

**GREEN PAPER**

**THE JAMAICA  
ENERGY POLICY**

**2006 - 2020**

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## **2006 - 2020**

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## References

The following documents were used as reference material in the preparation of this draft:

- The Cabinet Office – The Jamaica Energy Policy 2005
- India – Draft Integrated Energy Policy PUT for Public Debate, December 2005
- Jamaica Energy Sector Policy – 1995. Project to Conduct a Review of the Electricity Least Cost Expansion Plan Submitted by Jamaica Public Service Company – Final Report. Acres Management Consulting, Ontario, October 2005
- ECLAC ‘Energy Sustainability in Latin America and the Caribbean Study’ October 2003
- Renewable Energies Potential in Jamaica June 2005. MCST, UNECLAC, GTZ.
- The Draft Electricity Bill 2004

# **GREEN PAPER: THE JAMAICA ENERGY POLICY 2006 – 2020**

## **1.0 INTRODUCTION**

### **1.1 Country Profile**

Jamaica with an area of 10,990 km<sup>2</sup> and a population of 2,636 thousand (2003 Est.) is the largest English speaking island in the Caribbean. The GDP per capita (2003) is estimated at US \$2,728 (Table 1).

### **1.2 Economic Overview**

Jamaica operates an open economy in which the major sectors include tourism, mining, manufacturing, agriculture and financial and insurance services. Over the past two decades Jamaica has implemented a programme of economic liberalization, stabilization and structural reform that has made it more open to trade and financial flows. The liberalization programme covered trade, exchange controls, the removal of subsidies and price controls. The liberalization measures were also applied to the energy sector.

The economy was marked by high inflation in the early 1990s but strong measures were taken in recent years to bring inflation under control.

The Jamaican economy has recorded four (4) consecutive years of positive GDP growth with rates for the years 2001, 2002, 2003 and 2004 being 1.7%, 1.1%, 2.3%, and 1.2% respectively. This growth has taken place despite disruption in recent years due to natural disasters.

### **1.3 Energy and the Economy**

Jamaica has one of the highest energy intensity rates in Latin America and the Caribbean. This is largely due to the high energy use of the bauxite and alumina sector. In 1987, when both the bauxite and non-bauxite sectors are taken into consideration, it took 3.59 barrels of oil equivalent (boe), to generate US\$1000 GDP, whilst in 2003 it took 5.39 boe or 50% more energy as is shown in Table 2. The energy intensity without the bauxite and alumina sector is approximately 30% lower (Table 3).

For most of the Caribbean, excluding Trinidad and Tobago, per capita consumption and energy intensity have remained relatively stable over the last 10 years. For example, in 2001 the per capita consumption of energy in Jamaica was 9.71 boe while in St Lucia it was 3.6 boe.

In 1975 the per capita energy consumption in Jamaica was 8.4 boe. Energy conservation and efficiency measures introduced after the oil shock of the 70s contributed to a reduction of the per capita energy consumption to 6.9 boe by 1980. However, over the period 1987 to 2003 the per capita consumption of energy worsened, increasing from 5.6 to 10.31 boe.

Petroleum imports for 2000-2004 by volume and value are presented in Table 4. Over the period there has been an increase of 6.5% in volume, equivalent to 1.6 million barrels oil. This increase in consumption has not been reflected in GDP growth. In the same

period, oil import value ballooned by 37% or US \$255 M. The oil bill which accounted for 24% of merchandise exports in 1998 increased to 66% in 2004, resulting in an increased share of export earnings being used to cover the cost of energy; from every dollar of merchandise exports, we now need 66 cents to meet the oil bill (Figure 1). This has serious implications for the balance of payments account and exchange rate stability.

Bauxite alumina processing (36.6%), electricity generation (24.7%) road transportation (23.5%), and shipping and aviation (7.7%) account for approximately 93% of petroleum consumption (Table 5). It is estimated that energy demand will grow by about 3% to 4% per annum over the medium term.

The main characteristics of energy and its relationship with the Jamaican economy can be summarized as follows:

- excessive dependence on imported primary energy;
- low energy supply self-sufficiency due to a lack of indigenous energy resources, and low utilization of available sources, namely wind, hydro, solar and biomass;
- high petroleum consumption that is concentrated in alumina, power generation and transport sectors (per capita energy consumption has increased by 50% since the early 1990s);
- rising share of oil products in the import energy supply mix relative to crude oil (the latter share has fallen from 42.5% in 1990 to 23.5% in 2004);
- low levels of the refinery utilization, operating below 60% since 1983; and
- high systems losses in the electricity industry, which has been deteriorating since 2001 and which reached 20% in 2004.

There has been rising per capita energy consumption from 1,157 kilogram of oil equivalent (Kgoe) in 1990 to 1,406 Kgoe in 2003 and a worsening of the energy intensity from 642 Kgoe/US\$1000 GDP to 734 Kgoe/US\$1000 GDP.

## **2.0 GLOBAL ENERGY SITUATION**

The recent surge in oil prices on the international market beyond US\$50 per barrel marks the fourth 'wave' of increases since 1973. The first, was in late 1973, when the Organisation of Petroleum Exporting Countries (OPEC) which is a dominant supplier (>40% of world total), quadrupled prices. Prices, using Arabian Light crude as a benchmark, moved from US\$2.48 per barrel in 1972 to US\$11.58 in 1974. This was the first full year of the OPEC effect.

The second was a consequence of the Iranian Revolution of 1979 when the average Arabian Light crude price moved from US\$13.60 per barrel in 1978 to over US\$30 per barrel between 1979 through 1982 and about US\$28 per barrel during 1983-1985.

The third was the First Gulf War that saw prices of the Arabian Light crude rising from under US\$15 to approximately US\$20 in the early 1990s.

Notable about these first three ‘waves’ is that whilst in nominal terms there was no return to the pre 1973 OPEC prices, in the intervals between them, prices either rose gradually or dropped.

For example, between 1974 and 1978 they ranged between US\$11.58 and US\$13.60 per barrel; between 1986 and 1989, US\$14.32 and US\$18.23 per barrel; and after the First Gulf War ‘wave’ between US\$15.82 and US\$25.02 per barrel.

