

Sustainable energy policy for small-island developing state: Mauritius

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ABSTRACT

Small-island states face a unique challenge. Their natural beauty, an asset as a tourist attraction, hides the fact that they have fragile ecosystems, vulnerable to climate change. They often rely on imported fossil fuel, even if they may have a potential for renewable energy. High population density may be an additional burden. A new paradigm for their development is necessary. The case of Mauritius as a sustainable island (Maurice Ile Durable or MID) is analyzed with focus on energy, considering intrinsically-related engineering, economic, environmental and ethico-socio-political dimensions. A holistic action plan is proposed for a transition towards a sustainable future.

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1. Background

As from early 18th century, the first inhabitants of the island made the most of natural sources of energy from wood fuel to falling water, from solar drying to animal power, from wind mills to human labor. Even at the time when Mauritius became independent in 1968, renewable energy, namely hydropower and bagasse, made up for more than 60% of the electricity demand. The annual import of petroleum products was 5% of the current level.

Since the eighties, coinciding with low world energy prices, economic development has driven the energy demand in Mauritius upwards, at times at a rate of as high as 15% annually.

Fig. 1 shows the evolution of the primary energy requirement over the past decade. It is clear that the renewable energy input has stagnated over that period while the total energy requirement is steadily growing by about 5% yearly. The share of imported fossil fuel stands, henceforth, at above 80%.

1.1. Electricity

The increasing reliance on coal is a most salient feature of the evolution given in Fig. 2. Coal accounts now for more than one quarter of our primary energy requirement or of our imports of energy. This is predominantly related to the needs of Independent Power Producers (IPPs). Fig. 3 shows a turning point in recent

history in 2007 as the latter topple over the Central Electricity Board (CEB), the public utility company, as the first generator of electricity for the country.

An Outline Energy Policy of the Government was published, the first one of its sort, in April 2007 (Table Ia). It showed that the above trend was unlikely to be reversed unless the CEB would invest in power generation.

In 2009, a Long-Term Energy Strategy was produced by the Government as shown in Table Ib below, depicting a reduction of the target for renewable in the electricity mix from 43.5% to 35% by 2025 with an increase reliance on coal and fuel oil as compared to Table Ia.

In addition, the way matters had been going in the past meant that CEB might have to cater solely for peak and semi-peak demand, leaving the more lucrative base-load supply-side to IPPs. Fig. 4 clearly shows that the scope for Demand Side Management (DSM) is significant, particularly during summer when refrigeration and air-conditioning are most energy-intensive. Also, the supply of base-load electricity currently is in excess of actual demand. Thus, the base-load facilities are being run with little stimulus towards efficiency improvement.

1.2. Transport

Transport remains totally dependent on imported fossil fuel, accounting for half of energy imports.

Table II depicts a medium-case scenario for gasoline (mogas) and diesel use in the transport sector. However, it is likely that the gasoline demand will stabilize to confirm a trend noted over the past decade. In spite of the increasing population of petrol-driven

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¹ M.K. Elahee has worked for the National Economic and Social Council to produce a Blueprint for the Energy Sector which provides the basis for some of the work here discussed.

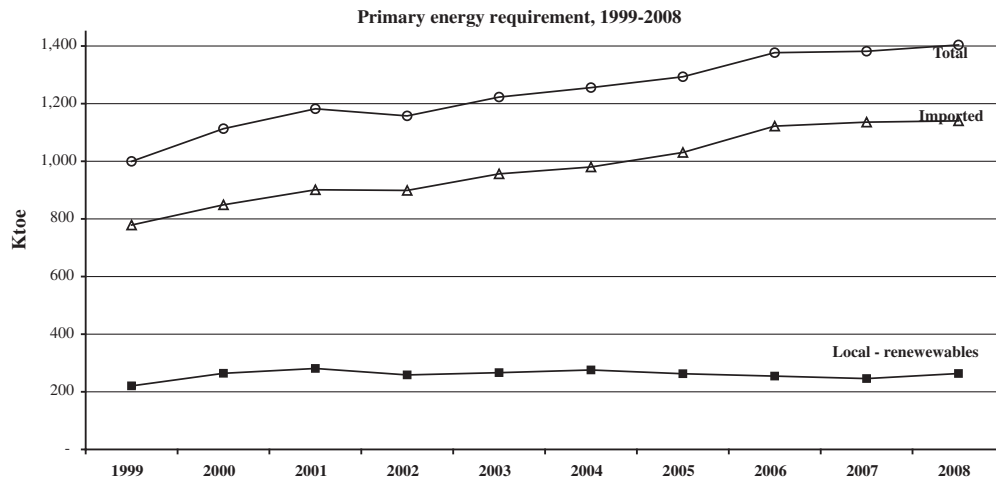


Fig. 1. Primary energy demand (CSO, 2009a).

vehicles, higher prices and, more significantly, improved engine efficiency of vehicles have led to the latter stability in demand.

