ENERGY AND WATER STATISTICS – 2012

Introduction

This issue of Economic and Social Indicators presents Statistics on Energy and Water for the years 2011 and 2012. The statistics have been compiled in close collaboration with the Central Electricity Board (CEB), the Central Water Authority (CWA), the petroleum companies, the Independent Power Producers (IPPs) and the Meteorological Services. All data refer to the Republic of Mauritius, unless stated otherwise.

The main energy and water indicators are given in Table 1. 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 8. Figures presented in the tables may not add up to totals, due to rounding.

2. Energy

2.1 Energy balance

The energy balance (Tables 2 and 3) shows the supply and final uses (demand) of energy and the different types of fuel.

Between 2011 and 2012, the energy supply, presented as the total primary requirement, increased from 1,426,853 toe to 1,458,844 toe (+2.2%) and the demand, presented as the total final consumption, increased from 862,323 toe to 885,546 toe (+2.7%). 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.

In 2012, total primary energy requirement was 1,459 ktoe, showing an increase of 2.2% compared to 1,427 ktoe in 2011 thus, resulting in an increase of 1.8% in the per capita primary energy requirement from 1.11 toe in 2011 to 1.13 toe.

2.2.1 Primary energy requirement from fossil fuel

Around 85% (1,237 ktoe) of the total primary energy requirement was met from imported fossil fuels (petroleum products and coal) in 2012 compared to 84% (1,196 ktoe) in 2011. The share of the different fossil fuels within the total primary energy requirement in 2012 was as follows: coal (28.7%), diesel oil (14.6%), dual purpose kerosene (kerosene and aviation fuel) (10.3%), gasolene (9.4%), and LPG (5.0%).

Energy supply from petroleum products increased by 2.5% from 798 ktoe in 2011 to 818 ktoe in 2012. It comprised mainly fuel oil (30.0%), diesel oil (26.1%), aviation fuel (17.9%), gasolene (16.7%) and LPG (8.9%). Supply of coal increased by 5.0% from 398 ktoe in 2011 to 418 ktoe in 2012 (Table 4).

2.2.2 Primary energy requirement from local sources (renewable)

In 2012, around 15% (222 ktoe) of the total primary energy requirement was obtained from local renewable sources namely: hydro, wind, landfill gas, photovoltaic, bagasse and fuelwood. Bagasse contributed around 93% of the local renewable sources while hydro, wind, landfill gas, photovoltaic and fuelwood accounted for the remaining 7%. It is to be noted that, in 2012, some (0.08 ktoe) of the primary energy requirement was met from photovoltaic.

2.2.3 Energy Intensity

'Energy intensity' defined as total primary energy requirement (toe) per Rs 100,000 of GDP (in year 2000 rupees) provides a measure of the efficiency with which energy is being used in production. As shown in Table 1, 'Energy intensity' stood at 0.76 in 2012, same as in 2011.

2.2.4 Imports of energy sources

In 2012, some 1,595 ktoe of petroleum products and coal were imported compared to 1,577 ktoe in 2011, representing an increase of 1.1%. Imports of petroleum products went down from 1,168 ktoe to 1,143 ktoe (-2.1%), while that of coal increased from 409 ktoe to 452 ktoe (+10.5%) (Table 5 and Fig. 2).

The import bill of petroleum products and coal increased by 7.9% from Rs 30,974 million in 2011 to Rs 33,421 million in 2012 and accounted for around 21% of total imports (Fig. 3). During the same period, the average imports price of coal fell by 12.3% and while that of fuel oil went up by 11.2%, gasolene by 9.1%, diesel oil by 8.5%, dual purpose kerosene by 18.6% and LPG by 11.0% (Fig. 4).

2.2.5 Local production (renewable)

Total energy production from local renewable sources; hydro, wind, landfill gas, photovoltaic, bagasse and fuelwood went down by 3.8% from 231.1 ktoe in 2011 to 222.3 ktoe in 2012. It was largely due to a decline of 5.3% in the production of bagasse from 218.1 ktoe in 2011 to 206.5 ktoe in 2012.