It was in this context, therefore, that OPEC in its ‘toughened stance’ set a price range of between US \$22 to US \$28 per barrel, which it would support. This policy meant that if prices were trending to below US \$22 per barrel, production would be cut to ensure that they did not fall below that level; and if they were trending over US \$28 per barrel production would be increased.

However, this fourth ‘wave’ of increase is driven mainly by heightened demand for energy by the rapidly expanding economies of China and India, the uncertainties revolving around the reliability of supplies from some key oil producing areas, shortage of refining capacity within the United States, the increased frequency of natural disasters, the slowed rate of discovery of new oil fields and the increased risks associated with terrorist attacks. These factors are of particular concern to oil importing countries and especially countries like Jamaica that are almost totally dependent on imported fuel.

Forecasters, including the International Monetary Fund (IMF), expect global energy demand over the next fifteen years to average 2.1% per annum driven by continued strong yearly growth in the global economy, which is predicted to be between 2.5% and 3%. Natural gas is predicted to be the growth leader with annual growth of 2.6%, followed by coal with annual increase of 2% and oil at 1.9%. The developing countries’ share is predicted to increase to account for 55% of the rise in the world energy demand. On the other hand, unrest in the major oil producing regions will continue to undermine security of supply and influence prices in the global market.

In 2006, world oil reserves were estimated to be 1,292 billion barrels. Natural gas reserves were estimated to be 6,112 trillion cubic feet. Estimates of world coal reserves in 2003, stood at 1 trillion short tons or over 490 billion tonnes of oil equivalent. (Table 6).

Consumption trends indicate that world oil demand increased by 27% between 1980 and 2003 to reach an estimated 80 million barrels of oil per day in 2003. The consumption trends for four selected countries between 1980 and 2003, is presented in Table 7.

Consumption of petroleum products globally has fuelled environmental concerns particularly as they relate to climate change. Several international conventions such as the Kyoto Protocol, are attempting to secure voluntary commitments to reduce global emissions from energy related activities. In parallel, there have been important technological advances designed to minimize adverse environmental impact.

### **3.0 REVIEW OF 1995 ENERGY POLICY**

#### **3.1 Background**

In 1995 an energy policy was promulgated, the objectives of which were to:

- ensure stable and adequate energy supplies at the least economic cost in a deregulated and liberalized environment;
- diversify the energy base and encourage the development of indigenous energy resources where economically viable and technically feasible; and ensure the security of energy supplies;
- encourage efficiency in energy production, conversion and use with the overall objective of reducing the energy intensity of the economy;
- complement the country's Industrial Policy recognizing the importance of energy as a critical input to industrial growth and stability;
- minimize the adverse environmental effects and pollution caused by the production, storage, transport and use of energy, and minimize environmental degradation as a result of the use of fuel wood; and
- establish an appropriate regulatory framework to protect consumers, investors and the environment.

Jamaica has achieved several of the objectives established under the 1995 Energy Policy but weaknesses remain in the areas of diversification from fuel oil and expansion of renewable energy. Further, it has proved difficult to achieve sustained improvements in the area of conservation. The main achievements are summarized below:

#### **3.2 Power/Electricity Sector**

JPSCo was privatized with 80% ownership transferred to an overseas investor, Mirant Corporation of Atlanta, USA and operate under a new All Island Electricity License of 2001.

Since privatization of JPSCo, the company has erected 120MW of new combined cycle power generation capacity at Bogue in St. James.

Independent power providers now account for 30% of electricity generation. The generation side of electricity was fully liberalized in 2004.

The Office of Utilities Regulation was established in 1997 as a multi-sector regulator for electricity and other utilities.

Under the Rural Electrification Programme, 7,000 km of low voltage distribution lines were constructed and approximately 70,000 rural homes electrified. Approximately 90% of households island-wide now have access to electricity.

Electricity prices now reflect true cost. However, Government's policy continues to provide a lifeline rate, which benefits monthly consumers of less than 100kWh per month. This cross-subsidy is provided by those consumers using more than 101kWh per month.

### **3.3 Petroleum Sector**

In the 1990s the petroleum market was liberalized in two phases. Price controls were removed on fuel prices, and new marketing companies were allowed to access petroleum products at the refinery's Industry Loading Rack. The market is now a liberalized and competitive one.

Liquid petroleum gas (LPG) has replaced fuel wood as the primary household fuel in 84% of Jamaican homes, improving the standard of living and easing the rate of deforestation for fuel supplies.

The stamp duties were removed, making it easier for new traders to enter the market to import petroleum products into the country. The deregulation of petroleum imports has partially achieved its objectives, creating more competition between the marketing companies.

Since the 1970s the Government has benefited from a series of oil accords. Jamaica benefits from the San Jose Accord that was originally signed in 1980 and has been reviewed annually since then providing for 160,000 barrels per day from Venezuela and Mexico split between 11 Central American and Caribbean countries as purchasers. The Accord allows Jamaica to access 14,000 barrels per day with 20% of the payment due on each shipment available as long-term loans for development projects. While this Accord offers no commercial benefits to the refinery, other than providing a secure supply base, benefits accrue to the wider economy in terms of low cost development financing.

The Caracas Agreement was signed between the Governments of Jamaica and Venezuela in 2000, and was renewed annually, providing for 7,000 barrels/day. In August 2005 the PETROCARIBE Agreement replaced the Caracas Accord. Within the framework of the PETROCARIBE Agreement, Venezuela, a member of OPEC, will extend credit facilities to countries of the Caribbean on the basis of a bilateral fixed quota; there are no price concessions.

Under the PETROCARIBE Bilateral Agreement that Jamaica entered, a quota of 21,000 barrels of oil per day may be accessed under special financing terms. Where the unit barrel price is US \$40 or greater, 60% of the cost is to be paid within 90 days and this amount attracts interest at 2% for the 60 – 90 day period. The remainder of 40% attracts a 1% rate of interest and is repayable within 25 years. At a price of US \$50/barrel for the

next 12-month period, the soft loan benefit is estimated to be US \$176 million, at an interest rate of 1%.

Should the price of oil fall below US \$40 per barrel, the schedule for the qualifying volume is prorated downwards, the applicable rate of interest increases to 2% and the repayment period for the long-term loan is lowered to 17 years. Similarly, should the price increase above US \$100 per barrel, the qualifying volume would increase to 50%, but all other conditions would remain as for US \$40 per barrel. The bilateral agreement is renewable on an annual basis.