The use of diesel, fuel oil and, probably also kerosene, may be much lower than the figures projected in Table II if renewables are favored and Demand Side Management (DSM) is fully considered.

It should be noted that Liquefied Petroleum Gas (LPG), whose demand has constantly increased over the last years, is highly subsidized and is predominantly used as cooking fuel.

Demands for kerosene (particularly as jet fuel JFT) and fuel oil are expected to follow the projected scenario due to bunkering requirements.

Table III summarizes a number of transport energy measures included in the Long-Term Energy Strategy (2009).

1.3. Final energy consumption

Fig. 5 illustrates the Final Energy Consumption sector wise. In spite of a drop in 2007, the fact remains that fuel use in the transport sector has increased by about 50% over the last decade. It should be noted that the data here include aviation fuel, but not re-exports and bunkering of marine fuels.

Although its level of consumption is less than in all other sectors except for agriculture, commercial and distributive trade has known a two-fold increase in energy use over the last decade. This reflects the growth of the tertiary sector of the economy, including the energy requirements for new buildings and infrastructure. Fig. 5. Final Energy Consumption (CSO, 2009e)

1.4. Current situation

- In 2007, the Outline Energy Policy (OEP) was published focusing on changing the dependence of the country on oil to one on coal. The Compromise Scenario shown in Table IV was the one retained by the CEB. The All Sugar-Cane Scenario was rejected on the basis that it would have an estimated extra cost of 5%. The 15 MW coal/bagasse project scheduled for 2008 did not happen. Thus far, no project has been completed.
- The current intention of the CEB to promote the construction of a 100 MW coal-fired plant and to invest in a 30 MW fuel oil-fired plant implies that the Base Scenario is very much the one on course, albeit with a delay of three years.

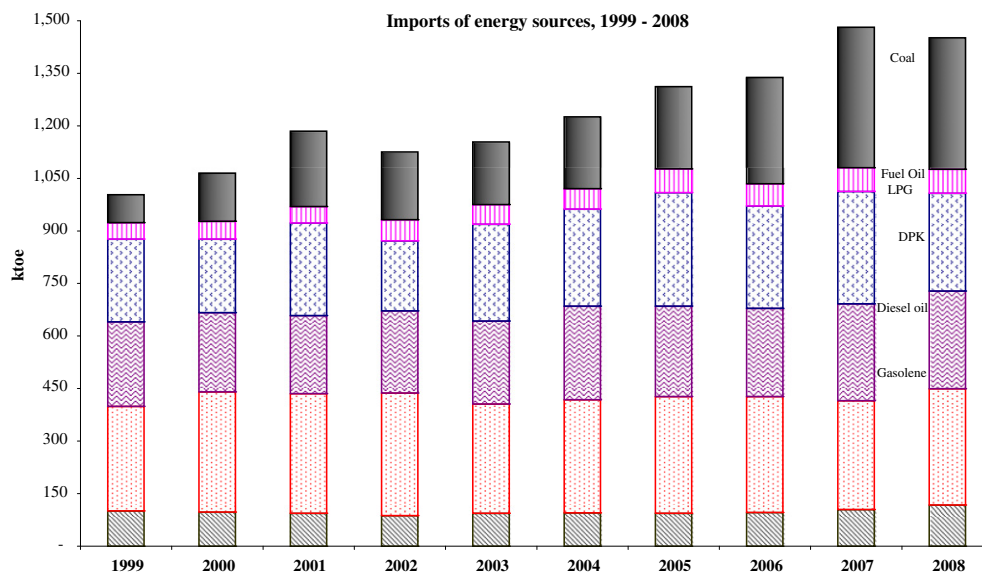


Fig. 2. Imports of energy by source (CSO, 2009b).

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