

PREAMBLE:

Jamaica is 99% dependent on imported oil for its commercial energy needs. Best current estimates are that the foreign exchange cost of petroleum imports represents approximately 30% of our total foreign exchange earnings. Consequently, economic growth will ultimately depend on the efficiency of energy use and the success in developing alternative and renewable sources.

2. It is clear that long-term planning and execution of the energy policy, is the only method of redressing the critical energy problems. This began with the current Five-Year Development Plan, which includes a National Energy Plan for the five-year period, 1978-1982. The main objectives of the National Energy Plan are:

- (i) Reduction in the dependence on imported energy and diversification of the present energy supply mix of the Jamaican energy system away from imported petroleum.
- (ii) Accelerated exploration for, and development of indigenous energy supply sources.
- (iii) Reduction of the energy intensity of the economy whilst seeking to sustain economic growth especially non-energy intensive export-oriented growth.
- (iv) Cushioning the impact of continually increasing energy prices on the low income groups of the society while adopting pricing policies appropriate to the promotion of objectives (i)-(iii) above.

PROGRAMMES:

3. The energy plan addressed these objectives through a number of programmes and projects concerned with:

- (a) Measures aimed at increasing energy conservation and energy economy.
- (b) Institutional support for effective implementation

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of the Energy Plan and economic transformation.

- (c) The identification and development of local energy resources including the non-conventional sources of energy.

(A) Energy Conservation and the Economy

Conservation remains the only short term option available to Jamaica for reducing the dependence on imported petroleum products. Consequently, this programme has been pushed forward with extreme urgency. Its focus is four fold:

- (i) Phased reduction of Petroleum Products availability and utilization.
- (ii) Energy Auditing
- (iii) Fiscal Measures
- (iv) Public Education.
- (i) Further Reduction of Petroleum Products:

A net decrease of 10% over 1979, on the availability and use of all petroleum products is to be made during 1980. This target will be closely monitored and reviewed at appropriate times.

The monitoring of petroleum supplies will be done mainly through direct inventory control with the Esso Refinery and the Marketing Companies.

Efforts will be made, at all times to ensure that the productive sector and essential services receive adequate supplies of fuel. However, to qualify for this special consideration, they will need to demonstrate efficient use of their fuel supplies.

(ii) An Energy Audit Scheme:

The energy audit scheme is ongoing on a limited basis by the Ministry of Mining and Energy. It is designed to identify any energy waste and recommend practical methods of increasing energy efficiency, particularly in industry. This programme, in most cases, will require a relatively small capital investment.

Foreign exchange for retro-fitting (when necessary) will be made available.

Active consultation and co-operation between the Ministry of Mining and Energy, its advisory committees on energy conservation, private sector organizations, public sector agencies, and international organizations have completed plans for the implementation of the programme shortly.

(iii) Fiscal Measures to rationalize the pricing and marketing of petroleum products in Jamaica, and also to encourage conservation have been identified. These include:

- (a) Complete removal of direct subsidies. This has so far been successful. The gradual removal of indirect subsidies on all petroleum products over the next 12 months is being implemented.
- (b) An appropriate pricing mechanism which includes moving the prices of all petroleum products to reflect their real cost of production.
- (c) Studies have been completed and proposals are being made concerning the following:
 - . The design of an appropriate electricity rate structure to ensure optimal end-use of fuel.
 - . The Ministry of Finance is now studying proposals to offer tax incentives which will encourage the use of alternative (non-petroleum) energy resources; e.g. removal of all taxes on solar water heaters.

(iv) A major Public Education Programme with the support of public sector, private sector and international support has been

successfully implemented. The major role of this programme is to develop public awareness about the energy crisis, methods of conserving energy and the alternative energy resources which may be available (Please refer to Appendix I for further details).

B. Institutional Support for the Effective Implementation of the Energy Plan and Economic Transformation:

The following institutional supports are being developed within the Ministry to assist Government and the economy to respond to the changing patterns of energy supply and pricing:

- (i) The Energy Division in the Ministry of Mining and Energy has been provided with a new structure to implement the energy policy objectives, as a matter of urgency. This new structure will help to strengthen the institutional and technical aspects of the Energy Division, particularly in the areas of policy planning and the National Energy Accounting System (NEAS).
- (ii) The National Energy Accounting System, a process of ongoing data collection, is being established to identify and quantify energy input-output in the different sectors of the society. Ultimately, a National Energy Model will be designed to assist the Government to institute relatively accurate and appropriate controls on the energy resources in the **country**.

The system will play an important role in estimating future energy needs within each sector of the economy and the end use to which the energy is put. The information gathered from sector survey will then allow for the identification of fuel substitution possibilities and conservation potential within each sector and for each energy resource.

Prior to the initiation of the NEAS, energy planning was not previously considered in overall economic planning.

- (iii) Direct Government to Government arrangements with petroleum exporting countries (e.g. Venezuela, Nigeria and Mexico) for the supply of crude oil to Jamaica at the most favourable terms is being pursued. This is being done in close co-operation with the Ministry of Foreign Affairs, to minimize the overall adverse effects of the ever increasing cost of oil purchased through other means as well as to ensure adequate supplies. (Please refer to Appendix II for further details).

- (iv) All energy project proposals will have to be examined by the Energy Division for their implications on energy resources and as they relate to proper energy/economic planning. Projects requiring relatively large quantities of energy will normally be discouraged except where they have a positive impact on GDP and significant foreign exchange earning potential. The Projects Unit in the Energy Division will co-operate with Project Analysis and Monitoring Company (PAMCO), Jamaica Industrial Development Corporation, (JIDC), Jamaica Development Bank (JDB) and other agencies which are responsible for approval of investment projects in Jamaica, to ensure that this aspect of the policy is observed.