Government reviewed the experiences of the 1980s oil exploration and updated the analysis of exploration data using new technology. As a result of this review the Government issued a number of licences to overseas prospectors for both onshore and offshore exploration.

### **3.4 Renewable Energy**

Overall the share of renewable energy in the gross energy supply mix increased to an estimated 12.2% in 2005 from 10.5% in 2003<sup>1</sup>.

A total of 23.2 MW of cogeneration capacity was brought on stream of which 12.2 MW was produced by Jamaica Broilers and 11 MW by Jamalco. Subsequently, the Jamaica Broiler's production was suspended and Jamalco reduced its available export capacity to approximately 6 MW as a result of the expansion in production capacity of 250,000 tons.

A 20.7 MW publicly owned wind farm was commissioned in 2004 at Wigton, Manchester costing US\$26 million. This system averages 7 MW due to variation in wind speed. Also, a small 225 KW wind system was introduced at Munro College in 1996, initially selling to JPSCo; however this system has since encountered technical problems and no longer provides supplies to the grid.

Government rehabilitated six of the mini-hydro plants, which were privatized to the JPSCo, and now account for 22 MW of capacity to the system.

Two demonstration photovoltaic schemes supplying non-grid electricity to 45 homes in deep rural Jamaica have been established; these communities are Middle Bonnet in St. Catherine and Ballymony in St. Ann.

In 2005, a US\$10 million ethanol plant was commissioned and re-commenced production and export of fuel ethanol to the USA, using Brazilian feedstock.

### **3.5 Energy Conservation and Efficiency**

The demand side management and energy efficiency programme introduced in 1996 has had some positive impact on the residential lighting market. A study commissioned by the World Bank in 2005 to determine the impact of the demand side management

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<sup>1</sup> Source: ECLAC 'Energy Sustainability in Latin America and the Caribbean Study' October 2003.

programme showed an estimated 28 MWh/year reduction in demand for electricity, eliminating the need for 6 to 8 MW of peak capacity.

A draft Energy Building Code to guide energy efficiency and conservation in building designs has been prepared and will now be subjected to review by the relevant stakeholders before promulgation.

Government approved an initial allocation of US\$10 million to establish the energy fund to finance energy conservation and efficiency projects.

### **3.6 Environment**

Jamaica has phased out lead from gasoline and established a new set of vehicle emission standards. This has significantly reduced greenhouse gas emissions.

The Government has taken a decision to phase out MTBE as an octane enhancer and to replace it with 10% ethanol. This phasing out will commence in the third quarter of 2006.

## **4.0 POLICY ISSUES AND RECOMMENDATIONS: 2006 – 2020**

Many of the objectives and related policy prescriptions articulated in the 1995 energy policy remain relevant today. Among the significant accomplishments emanating from the 1995 policy, are those related to changes in market structure; a liberalized and deregulated petroleum sector and a privatized electricity sector in which the power generation component is liberalized.

The current challenge is to formulate new policy prescriptions that preserve a highly competitive and efficient energy sector particularly in light of the new ‘wave’ of oil price increases and within the context of the structural changes in the local market.

It is established that the economy is energy intensive and highly dependent on imported supplies. For Jamaica to attract foreign direct investment and for locally based industries to participate successfully in the globalized market environment, supplies must be secured at the most competitive prices. This policy, while embracing the relevant elements of the policy promulgated in 1995, seeks to advance that agenda.

The objectives of this energy policy are similar to those prescribed in the 1995 policy but with greater emphasis on energy efficiency, fuel sources and energy use in transportation. The main objectives of this energy policy are as follows:

- ensure stable and adequate energy supplies at the least economic cost in a deregulated and liberalized environment to enhance international competitiveness and to improve quality of life of householders;

- provide an appropriate environment conducive to private sector participation in electricity generation;
- make electricity available to the remaining areas of the island, especially in deep rural areas and at affordable rates to lifeline customers;
- diversify the energy base and encourage the development of indigenous energy resources where economically viable and technically feasible; and ensure the security of energy supplies;
- protect the economy from the volatility in energy prices which has been experienced with petroleum fuels and which will continue as oil supplies become more limited;
- encourage efficiency in energy production, conversion and use with the overall objective of reducing the energy intensity of the economy;
- complement the country's Industrial Policy recognizing the importance of energy as a critical input to industrial growth and stability;
- minimize the adverse environmental effects and pollution caused by the production, storage, transport and use of energy, and minimize environmental degradation as a result of the use of fuel wood; and
- establish an appropriate regulatory framework to protect consumers, investors and the environment.

## **4.1 Energy Supply and Security**

### **4.1.1 Policy Issue: Security of Energy Supply**

Supply security is threatened by diminishing global oil reserves, rapid economic growth in China and India and uncertainties in regard to reliability from some key oil producing areas. Shortage of refining capacity, the impact of natural disasters on oil and gas-producing facilities, declining rate of discovery of new oil fields and the vulnerability of energy facilities to possible terrorist attacks also influence security and feed speculation in oil markets.

Jamaica traditionally imports petroleum supplies from Venezuela, Mexico, Trinidad and Tobago and Ecuador and, as necessary, purchases on the spot market (Table 8). The oil reserves in the Latin American and Caribbean Region are estimated at 103 billion barrels while the reserves of natural gas and coal are 250 trillion cubic feet and 22 billion short tons respectively (Table 6).

Over the years, Jamaica has benefited from government to government energy agreements which form an important part of the energy security strategy and

involve access to crude and refined products under favourable financing agreements.

Unexpected interruptions in the petroleum supply chain, external or within the country, as well as disaster events such as hurricanes can cause short-term disruptions in the market and this risk must be carefully managed.

#### **Policy Recommendations**

*The Government's foreign trade policy will seek to strengthen bilateral relationships with energy supplying countries within and external to the region and especially with Venezuela, Mexico, Trinidad and Tobago, Ecuador and Brazil, as well as with North/West Africa and Middle East energy producing countries.*

*It is important for the country to preserve benefits negotiated under various bilateral energy agreements.*

*The Government will revise existing regulations to make provisions that will ensure adequate inventory levels exist to cushion any short-term disruption in supply.*

#### **4.1.2 Policy Issue: Diversification of Energy Types**

Taking account of the reserves for the various energy types and with advances in technology, energy sources such as natural gas, coal and renewable energy must be considered in the fuel mix for the Jamaican economy.

