



Power play in Mauritius

John Etkind
'27-APR-06 05:00'

Mauritius faces the rude awakening that its sheltered age of preference and protection is "really and truly over", and that it must find new ways of building sinew and muscle to replace the flab rendered by years of preferential economic conditions. An overhaul of its energy sector is on the priority list.

Mauritius is devoid of any fossil fuel and must import 75 percent of its energy requirements by way of petroleum products derived from fossil fuels. The remainder comes from sugar cane bagasse and hydro-electric generation and, to a lesser degree, through other renewable resources. Ambitious power generating projects are at the pilot stage while others art on the drawing board.

Private and public institutions on the island are under no illusion that they must do something about their power requirements fast. Mauritius' boldly envisioned growth plans, some already nearing reality, include tourism, manufacture and industry extension, leisure and property development. All have a common demand: more power from electricity and other types of generation.

The government is first to admit that "there is room for improvement in the efficient utilisation" of traditional power generation along with the development of alternative sources of energy. Improvement of energy use in sugar cane processing, adopting energy conservation measures, more extensive use of cogeneration in the textile sector, use of alternative fuel like LPG or ethanol in the transport sector, adoption of an electricity tariff structure to optimise load demand are some of the areas identified to require priority considerations.

Mauritius signed the United Nations Framework Convention on Climate in 1992 and was the first state to ratify it.

The particular conditions of Mauritius as an insular country with no potential for interconnection encouraged the government to make greater use of local and renewable energy sources for electricity generation. A state-commissioned study in 2002 concluded that a combination of coal and bagasse, the pulp residue from cane sugar extraction, was the least costly source for electricity generation for Mauritius. The move was in accordance of the Electricity Act of 2004 and opened the way for private companies to set up co-generation coal and bagasse power plants under the Bagasse Energy Development Programme.

Other projects under consideration for imported oil substitution include wind and sea, and an extension of already widely applied solar power generation for households.

"Mauritius, being quite exposed to windy conditions, is exploring possibilities for wind energy exploitation," says a government briefing. "The country is also envisaging the use of ocean thermal energy conversion is geographically well placed to harness ocean energy."

Mauritius at the crossroads

Describing the island as finding itself at the crossroads over the recent years, the Mauritius Chamber of Commerce and Industry says if 2005 was the "watershed" year then 2006 must be the "springboard" year.

"We shall need to leapfrog from a basically agro-based society with a manufacturing and service oriented 'pendant' into a full blown competitive service oriented society with a diversified manufacturing sector resting on value added products, innovation and creativity," the chamber reports.

Agro-industry is expected to remain a vital aspect of future diversification for manufacturing-base, despite the shrinking share of sugar in Mauritius' national statistics.

"The year 2005 was a watershed for Mauritius," says Rajiv Servansingh, the chamber's Deputy Secretary-General, "starting with the phasing out of the Multi Fibre Agreement, continued with the non-extension of the Third Country Fabric Status to Mauritius under AGOA and ending with the European Union sticking to its guns over the 35% reduction in sugar prices, in spite of vehement protests from the ACP countries."

Albeit reluctantly at first, Tempered by a lingering hope "that in the end things would work out more or less in our favour", Mauritians now recognise the need for change and have accepted a more realistic appreciation of the situation – the preference and protection era is really and truly over.

As a consequence, the New Year started with a bang for the islanders, not of celebratory fireworks, but as a wake-up call. It was a reality check that arrived in a cascade of increased prices for a range of products including bread and flour.

"Working harder and smarter is basically the only way forward," maintains Servansingh. "The

preferential/protection model of development creates room for substantial slack in our production processes whether in manufacturing or in services, in the private or public sectors alike. The public/private sector nexus, which has been such a vital element of our erstwhile success, will continue to be a determining factor in the future scenario. Whether reform succeeds and endures will depend on striking the right partnership and mobilising all resources to focus on the priorities of the day.”

