

ENERGY AND WATER STATISTICS – 2011

Introduction

This issue of Economic and Social Indicators on Energy and Water Statistics contains data for the years 2010 and 2011. These statistics have been compiled in close collaboration with the Central Electricity Board, the Central Water Authority, the petroleum companies, the Independent Power Producers and the Meteorological Services. All data refer to the Republic of Mauritius, unless stated otherwise.

2. Energy

2.1 Energy balance

The energy balance (Tables 1 & 2) shows the supply and final uses of energy and the different types of fuel. In order to compare the energy content of the different fuels, a common accounting unit, namely tonne of oil equivalent (toe) is used. The conversion factors are given on page 7.

The energy supply presented as the total primary requirement decreased from 1,430,661 toe to 1,426,803 toe (-0.3%) whereas the demand presented as the total final consumption increased from 853,998 toe to 862,270 toe (+1.0%). The difference between the supply and the demand is mainly due to fuel transformed into electricity.

2.2 Total primary energy requirement

Total primary energy requirement, also known as Total Primary Energy Supply (TPES), is obtained as the sum of imported and locally available fuels less re-exports and bunkering, after adjusting for stock changes. As shown in Table 3, the total primary energy requirement was 1,427 ktoe in 2011, down by 0.3% from 1,431 ktoe in 2010 leading to a decrease of 0.9% in the per capita primary energy requirement from 1.12 toe to 1.11 toe.

In 2011, 83.8% (1,196 ktoe) of the total primary energy requirement were met from imported fuels (petroleum products and coal) compared to 83.1% (1,189) in 2010. Locally available sources (hydro, wind, landfill gas, bagasse and fuelwood) which are all renewable accounted for 16.2% (231 ktoe) in 2011 compared to 16.9% (242 ktoe) in 2010. It is to be noted that as from August 2011, some of the primary energy requirement was met from landfill gas.

Energy supply from petroleum products increased by 3.0% from 775 ktoe in 2010 to 798 ktoe in 2011. It comprised mainly fuel oil (31.1%), diesel (26.3%), gasoline (16.3%) and aviation fuel (16.8%). Coal was at 398 ktoe representing a decrease of 3.9% over the 414 ktoe estimated in 2010.

Local productions which are all renewable stood at 231 ktoe in 2011. Bagasse contributed 94.4% of the renewable sources and the remaining 5.6% was from hydro, wind, landfill gas and fuelwood.

'Energy intensity' defined as total primary energy requirement (toe) per Rs 100,000 of GDP (in 1990 rupees) provides a measure of the efficiency with which energy is being used in production. As shown in Table 16, 'Energy intensity', which stood at 1.46 in 2010, fell to 1.40 in 2011 reflecting a more efficient use of energy.

2.2.1 Local Production (Renewable)

Total energy production from local renewable sources went down by 4.5% from 242 ktoe in 2010 to 231 ktoe in 2011. It was mainly due to a decrease of 42.7% in the production of hydroelectricity from 8.9 ktoe in 2010 to 5.1 ktoe in 2011. This was coupled by a decrease of 3.1% of bagasse from 225 ktoe to 218 ktoe (Table 3).

2.2.2 Imports of energy sources

In 2011, some 1,577 ktoe of petroleum products and coal were imported compared to 1,500 ktoe in 2010, representing an increase of 5.1%. Imports of petroleum products went up from 1,091 ktoe to 1168 ktoe (+7.1%) while that of coal remained almost the same at around 409 ktoe (Table 4 and Fig. 2).

The import bill of petroleum products and coal increased by 25.3% from Rs 24,721 million in 2010 to Rs 30,974 million in 2011. The import bill of petroleum products and coal as a percentage of total imports, was 21.0% in 2011 compared to 18.0% in 2010 (Fig. 3).