#### **Policy Recommendation**

*The Government will promote diversification of energy types to reduce reliance of the energy intensive sectors of the economy such as bauxite, electricity generation and transport on a single fuel type. Natural gas, coal and renewable energy sources are among the alternatives which will be explored.*

#### **4.1.3 Policy Issue: Need to pursue Oil and Gas Exploration**

As world fossil fuel prices increase and with advances in oil exploration technologies, reserves, which were once uneconomic to exploit, could become viable. Against this background, there is the need for Jamaica to assess its oil and gas potential with a view to developing these if feasible.

Further, with developments in analytical techniques applicable to oil and gas exploration data, a decision was taken to re-evaluate exploration data gathered over the last 20-30 years from various locations in Jamaica. From this analysis, there are indications that Jamaica could have some commercial quantities of oil and gas reserves. Accordingly, the Government has been encouraging companies to undertake further exploration work.

### **Policy Recommendations**

*The Government will encourage the exploration and commercial development of oil and gas resources in Jamaica. This will be done within a framework that protects sovereign rights, protects the environment, provide opportunity for participation by local investors and which is mutually beneficial to prospectors and the local economy.*

## **4.2 Petroleum Industry**

### **4.2.1 Policy Issue: Maintain a Competitive Petroleum Industry with Industrial Harmony**

Jamaica is the only CARICOM member state with a liberalized and deregulated petroleum industry. Local and international marketing companies operate in the distribution and retail sectors and a number of independent dealers operate under franchise and other licensing arrangements. The Government participates as a player in all segments and is committed to maintaining this structure.

Within this structure, there are concerns about the abuse of dominant positions by some players. The resulting tension between marketing companies and retailers often causes disruption of supplies for the domestic market which adversely affects normal economic activity. Efforts to correct these weaknesses through moral suasion and within the existing regulatory framework have not yielded sustained results.

The Government has resisted the promulgation of regulation over the years hoping that self-regulation and good business practice would be adequate.

### **Policy Recommendation**

*The Government will use instruments of policy, legislation, regulation and licensing to maintain a competitive and deregulated petroleum industry and to facilitate relative peace and industrial harmony.*

### **4.2.2 Policy Issue: Need to ensure appropriate behaviour in a Competitive and Deregulated Environment**

Legislation exists that governs operations within the sector: landing and storage, conveyance and quality. Provisions in the Weights and Measures Act address areas such as the retailing of products to protect the consumers. However, attempts to regulate measurements related to fuel transfer between marketing companies and retailers using the provisions of the Weights and Measures Act have been met with legal challenges.

The provisions in existing legislation that governs trading in, and handling of kerosene and LPG need revision.

Elsewhere in this document, reference is made to disruptions that occur in the country when there are interruptions or any perception of interruption of

petroleum supplies. Clear protocols that address resolution of conflicts should be established.

**Policy Recommendation**

*The Government will amend existing legislation and regulations or promulgate new ones where necessary to ensure responsible market behaviour and promote industrial harmony.*

**4.2.3 Policy Issue: Need for Intervention in Time of Disasters**

Jamaica is prone to natural disasters, especially hurricanes that create dislocations in energy supplies.

**Policy Recommendation**

*In cases of disaster the Government will be empowered to intervene in the energy sector, if necessary, for a specified time to bring order and ensure that national priorities are met.*

**4.2.4 Policy Issue: Need to prevent Mergers and Acquisition that could Impair Competition**

There are several modes of conduct that could compromise competition in the marketplace. Existing legislation can deal with informal modes. On the other hand, mergers and acquisitions in small economies such as Jamaica could undermine competition. Other jurisdictions legislate against anti-trust practices.

**Policy Recommendation**

*The Government will promulgate legislation and establish protocols to safeguard against mergers and acquisitions which could be anti-competitive.*

**4.2.5 Policy Issue: Petroleum Refining Capacity**

The state-owned refinery, which operates in a fully liberalized and deregulated market, contributes 2% to gross domestic product. The Government is committed to preserve the value-added benefits from the refinery. There is need, however, to increase capacity and modernize to improve efficiency of the refinery that now supplies approximately 55% of local demand including the bauxite sector (Table 4).

**Policy Recommendation**

*The Government will maintain local efficient refining capability as an important contributor to the country's GDP, to ensure energy security, facilitate access to benefits under bilateral energy arrangements and enhance stability in the local petroleum market.*

*The Government will invite broader participation in the ownership of the upgraded refinery.*

#### **4.2.6 Policy Issue: Need for a relevant Petroleum Reference Price**

Internationally, the price of petroleum is influenced by trading activities in commodity markets. Within this region, the US gulf reference price is the basis that is used to price petroleum and consequently, this is the reference price that is used in Jamaica.

Jamaica needs to adopt a suitable internationally accepted reference-pricing model that reflects the regional market conditions.

#### **Policy Recommendations**

*The Government will maintain an import parity price basis for products that reflects regional market characteristics for petroleum.*

### **4.3 Petroleum Tax**

#### **4.3.1 Policy Issue: Use of a Petroleum Tax Regime to enhance Efficiency and Conservation**

Petroleum and petroleum products, like all other imports, are subject to border taxes. However, imported finished products are sourced largely from Trinidad and Tobago, and do not attract Common External Tariff (CET).

Petroleum products sold in the domestic market attract a special consumption tax (SCT) fixed on a volume basis. There is provision for an *ad valorem* tax but in 1999 a policy decision was taken to freeze this. Therefore, the level of tax as a percentage of gasoline prices in Jamaica is relatively low (Table 9) even when compared with oil producing countries such as Barbados and Trinidad and Tobago. In other jurisdictions, an *ad valorem* tax is generally applied.

However, LPG, used in 84% of households (mainly as a cooking fuel) and as well as in commercial and industrial enterprises, attracts a minimal level of taxation (Table 10) and now stands at J\$0.04 per litre. There is no significant difference in the levels of taxation between the other fuel types, which is not the case in many countries (Table 9).