Energy resources

The major locally available energy resources in Mauritius exploited so far are hydro, sugar cane bagasse, solar for water heating and woody biomass. Other means are being investigated.

Hydroelectric. The installed capacity for hydro is 60 MW and around 100 GWh of electricity are produced in a normal rainfall year. Major hydro power supply could decrease due to some water supply being diverted to the north of the island for irrigation. Mini-hydro projects are being studied.

Bagasse. Significant progress of sugar cane bagasse as an energy generating resource has taken place over the past 10 years or so following government policy on its use for electricity generation for export to the public grid. The development was triggered by Gulf crisis of 1971 and resulted in the sustained diversification of the country's energy resources.

Bagasse energy development will continue to carry a higher priority in Mauritius, as the present emphasis on maximising sucrose production will gradually shift towards the use of the fibrous fractions (bagasse, CTL and trash). Sugar will probably become a co-product of the sugar

Industry whereas proceeds from co-generated electricity will constitute an important revenue source for today's traditional sugar factories. With the closure of some of mills in favour of units with higher cane crushing capacities through centralisation, there is additional potential for energy export to the public grid.

Woody Biomass. In 1990, it was estimated that as much as 4 percent of the primary energy consumption in Mauritius was from woody biomass, used largely for cooking purposes. By 2000, this figure had dropped to a negligible 0.4 percent, with positive impact on the ecosystem.

Potential energy resources

Wave energy. Advances in wave energy technology are encouraging enough for consideration as an alternative means of long-term power generation. A pilot plant is under consideration. Generators either coupled to floating devices or turned by air displaced by waves in a hollow concrete structure would produce electricity for delivery to shore. Numerous practical problems have frustrated progress. A prototype shore based wave power generator is being constructed at Port Kembla in Australia and is expected to generate up to 500 MWh per annum. A wave energy converter has been constructed and initial test results have exceeded expectations in terms of energy production during times of low wave energy. The energy of waves crashing against the shore is absorbed by an air driven generator and converted to electricity. For countries with large coastlines and rough sea conditions the energy density of breaking waves offers the possibility of generating electricity in utility volumes. Excess power in periods of rough sea could be used to generate renewable hydrogen.

Ocean thermal energy conversion. A relatively unproven technology, the process uses differences in temperature between water near the surface and deeper water, up to 20 °C. The warm water causes liquids such as ammonia to evaporate and expand. The gas forces its way through turbines, after which it is condensed using the colder water and the cycle begins again.

Dual-fuel combustion uses combustible wastes and by-products for recycling and recovery of energy. Wastes and by-products are available in different forms and in large quantities in different sectors. Possibilities exist of dual fuel combustion e.g. coal/bagasse, biodiesel, solid waste/coal, used oil/diesel, cane-top/bagasse. **Wind power.** Investigations are underway into various new methods of wind power generation on the islands of Mauritius, Agalea and Rodrigues. Assessments of the innovations in wind energy technology that respond to regional constraints such as cyclonic winds are under way. Several pilot projects have been carried out with mixed results.

Solar power is widely used throughout the island mainly for residential water heating purposes, and investigation continues into new technology. Several investigatory projects have been carried out on a pilot-scale in the past with mixed results. The government has focused applied research on solar energy as an important energy source in line with its long-term energy policy and has called for the collaboration of such international co-operation agencies like JICA and UNEP.

Sugar cane by-products. Most energetic non-fossil power research is involved in producing alternative fuel for transportation, notably diesel and ethanol. Sugar cane by-products are the most logical, because of their attractive combustion and emission characteristics in reducing pollution, including CO₂ emissions with the additional benefit of cutting down on import and reliance of fossil fuel. The production of such alternative fuels for the transport sector suffers from the absence of major technological and competitive disadvantages; these, however, can be offset by incentivisation in the private and private/public sector. Research projects are under way.

This report was first published in Energy in Africa Magazine, February 2006 - April 2006. To subscribe click here