2.2.3 Re-exports and bunkering

Of the 1,577 ktoe of imported energy sources in 2011, around 402 ktoe (25.5%) were supplied to foreign marine vessels and aircraft up by 14.2% over the 2010 figure of 352 ktoe. Re-exports consisted of 124 ktoe of aviation fuel (30.7%), 178 ktoe of fuel oil (44.2%) and 101 ktoe of diesel oil (25.1%) (Table 5).

2.3 Electricity generation

The peak power demand in 2011 reached 412.5 MW (+2.1%) in the Island of Mauritius as compared with 404.1 MW in 2010 (Table 6).

Some 2,730 GWh (235 ktoe) of electricity was generated in 2011 as compared with 2,689 GWh (231 ktoe) in 2010, representing an increase of 1.5%. Around 80% (2178 GWh) of the electricity generated were from non renewable sources and the remaining 20% (552 GWh) from renewable sources. The total amount of electricity generated from renewable resources (hydro, wind, landfill gas and bagasse) decreased by 15.6% from 654 GWh in 2010 to 552 GWh in 2011 (Table 7).

Table 8 shows that the Independent Power Producers (IPPs) supplied 58.6% of the total electricity generated while the Central Electricity Board (CEB) provided the remaining 41.4%. Thermal energy represented 97.7% and hydro, wind and landfill gas, 2.3%.

2.3.1 Fuel input for electricity generation

The different types of fuel used for electricity generation are shown in Table 9. Fuel input decreased from 778 ktoe in 2010 to 773 ktoe in 2011 (-0.6%). The major components of the fuel input were coal (49.5 %), fuel oil (26.6%) and bagasse (23.2%).

2.3.2 Electricity sales and consumption

Electricity sales increased by 2.5% from 2,174 GWh (187 ktoe) in 2010 to 2,228 GWh (192 ktoe) in 2011. During the same period, the average sales price of electricity went up by 9.0% from Rs 5.22 to Rs 5.69 per kWh (Table 10).

The per capita consumption of electricity sold went up by 2.1% from 1,697 kWh in 2010 to reach 1,733 kWh in 2011 (Table 16).

2.4 Final energy consumption

Final energy consumption is the total amount of energy required by end users as a final product. End-users are mainly categorized into five sectors, namely manufacturing, transport, commercial and distributive trade, households and agriculture. Final energy consumption increased by 0.9% from 854 ktoe in 2010 to 862 ktoe in 2011. “Transport” and “Manufacturing” were the two largest energy-consuming sectors accounting for 50.5% and 25.7% of energy consumed respectively. They were followed by “Household” (13.6%), “Commercial and Distributive Trade” (9.4%) and “Agriculture” (0.5%). Details on the different types of fuel consumed by each sector and the respective amounts are given in Table 11.

2.4.1 Manufacturing

Between 2010 and 2011, energy used for manufacturing processes decreased by 3.9% from 231 ktoe to 222 ktoe. In 2011, electricity contributed around 79 ktoe (35.6%); bagasse, 39 ktoe (17.6%); diesel oil, 43 ktoe (19.4%); fuel oil, 39 ktoe (17.6%).

2.4.2 Transport

Energy consumption by “Transport” sector stood at 435 ktoe, representing an increase of 3.1% over the previous year’s figure of 422 ktoe. Consumption of fuel for land transport increased from 291 ktoe to 293 ktoe (+0.7%). Consumption of aviation fuel increased from 123 ktoe in 2010 to 134 ktoe in 2011 (+8.9%) and that of sea transport remained at around 8.0 ktoe.

2.4.3 Commercial and Distributive Trade

Total energy consumption by “Commercial and Distributive Trade” sector increased by 6.6%, from 76 ktoe in 2010 to 81 ktoe in 2011.

Electricity was the main source of energy in the commercial and distributive trade sector and its consumption increased from 64 ktoe to 68 ktoe (+6.3%). LPG consumption remained at around 12 ktoe.