#### **Policy Recommendation**

*The Government will undertake studies and conduct consultations with stakeholders on taxation levels for petroleum fuels (such as gasoline, diesel, kerosene, natural gas) with a view to instituting a system designed to enhance efficiency and conservation. This system will be consistent with regional and international trends and best practices.*

*The tax rate on LPG will remain low as an important strategy to encourage its use as a convenient household fuel and to reduce harvesting of wood for fuel.*

#### **4.3.2 Policy Issue: Need for Sustainable Source of Funds to Support Road Maintenance**

Many countries have established a “user-pay” principle towards meeting the costs for the upkeep of the road infrastructure through motor vehicle levies and user fees.

Jamaica has one of the most dense road networks in the world totaling approximately 20,000 km in an area of 10,990km<sup>2</sup>. The country has a recurrent experience of extensive damage to the road network during the rainy season. Following the rainy season and damage to the road network, there is often increased public outcry, sometimes manifested in civil disobedience to draw attention to the need for urgent road repairs. The cost of maintaining this extensive road network has been a burden to the general taxpayer and a sustainable source of funds is needed to supplement budgetary allocation for this activity.

#### **Policy Recommendation**

*The Government will undertake studies and conduct consultations with a view to the possible introduction of an ad valorem tax on transportation fuels and the dedication of this increased revenue to the Road Maintenance Fund with about 20% provided to the National Energy Fund to support conservation, efficiency and renewable energy projects.*

### **4.4 Electricity Sector**

#### **4.4.1 Policy Issue: Need for a Transparent and Well-Regulated Electricity Market**

The JPSCo was privatized and operates under the All Island Electricity Licence 2001, which expires in 2021. In keeping with the provisions of the licence, the power generation side was liberalized in 2004 and several independent power producers now supply electricity to the national grid. JPSCo retains the exclusivity for transmission, distribution and retailing. These are to be closely regulated by the Office of Utilities Regulation (OUR) under a price cap incentive regime.

The main legislative instruments regulating the electricity sector are:

- The 1890 Electricity Lighting Act
- The 1958 Electricity Development Act
- The Office of Utilities Regulation Act
- The Natural Resources Conservation Act
- The 2001 All Island Electricity Licence

Effectively, the provisions of the JPSCo’s licence now set the framework for the regulation of the electricity sector. Work is well advanced for the promulgation of a new electricity lighting act.

### **Policy Recommendation**

*The Government will continue to honour the provisions of existing licences. Subsequently the industry will be regulated through harmonized legislation designed to maintain a modernized industry.*

#### **4.4.2 Policy Issue: There are concerns regarding responsibility for the development of a least cost expansion plan (LCEP) for electricity within the context of a privatized electricity sector and liberalized generation market**

There is a need to ensure that the country has an adequate supply of electricity over the long run. Considering that the lead-time from planning to implementation of power plants can take several years, it is critical that a system for proper planning and timely approval be instituted. The installation of adequate generation, transmission and distribution capacity on a timely basis is important to ensure reliability of supply and an adequate reserve margin. This is important if the country is to avoid power outages that could cripple the productive sector and inconvenience the residential consumers.

Internationally, the development of a least cost expansion plan (LCEP) establishes a balance between capital investments that flow into the sector and the price to the consumer. To protect the long term interest of the country, and to ensure that conflict of interest among the competing firms in the sector can be effectively managed, the state should have responsibility and control over the development of the LCEP as this has important policy implications.

Under the present licence, the JPSCo is empowered to be responsible for the preparation of the LCEP. The JPSCo also has authority to prepare tenders, invite bids and evaluate the bids for new generation capacity. Potential bidders for generation capacity have expressed concern with this arrangement since there is a potential conflict of interest as JPSCo can also bid. The moral hazards associated with this arrangement are high since bidders would have revealed confidential financial and technical information, which could compromise their negotiating position with JPSCo.

While the Government has the authority to approve the LCEP, administratively this has proven to be quite difficult.

### **Policy Recommendation**

*A system for the proper planning and timely approval of a least cost expansion plan for electricity will be instituted consistent with the harmonized legislation.*

#### **4.4.3 Policy Issue: Need for Heat Rate to be Consistent with International Standards**

On average, the electricity sector constitutes approximately 25% of petroleum products consumed in the country. It is critical to have high levels of efficiency

in generation; fuel cost is a “pass through” in pricing electricity and underpins the competitiveness of the productive sector.

Between 1995 and 2003, the level of generation efficiency (rate at which heat in the fuel is converted into electricity) ranged from a low of 25.3% in 1995 to a high of 28.4% in 1998. The newer generation plants have higher heat rates and therefore as new generation capacity is added, the more efficient plants should be dispatched first.

#### **Policy Recommendations**

*The Government will establish efficiency standards for each generating unit with a schedule for phased replacement of inefficient plants. The phased replacement will take account of the most appropriate and modern technology.*

*The Government will make provision in the new electricity act for an independent and transparent system for merit order dispatch. In this regard, it might be necessary to “grandfather” relevant features of existing licences.*

#### **4.4.4 Policy Issue: Need for Prescribed Protocols for the supply of Electricity to the National Grid**

As a matter of policy, the Government expects to have renewables contributing more significantly to the electricity capacity. To enable the development of this market, barriers to entry for energy from renewable sources and from cogeneration must be minimized. Among the key issues to be addressed will be appropriate protocols within which contractual arrangements are governed; timeliness in finalizing supply contracts, wheeling and net metering are among the issues.

#### **Policy Recommendation**

*The Government will establish appropriate protocols to guide contractual arrangements between independent power producers on the one hand and on the other, any dominant player(s) in the industry. These protocols will include arrangements for conventional planned generation, cogeneration, wheeling and net metering, among other features.*

#### **4.4.5 Policy Issue: Need to Optimize Efficiency in Transmission and Distribution of Electricity**

There is need to reduce the current level of technical and non-technical losses in transmission and distribution of electricity, estimated to be approximately 18% in 2003 and allocated equally among the two categories. Since privatization, there has been an increase in total system losses from 16.3% in 2001 to 20% in 2004. Losses are absorbed by paying customers.

