseous form (manufactured gas) and is also used in portable cooking stoves and heaters and to power some vehicles.

Manufactured gas - used as a fuel in homes for cooking and heating; made by converting (transforming) LPG into a gaseous form which can be piped through a gas network.

Energy balance

Calorific value - the calorific values assigned to each fuel are from the tables “Estimated average calorific values of fuels 2015 (DUKES A1-A3)” published by the UK Department for Business, Energy & Industrial Strategy: <https://www.gov.uk/government/statistics/dukes-calorific-values>.

Supply - the sum of production, imports and other sources, accounting for exports and stock changes; commodities that pass through Jersey on their way to a final destination in another jurisdiction are excluded.

Transformation - activities that transform the original primary (and sometimes secondary) commodity into a form which is more suited for specific uses, e.g. burning petroleum products in order to generate electricity; converting LPG into a gaseous state which can then be pumped through a gas network.

Available supply – the sum of supply and transformation.

Public electricity supply - the sum of electricity produced in Jersey, imported electricity (pre-transmission losses) and exports.

Demand - the sum of transformations, energy industry use, losses and final consumption, including non-energy use.

Final consumption - energy consumption by final users; does not include energy used in transformation processes, energy industry own use or losses.

Energy industry use - consumption to support transformation processes e.g. for lighting, operating compressors and cooling systems, but not for transformation itself.

Losses - the intrinsic losses that occur during the transmission and distribution of electricity and gas.

Statistical difference - the excess of supply over demand. A statistical difference arises when figures are gathered from a variety of independent sources and reflect differences in timing, definition of coverage, commodity definition and also in metering and accounting. A non-zero statistical difference is generally expected.