2.2.6 Re-exports and bunkering

Of the 1,595 ktoe of imported energy sources in 2012, around 375 ktoe (23.5%) were supplied to foreign marine vessels and aircraft, representing a drop of 6.7% compared to 402 ktoe in 2011. Reexports consisted of 114.7 ktoe of aviation fuel (30.6%), 156.8 ktoe of fuel oil (41.8%) and 103.7 ktoe of diesel oil (27.6%) (Table 6).

2.3 Electricity generation

The peak power demand in 2012 reached 430.1 MW in the Island of Mauritius as compared with 412.5 MW in 2011, up by 4.3% (Table 7).

The total electricity produced was 2,796 GWh (240 ktoe) in 2012. Around 79% (2,218 GWh) of the electricity were generated from non-renewable sources, mainly coal and fuel oil while the remaining 21% (578 GWh) were from renewable sources, mostly bagasse (Table 8).

Between 2011 and 2012,

- Total electricity generated increased by 2.4% from 2,730 GWh to 2,796 GWh;
- Electricity generated from coal increased by 3.8% from 1,108 GWh to 1,150 GWh and that from fuel and diesel oil together decreased by 0.2% from 1,059 GWh to 1,057 GWh; and
- Electricity generated from renewable sources increased from 552 GWh to 578 GWh, up by 4.7%. Main changes were as follows: hydro (+31.2%), wind (+28.6%), landfill gas (+5.7%), bagasse (-1.6%). It is to be noted that 17.8 GWh of electricity was produced from landfill gas in 2012, compared to only 3.1 GWh in 2011 as the production started in August 2011.

Table 9 shows that the Independent Power Producers (IPPs) produced around 59% of the total electricity generated while the Central Electricity Board (CEB) the remaining 41%. Thermal energy represented around 97% of the overall generation.

2.3.1 Fuel input for electricity generation

Table 10, shows the different types of fuel used for electricity generation and it indicates that:

- Between 2011 and 2012, fuel input increased by 1.5% from 773 ktoe to 785 ktoe;
- In 2012, coal (51.3%) was the major fuel used to produce electricity followed by fuel oil (26.0%) and bagasse (22%);
- Input of coal increased by 5.2% (from 382.7 ktoe in 2011to 402.5 ktoe in 2012), while that of fuel oil decreased by 0.7% (from 205.9 ktoe in 2011 to 204.5 ktoe in 2012); and
- Some 172.5 ktoe of bagasse was used to produce electricity in 2012 as compared to 179.1 ktoe in 2011, down by 3.7%.

2.3.2 Electricity sales and consumption

Electricity sales increased by 3.0% from 2,228 GWh (192 ktoe) in 2011 to 2,294 GWh (197 ktoe) in 2012. During the same period, the average sales price of electricity remained at around Rs 5.70 per kWh. The share of domestic, commercial and industrial in total electricity sales (MWh) in 2012 was 32.8%, 35.7% and 30.0% respectively (Table 11 & Fig. 10).

The per capita consumption of electricity sold went up by 2.5% from 1,733 kWh in 2011 to reach 1,777 kWh in 2012 (Table 1).

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 2.8% from 862 ktoe in 2011 to 886 ktoe in 2012.

The two main energy-consuming sectors were "Transport" and "Manufacturing", accounting for 51.8% and 24.4% of the energy consumed respectively. They were followed by the household sector (13.6%), commercial and distributive trade (9.4%) and agriculture (0.5%) (Table 12).

2.4.1 Transport

In 2012, energy consumption by "Transport" Sector was 458.5 ktoe, up by 5.3% compared to 435.3 ktoe in 2011. Consumption of fuel for land transport increased from 293.1 ktoe to 304.2 ktoe (+3.8%). The principal energy source used in land transport was diesel.

Consumption of aviation fuel increased from 134.3 ktoe in 2011 to 146.2 ktoe in 2012 (+8.9%) and fuel consumed by sea transport remained at around 8.0 ktoe.