Reduction in system losses is in the national interest. However, it is recognized that the high cost of capital is a constraint to timely investments to improve efficiency.

It is of note that Jamaica is vulnerable to hurricane disasters which often cause extensive damage to the transmission and distribution system.

**Policy Recommendation**

*The Government will establish standards, to be rigorously enforced, for technical losses in transmission and distribution of electricity as well as quality of service standards.*

*There will be a programme for a phased modernization of transmission and distribution systems to minimize technical and non-technical losses.*

*The Government will encourage the service provider(s) to obtain financing through bilateral and multilateral sources to introduce programmes designed to reduce system losses.*

*The new electricity act will make appropriate provisions for penalties for illegal tapping of power lines.*

*In keeping with advances in technology related to size and type of power units and demand requirements, there will be strategic placement of generating plants to optimize efficiency and reliability.*

*In selected areas, over the long term and to coincide with major infrastructure development, power distribution lines are to be installed underground to reduce vulnerability to natural disasters, improve the environmental aesthetics as well as reduce non-technical losses.*

**4.4.6 Policy Issue: Need to Ensure Accuracy of Meters and Billing Systems**

As customers react to conservation messages as well as increased electricity rates, there is a higher level of sensitivity to service standards including accuracy of meters, timely billing cycle and actual versus estimated bills.

**Policy Recommendation**

*The Government will establish quality of service standards and use regulatory instruments to serve the best interest of consumers and investors.*

**4.5 Rural Electrification Programme (REP)**

**4.5.1 Policy Issue: There is a need to provide Electricity to Remote Communities and Marginalized Groups**

Electricity fosters development in rural communities, it reduces rural – urban drift and improves overall quality of life. Private power producers will not extend service to communities where the timeline for the return on investment is not aligned with their business strategy.

The REP was established as an operating arm of the then state-owned JPSCo to be the implementing agency for extending electricity supply to rural communities. The REP remains state-owned and maintains its original mandate.

At this time, approximately 16,000 rural households remain to be electrified. And, with the advent of urban renewal programmes, there are opportunities to regularize arrangements for electricity supply in certain urban communities.

#### **Policy Recommendations**

*The Government will facilitate universal access to electricity within specified geographic regions and in keeping with established standards.*

*The Government will make appropriate provisions, including technological solutions to enable marginalized groups access to electricity at affordable rates.*

#### **4.5.2 Policy Issue: Transfer of Assets Owned by the REP**

The Rural Electricity Programme (REP) now establishes the electricity distribution infrastructure into communities which are uneconomic to the private power company. Once constructed, these assets are to be transferred to the authorized service provider.

#### **Policy Recommendation**

*The Government will establish clear protocols for the transfer of power lines and any other infrastructure constructed by the authorized agency to service providers. Valuation will take into consideration factors such as rate of return envisaged in any licence and economic expected life of the assets among others.*

#### **4.5.3 Policy Issue: Need for more Competition in the Electricity market**

In 1994 the Government adopted the first major change to the operation of the electricity market by discontinuing the utility's monopoly over the generation capacity market and permitted a number of independent power producers and self-generators to enter the bulk electricity market for the first time.

A generation market study was carried out and further examination is needed to determine the appropriate level of competition that should be introduced.

#### **Policy Recommendation**

*The Government will explore the appropriate level of competition which should be further introduced in the electricity market consistent with efficient operation of the industry.*

### **4.6 Transport Sector**

Aspects of transportation that have a direct impact on energy demand are addressed in this policy.

A White Paper entitled “National Transport Policy” was presented to Cabinet in October 2005. That document contains the detailed policy issues and proposed policy positions on the various aspects of the transport sector.

#### **4.6.1 Policy Issue: Need for Small Engine Size Vehicles**

With the rising cost of fuel and the attendant foreign exchange costs to the country, it is important to implement policies that will serve to conserve fuel for transportation.

In the early 1980s restrictions were put on vehicles with engine size over 2800 c.c. for gasoline vehicles and 3000 c.c. for diesel units. Additionally, the duties on gasoline engine sizes below 2000 c.c. and diesel units below 2200 c.c. were reduced from 175% to 75%.

Presently there are no constraints on vehicle imports with respect to engine capacity or fuel efficiency.

#### **Policy Recommendation**

*The Government will maintain a lower level of import duty on vehicles with smaller engines than on vehicles with larger engine sizes.*

#### **4.6.2 Policy Issue: Need for more Diesel-powered Engines versus Gasoline**

Fuel efficiency of diesel powered vehicles range between 15-20% greater than that of the equivalent gasoline powered engines. In Europe, where policies favour diesel engines, these constitute 35% of the cars and light duty vehicles market. In Jamaica the most recent information available show that in 1997, 12% of the rolling stock was diesel engines.

Efforts should be made to increase the proportion of diesel-powered vehicles in Jamaica.

#### **Policy Recommendation**

*The Government will institute a data collection mechanism to track imports of vehicles according to fuel type.*

*The Government will seek to implement a lower tax on diesel-powered engines such that this will serve to increase the proportion of diesel-powered vehicles to reach a target of 30% of the annual imports within 10 years.*

#### **4.6.3 Policy Issue: Octane Enhancement of Fuel**

The cost of production of lower octane grade gasoline is less than for the higher-octane grade and this is reflected in the price to consumers. With few exceptions, there is no loss of performance in using the 87 octane for motor cars in the rolling stock.

### **Policy Recommendation**

*The Government will, by way of public education, encourage economy through the use of appropriate fuel grades for motor vehicles.*

#### **4.6.4 Policy Issue: Introduction of Biofuels**

MTBE, an octane enhancer in fuel, poses certain environmental hazards and is being phased out in some countries such as the USA. Ethanol, a biofuel, is now a common substitute as an octane enhancer. Importantly, the use of ethanol as a fuel provides an opportunity for the expansion of the local sugar cane industry.

The present rolling stock of vehicles can use ethanol as an enhancer in gasoline, without engine modifications.

### **Policy Recommendations**

*Ethanol will be introduced as an octane enhancer to replace MTBE. Initially this will be at 10% to be increased incrementally within five years to 15%.*

#### **4.6.5 Policy Issue: Need for increased use of Flexi and Hybrid Vehicles**

Constraints to the use of electric vehicles have been overcome through the use of hybrid vehicles. A hybrid vehicle integrates a gas engine and an electric motor to provide power. Flexi vehicles use gasoline and biofuels, such as ethanol, in various proportions.