2.4.4 Household

Energy consumed by households (excluding transport) increased by 0.4% from 116.9 ktoe in 2010 to 117.4 ktoe in 2011. The two main sources of energy for households were electricity and LPG, representing 53% and 41% respectively of total energy consumed by households. Consumption of electricity rose by 2.1% and that of LPG by 1.3%.

2.4.5 Agriculture

Energy consumption in “Agriculture” went down from 4.4 ktoe in 2010 to 4.3 ktoe in 2011 (-2.3%). Electricity and diesel were the only two sources of energy used in this sector. In 2011, about 1.9 ktoe of electricity were used mainly for irrigation compared to 2.1 ktoe in 2010 while consumption of diesel oil which was used for mechanical operations in fields remained at 2.4 ktoe.

3 Water

3.1 Rainfall

The mean amount of rainfall recorded around the island of Mauritius during the year 2011 was 1,945 mm, compared with the 1,806 mm registered in 2010 showing an increase of 7.7%. The wettest month in 2011 was March with 373 mm of rainfall while September was the driest with 44 mm of rainfall.

The island of Rodrigues registered a mean rainfall of 834 mm, a 27.0% decrease compared to 1142 mm in 2010. The highest amount of rainfall with 109 mm was recorded in the month of March while the least amount was in September with 9 mm (Table12).

3.2 Water storage level

In 2011, the minimum and maximum percentage water storage level of the different reservoirs was as follows:

Reservoir	% Minimum (month(s))	% Maximum (month(s))
Mare aux Vacoas	26 (Nov)	49 (March, April)
La Nicoliere	39 (Jun)	100 (Feb-April), (Aug,Sep)
Piton du Milieu	30 (Jan)	100 (Mar)
La Ferme	31 (Dec)	100 (Mar, Apr)
Mare Longue	29 (Jan)	100 (Aug)
Midlands Dam	33 (Jan)	96 (Oct)

The mean percentage water level for all reservoirs (excluding Midlands Dam) varied from 39% to 70% in 2011. It is to be noted that the mean water level is computed as the average level during a month while the normal level is the long term mean averaged over the period 1990 to 1999 (Table 13).

3.3 Water production

The total volume of potable water treated by the different treatment plants went down by 9.4% from 223 million cubic metres (Mm³) in 2010 to 202 Mm³ recorded in 2011. Some 46% of the average water production was from surface water and 54% from borehole in 2011 (Table 14).

3.4 Water sales and revenue collectible

Total volume of water sold decreased from 115.0 Mm³ in 2010 to 113.4 Mm³ in 2011 (-1.4%). In 2011, potable water made up 85.1% of the volume sold and the remaining 14.9% consisted of non-treated water. Water for domestic consumption was 73.7 Mm³, accounting for nearly 65.0% of the total volume of water sold.

The amount of revenue collectible from the sale of water for the year 2011 was Rs 986.1 million, that is a fall of 4.8% over the amount of Rs 1035.8 million collected in 2010 (Table 15).

Statistics Mauritius

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Concepts and Terminology

The energy data have been compiled according to the recommendations of the United Nations Manual, Series F No. 29 on Energy Statistics.

- **Energy**
Energy means the capacity for doing work or for producing heat. Producing heat is a common manifestation of "doing work" as are producing light and motive force.
- **Primary energy**
Primary energy designates energy from sources that involve only extraction or capture, with or without separation from contiguous material, cleaning or grading, before the energy embodied in that source can be converted into heat or mechanical work. Primary energy is not derived from any other form of energy. By convention, sources of energy that occur naturally such as coal, natural gas, fuel wood are termed primary energy.
- **Secondary energy**
Secondary energy designates energy from all sources of energy that results from transformation of primary sources.
- **Fuels**
The term fuel is used to describe those energy sources, whether primary or secondary, that must be subjected to combustion or fission in order to release for use the energy stored up inside them.
- **Re-export of bunkers and aviation fuel**
Bunkers relate to fuels sold to ships irrespective of their flags of ownership or registration. Re-exports include aviation fuel delivered to foreign aircraft. Aviation fuel delivered to aircraft owned by the national airline is included as final consumption in the transport sector.
- **Primary energy requirement**
It is the sum of imported fuels and locally available fuels less re-exports of bunkers and aviation fuel to foreign aircraft after adjusting for stock changes.
- **Primary energy input to hydro electricity.**
The primary energy input to hydro electricity is defined as the energy value of the electricity generated from hydro.