2.4.2 Manufacturing

Some 215.4 ktoe (24.4%) of the total final energy consumption was used by the manufacturing sector in 2012 against 221.7 ktoe in 2011, down by 2.8%. The main energy sources consumed by the sector were as follows: electricity, 79.9 ktoe (37.1%); bagasse, 34.1 ktoe (15.8%); diesel oil, 41.7 ktoe (19.4%); fuel oil, 37.4 ktoe (17.4%).

2.4.3 Commercial and Distributive Trade

Total energy consumption by "Commercial and Distributive Trade" sector, which represent around 9% of total energy consumed increased by 3.7%, from 80.7 ktoe in 2011 to 83.7 ktoe in 2012.

Electricity was the main source of energy in the commercial and distributive trade sector and its consumption increased from 68.1 ktoe to 70.4 ktoe (+3.4). LPG consumption went up by 5.7% from 12.2 ktoe to 12.9 ktoe.

2.4.4 Household

Energy consumed by households (excluding transport) represented around 14% (120 ktoe) of the total energy consumption. The two main sources of energy for households were electricity and LPG, representing 54% and 41% respectively of the total energy consumed by households.

Between 2011 and 2012, household consumption of electricity and LPG rose by 3.7% and 1.7% respectively.

2.4.5 Agriculture

Energy consumption in "Agriculture" increased from 4.3 ktoe in 2011 to 4.5 ktoe in 2012 (+4.6%). Electricity and diesel were the only two sources of energy used in this sector. In 2012, about 2.1 ktoe of electricity were used mainly for irrigation compared to 1.9 ktoe in 2011 while consumption of diesel oil, which was used for mechanical operations in fields remained at 2.4 ktoe.

3. Water

3.1 Rainfall

During the year 2012, the mean amount of rainfall recorded around the island of Mauritius was 1,609 millimetres (mm), representing a decrease of 17.3% compared to the 1,945 mm in 2011. The wettest month in 2012 was March with a mean of 329 mm of rainfall while October was the driest with 47 mm of rainfall.

The mean rainfall registered in Rodrigues at Point Canon in 2012 was 1,040 mm, a 24.7% increase compared to 834 mm in 2011. The highest amount of rainfall with 227 mm was recorded in the month of February while the least amount was in October with 11 mm (Table13).

3.2 Water storage level

In 2012, the minimum and maximum percentage of water storage level of the different reservoirs was as follows:

Reservoir	% Minimum [month(s)]	% Maximum [month(s)]
Mare aux Vacoas	23 (February)	90 (May and June)
La Nicoliere	39 (November and December)	100 (March to August)
Piton du Milieu	26 (December)	100 (February to May)
La Ferme	21 (December)	100 (May)
Mare Longue	36 (December)	89 (May)
Midlands Dam	37 (December)	100 (March to September)

The mean percentage water level for all reservoirs (excluding Midlands Dam) varied from 37% to 91% in 2012. 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 14).

3.3 Water production

The total volume of potable water treated by the different treatment plants increased by 5.9% from 203 million cubic metres (Mm³) in 2011 to 215 Mm³ recorded in 2012. Some 49% of the average water production was from surface water and 51% from borehole in 2012 (Table 15).

3.4 Water sales and revenue collectible

Total volume of water sold decreased from 113.4 Mm³ in 2011 to 111.2 Mm³ in 2012 (-1.9%). In 2012, potable water made up 85.5% of the volume sold and the remaining 14.5% consisted of non-treated water. Water for domestic consumption was 72.9 Mm³, accounting for nearly 66% of the total volume of water sold.

The amount of revenue collectible from the sales of water for the year 2012 was Rs 1,322.6 million, that is an increase of 34.1%, over the amount of Rs 986.1 million collected in 2011. It is to be noted that there was an increase in tariff as from January 2012 (Table 16).

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Contact person:

Mrs. D. Balgobin (Statistician)

Mrs. N. Meenowa (Senior Statistical Officer)

Tel. No. (230) 213 3077

Fax: (230) 211 4150

Email: cso_energy @mail.gov.mu

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. Reexports 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	Tonne	<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/Photovoltaic	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

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