The kilometer per litre performance of hybrid vehicles is approximately twice that of comparable conventional vehicles. Hybrid vehicles are currently more expensive but because of their lower operating cost, the cost per kilometer could be lower over their economic useful life.

### **Policy Recommendation**

*The Government will promote the wider use of hybrid and flexi vehicles through a discriminatory tax regime that favours fuel diversification and fuel efficient vehicles.*

#### **4.6.6 Policy Issue: Need for Greater use of Public Transportation**

Land transportation accounts for approximately 23% of petroleum fuel consumption. The 2004 annual transport statistics report classifies 10.5 % of the rolling stock as public passenger transport and 74.8% as private (Table 11). Private mode of transportation is inefficient and demands significant investments for upgrading and maintaining road networks and the provision of expensive urban land for parking.

### **Policy Recommendation**

*A “balancing” between the public and private transportation modes is an important step to improve energy efficiency in the transport sector and the 2005 white paper “National Transport Policy” offers policy remedies.*

## **4.7 Development of Renewable Energy Resources**

The price of fossil fuel, a traded and exhaustible commodity, is highly volatile and responds sensitively to factors other than supply and demand balance. On the other hand, the cost of harnessing energy from renewable sources is influenced largely by the initial high capital investments as well as uncertainties with respect to constancy in availability. As price of fossil fuels increases and, with significant technological advances in harnessing the renewables, energy supply systems that complement fossil fuel consumption with energy from renewable sources become more attractive.

There are significant collateral benefits associated with the use of renewable energy; it can be harnessed and used in remote areas, recurrent expenses are low and they are environmentally clean. Global concerns about climate change induced by the use of fossil fuel and driven by international conventions such as the Kyoto Protocol, have stimulated interest in bringing renewable energy projects on stream. Importantly, income can be derived from the sale of carbon credits from some projects.

The initiatives to develop the renewable energy sector in Jamaica need to have focus and will benefit from supporting policies.

### **4.7.1 Policy Issue: Need to increase use of Renewable Energy to complement Fossil Fuel**

Renewables now account for approximately 12.2% percent of the total energy requirements, with about 6% for electricity.

A recent study published jointly by the Government and United Nations Economic Commission for Latin America and the Caribbean (UNECLAC) discusses the renewable energies potential of Jamaica<sup>2</sup>. It shows that the potential for increased use in this sector exceeds by far, what is now realized.

Several investment opportunities exist to develop the renewable energy sector in Jamaica such as wind farms and mini-hydro systems to generate electricity, biogas generators for domestic and institutional application and for the harnessing of solar energy. Excellent prospects exist for inclusion of solar water heating systems in new construction developments as well as for small-scale commercial applications in agro-industry. The capital cost for installing solar systems is comparatively high; however payback can be realized in less than four years.

There are many public institutions such as hospitals and private dwellings that now use electricity to provide hot water. The cost to produce this can be significantly reduced by integrating solar panels as collectors into existing heating systems; a reduction in the recurrent expenditure for energy at the institutional and household levels would be significant.

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<sup>2</sup> Ministry of Commerce, Science and Technology, UNECLAC, GTZ, 2005; Renewable Energies Potential in Jamaica

In light of the high electricity consumption by the National Water Commission, adoption of these renewable technologies for the pumping and distribution of water should be given serious consideration.

Early studies (CREDP<sup>3</sup>) identified several barriers to the wide scale adoption of renewable energy systems in Jamaica; financing, cultural prejudices, the absence of or weak fiscal and regulatory provisions are some. Possibly the largest barrier to the development of a domestic renewable and cogeneration market is the absence of appropriate protocols to facilitate contracts governing seller – buyer relationships.

#### **Policy Recommendation**

*Contribution from renewable sources to the electricity sector will be increased from the current level of 6% up to 10 % by 2010 and 15% by 2020.*

*Tax policies will be designed to encourage development of the renewable energy sector.*

*The Government will encourage the local financial sector to provide funding.*

*The Government will encourage the development of a domestic industry for the production of solar systems and biogas technologies.*

*Through existing national institutions, the Government shall facilitate low cost funding for implementation of solar heating solutions at the household and institutional levels.*

*The government will strengthen the legislative and regulatory framework and establish appropriate protocols to facilitate the development of the sector and govern trading relationships including a basis for premium pricing.*

#### **4.7.2 Policy Issue: Need for Institutional Focus for Development of Renewable Energy**

Several Jamaican institutions have over time, been engaged in research, development and implementation of renewable energy technologies (RET). In more recent times one commercial wind farm, with a capacity of 20.7 MW, was commissioned at Wigton in Manchester. There are several privately owned mini-hydro projects with a combined capacity of about 23 MW. On the other hand, attempts to institutionalize the use of solar systems for water heating have not been met with the desired results.

The local sugar industry is now being restructured and one important strategy is to develop cogeneration systems, to satisfy steam and electricity requirements for production and to sell excess electricity to the national grid. There is potential for

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<sup>3</sup> Final Report – Caribbean Renewable Energy Development Project (CREDP), January 2000, GTZ

the adoption of cogeneration technologies in other industries such as poultry and bauxite-alumina production. Among the strategies to be pursued would be:

- the conduct of gap analyses and facilitating applied research projects to fill these gaps;
- establishing databases to support development initiatives;
- fostering capacity building; and
- establishing a focal point for interaction with national and international institutions.

#### **Policy Recommendation**

*The Government will establish a centre of excellence, to bring focus to the development of the renewable energy sector in order to realize the objective of increasing the contribution from these sources to the overall energy demand.*

*The Petroleum Corporation of Jamaica and other public sector agencies will actively stimulate development of, and promote investments in this sector.*

*The relevant Government institutions, including educational facilities will engage in research and development aimed at improving designs and efficiency and provide technical assistance in support of these renewable energy sectors.*

#### **4.7.3 Policy Issue: Need to expand use of Solar and other forms of Renewable Energy at the Household Level**

While Jamaica has been making some progress in its use of solar energy, principally for water heating, the intensity of use is still low. In Barbados for example, there are 50,000 units for a population of 270,000 while Jamaica has between 10,000 – 12,000 units. Use of solar energy needs to be employed on a wider scale, particularly in the hotel sector.