Energy conversion factors

The following energy conversion factors have been used to express the energy content for the different fuels in terms of a common accounting unit, tonnes of oil equivalent (toe).

Energy Source	<u>Tonne</u>	<u>toe</u>
Gasolene	1	1.08
Diesel Oil	1	1.01
Dual Purpose Kerosene (DPK)	1	1.04
Fuel oil	1	0.96
Liquefied Petroleum Gas (LPG)	1	1.08
Coal	1	0.62
Bagasse	1	0.16
Fuel Wood	1	0.38
Charcoal	1	0.74
	<u>GWh</u>	<u>toe</u>
Hydro/Wind/Landfill gas	1	86
Electricity	1	86

ABBREVIATIONS

The following technical abbreviations have been used throughout the report.

toe	Tonne of oil equivalent
ktoe	Thousand tonnes of oil equivalent
LPG	Liquefied Petroleum Gas
MW	Megawatt (1,000 kW)
kWh	Kilowatt hour
GWh	Gigawatt hour
Mm	Millimetres
Mm ³	Million cubic metres

ACRONYMS

CEB	Central Electricity Board
IPP	Independent Power Producers
GDP	Gross Domestic Product

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Tonne of oil equivalent (toe)														
Fossil fuels						Renewables							Electricity	Total
Petroleum products														
Petroleum products	Aviation Fuel	Kerosene	Fuel Oil	LPG	Total Petroleum products	Fuelwood	Charcoal	Hydro	Wind	Landfill Gas ¹	Bagasse	Total Renewables		
1,299	-	-	-	-	-	7,638	-	4,858	243	270	218,132	231,142	-	231,142
12,991	235,073	4,464	417,401	71,636	1,167,580	-	-	-	-	-	-	-	-	1,576,877
1,228	(123,458)	-	(177,645)	-	(402,332)	-	-	-	-	-	-	-	-	(402,332)
1,675	22,722	(123)	8,316	(488)	32,753	-	-	-	-	-	-	-	-	21,116
10,088	134,337	4,341	248,072	71,148	798,000	7,638	-	4,858	243	270	218,132	231,142	-	1,426,803
1,539	-	(3,805)	(205,936)	-	(211,281)	-	-	(4,858)	(243)	-	-	(5,101)	97,143	(119,238)
-	-	-	-	-	-	-	-	-	-	(270)	(179,046)	(179,317)	137,675	(424,365)
-	-	-	-	-	-	(889)	433	-	-	-	-	(456)	-	(456)
-	-	-	-	-	-	-	-	-	-	-	-	-	(3,785)	(3,785)
-	-	-	-	-	-	-	-	-	-	-	-	-	(16,687)	(16,687)
18,549	134,337	536	42,135	71,148	586,720	6,749	433	-	-	-	39,086	46,268	214,346	862,270
13,525	-	-	38,824	5,657	88,006	542	-	-	-	-	39,086	39,628	79,211	221,781
52,656	134,337	-	3,311	4,862	435,181	-	-	-	-	-	-	-	-	435,181
-	-	-	-	12,161	12,161	-	347	-	-	-	-	347	68,164	80,671
-	-	536	-	48,211	48,747	6,208	86	-	-	-	-	6,294	62,376	117,416
2,367	-	-	-	-	2,367	-	-	-	-	-	-	-	1,935	4,302
-	-	-	-	257	257	-	-	-	-	-	-	-	2,661	2,918