The National Housing Trust (NHT) should provide loans for installing solar water heaters and, in the circumstance, enable a beneficiary to secure more than one loan. In addition, the NHT should incorporate solar water heaters as a part of the schemes, which they finance.

#### **Policy Recommendations**

*The Government has proposed that the National Housing Trust provide loan financing for solar water heating systems to NHT beneficiaries.*

*The Government will seek to create a competitive market for solar water heating systems.*

## 4.8 Energy Conservation and Efficiency

### 4.8.1 Policy Issue: Need to Conserve on, and Improve Efficiency of, energy use in the Domestic Economy

In 2004, Jamaica spent approximately US \$1.0 billion for the importation of petroleum of which electricity, road transportation, bauxite and alumina, and international transport account for 25%, 24%, 37% and 8% respectively (Table 5). Conservation and efficiency initiatives must focus on the electricity and road transportation sectors as the other two major sectors are not under domestic control.

Data for 2004 show that the government used 192 million KWh of which the National Water Commission (NWC) accounted for 47% (Table 12). Data for 2005 are still being compiled. However, conservation programmes between January and November 2005 resulted in a reduction of 28 million KWh. The NWC was not involved in the conservation initiative. The Government must continue to improve energy efficiency and conservation in the public sector.

Policy recommendations to promote fuel efficiency in the transport sector have been articulated elsewhere in this document. And, the National Transport Policy contains several provisions to encourage energy savings.

#### **Policy Recommendations**

*The Government will implement a sustained energy efficiency and conservation programme to reduce motor vehicle use and electricity consumption in the public sector, with emphasis on major users such as the National Water Commission in the case of electricity.*

*The Government will implement an extensive and sustained public education programme that is cost-effective and designed to promote lifestyle changes in order to encourage energy conservation and efficiency in the wider society.*

*It will be a requirement for all ministries and public sector entities, specified energy intensive firms as well as publicly listed firms to publish prescribed energy statistics.*

*Companies with gross revenue of over US \$3 million will be encouraged to include prescribed energy statistics with their annual reports.*

*Government funded post-secondary institutions will be required to include energy courses in their programmes. Technical tertiary institutions will be required to offer energy-related programmes to provide relevant professional skills.*

*The Government will establish equipment standards to encourage energy efficiency.*

*The Government will facilitate the establishment of parking facilities at strategic locations in support of a “park and ride” programme for urban centres to reduce energy use.*

*The Government will promulgate energy efficient building codes to include passive solar design as well as the incorporation of solar technologies and biogas production systems.*

## **4.9 Energy Fund**

### **4.9.1 Policy Issue: Need for a Dedicated Energy Fund to Finance Energy Conservation, Efficiency, Renewable and related Projects**

Certain energy-type projects such as retrofitting of buildings to improve energy efficiency and conservation do not now qualify for funding through traditional development bank facilities. Also, commercial banks do not fund energy conservation and efficiency-type projects to the level required to have any meaningful impact on the nation’s energy bill. In an effort to accelerate lending for energy conservation and efficiency, there is the need for a dedicated energy fund.

This fund is not expected to finance all energy conservation and efficiency projects. Once certain types of projects are established to be viable, it is envisaged that the commercial banks will eventually expand their lending to such projects. The fund is therefore intended to develop the market for such type of lending. It is envisaged that the fund will also finance relevant developmental initiatives in energy such as small renewable energy systems at community or household levels.

#### **Policy Recommendation**

*The Government will establish a revolving energy fund to finance energy conservation, efficiency, and general energy initiatives of a developmental nature. The Government will also institute a system that will provide the fund with a sustainable source of financial resources independent of the Consolidated Fund.*

## **4.10 Institutional Arrangement**

### **4.10.1 Policy Issue: There is need to rationalize the Institutional Arrangements for Policy Development and Implementation, Regulation and Monitoring Functions of the Energy Sector**

The subject of energy requires national focus.

Under the present arrangement, aspects of the electricity sector are regulated by the OUR, the Bureau of Standards and the portfolio ministry. In the case of the petroleum sector, this is regulated by the portfolio ministry, and while there are

general provisions in the Weights and Measures Act administered by the Bureau of Standards, regulations that flow from this are difficult to implement.

The institutional structure for the electricity is described elsewhere. For petroleum, the industry is fully liberalized. The state and private enterprise, local and multinational, operate in every segment of the market. The refinery is state owned. The Government wishes to maintain a liberalized market.

#### **Policy Recommendation**

*The Government will, through the National Commission on Science and Technology, formally involve the wider society in the process of energy policy review.*

*The Government will further rationalize the institutional arrangements for the regulation and monitoring of the energy sector, with the objective of establishing an effective and efficient system.*

#### **4.10.2 Policy Issue: Need for timely and reliable Information and appropriate Analytical Tools to support Policy Development and Planning**

There are now significant delays in accessing reliable information on various aspects of the energy sector. This has adverse effects on the ability to plan and take decision on informed judgment. The relevant Ministries and state agencies need to be empowered to collect reliable information, and on a timely basis to inform the decision making process.

#### **Policy Recommendations**

*The designated Ministries and Agencies will collect reliable energy information and related economic indicators, from all relevant sources and on a timely basis to inform policy and planning processes, legislative review and formulation of strategies to meet Government policy objectives.*

*The portfolio Ministry will maintain a national energy data-base and make non-proprietary information readily available to stakeholders.*

#### **4.10.3 Policy Issue: Financing the Energy Investment**

The investment analysis for the energy sector shows that over US \$1.53 billion will be needed for energy investments over the next six (6) years, in addition to about US\$250 million for the replacement of old electricity plants: the major ones being capital to finance capacity expansion and conversion to natural gas; upgrade the transmission system and to reduce system losses; for the oil refinery upgrade and expansion; capital for the establishment of the LNG infrastructure and the re-gasification plant and financing for renewable energy, end use energy efficiency and rural electrification.

**Policy Recommendation**

*The Government will seek to encourage private investment to meet the investment needs of the energy sector consistent with its policy liberalization within the energy sector.*