- (v) The following controls in the Petroleum Industry are being instituted to support the policy objective:

- (a) the importation of petroleum and petroleum projects must first have the approval of the Ministry of Mining and Energy.
- (b) Offshore sales and exports of all petroleum products, including all "Bunker" sales must first have the approval of the Ministry of Mining and Energy.

- (c) The production programme of the Esso (Jamaica) Refinery (and any adjustments to the production programme) must have the approval of the Ministry of Mining and Energy before implementation.
- (d) Phasing out of kerosene sales at Service Stations by the substitution of a more equitable distribution system (which is now being studied for implementation, particularly with the Jamaica Agricultural Society and the Kerosene Retailers).
- (vi) The development of agriculture continues to be a major objective of the Government of Jamaica. Hence, it is expected that this will generate substantial bio-mass for the production of biogas fuel, alcohol and wood for charcoal, while at the same time requiring relatively low quantities of energy.

C. Identification and Development of Local Energy Resources:

The energy resources may be grouped as "non-renewable" (e.g. oil, gas and peat) and "renewable" (e.g. solar, wind, biomass). A number of public and private sector agencies, as well as international organizations are involved in the programme research, development and implementation.

The exploitation and development of these energy resources in Jamaica is being actively pursued as follows:

- (i) Oil and Gas Exploration Programme is being carried out by the Petroleum Corporation of Jamaica, Geophysical Studies which have been completed are encouraging, and drilling is expected to begin during 1980. If petroleum onshore Jamaica and/or on the Pedro Banks is found, the development lead-time would be from three to six years.
- (ii) Peat is the most significant indigenous energy resource which Jamaica is known to possess, in commercial quantities. The two major deposits are at Black River and Negril. Together they contain enough peat to supply an estimated 80

megawatts of electrical power for a minimum period of 30 years. It represents approximately 35% of the current generating requirements of the Jamaica Public Service Company. While the exploitation of peat as an energy resource is very attractive, there are likely to be ecological consequences. Consequently, studies to evaluate the likely ecological effects are now taking place, and are expected to be completed by June of this year. At that time a decision will be taken concerning the future of the project.

- (iii) A number of solar energy programmes have been prepared for implementation. The Solar Water Heating Programme is the major immediate thrust in this programme, and is being implemented. It is expected that all public institutions requiring hot water will be fitted with these heaters over the next two to three years. A large-scale solar crop drying project is also to be introduced. Studies are now being done for the possible introduction of other solar energy technologies in the near future. A close watch is also being kept on the development of new and emerging solar technologies as well as solar energy technology transfer.
- (iv) A Five-Year Biogas Programme is to be implemented beginning 1980. Farms and rural households have the potential to generate significant amounts of their energy requirements by producing biogas from animal and vegetable waste. A national programme is in preparation and is expected to begin within the next four months and continue into 1984. This programme will improve the quality of life of the rural poor by producing energy for cooking, crop drying and lighting.
- (v) A "Biomass" Programme involving charcoal, wood, plant and animal wastes and plants for fuel alcohol production is being developed. Charcoal, (the major sector of the programme) is increasingly coming back into use as a domestic fuel. A controlled programme of efficient charcoal production and a related re-forestation project has been studied and is to be

implemented on a phased basis during the next six months. Fifteen efficient charcoal kilns are presently being used in the rural areas. In addition, an efficient stove design is now available. The use of waste (e.g. municipal waste) is being studied with a view of its use as an important source of energy within the next three years.

A phased assessment of plants such as cassava and sorghum, will be done for the purpose of using them as major sources of "fuel alcohol".

- (vi) An active Wind Energy Programme is being pursued. Associated with this is an intensive wind mapping programme. The utilization of wind energy, particularly for water irrigation is being developed between the Ministry of Mining and Energy and the National Water Authority. Designs have already been completed by the Ministry for an efficient windmill and implementation of the project will begin on a phased basis by the summer of this year.
- (vii) Hydropower is being examined and implemented under these major sections:
 - (a) The Blue Mountain multipurpose project (feasibility studies and reports will be available by April).
 - (b) The Mid and Western hydro-project (feasibility studies completed and funding being sought).
 - (c) The Mini and Micro hydro-projects - (Studies and implementation currently being done).
- (viii) Several other alternate energy sources with relatively long research and development lead-times are being examined. These include, geothermal, sea thermal gradients and hydrogen (as an efficient energy carrier when transfer of energy as electricity is either inefficient, impractical or impossible).

As a result of the enthusiastic support and co-operation received from the many local Agencies, e.g. National Planning Agency (NPA), Project Analysis and Monitoring Company (PAMCO) the Petroleum Corporation of Jamaica, National Water Authority, College of Arts Science and Technology (C.A.S.T.). Scientific

Research Council (SRC), University of the West Indies (UWI) to name a few) as well as the many government and international agencies (e.g. Britain, CIDA, EEC, Norway, OAS, OLADE, Sweden, UNDP, USAID) which have so far given assistance and have offered to continue to assist in various ways with the achievement of our national energy plan and the specific objectives; there is great optimism about the successful implementation of the various energy projects.

4. 4.

PHASING AND PRIORITIES

The goals of these programmes which cumulatively represent the six objectives cited in the preamble of the Paper have been classified as short term (1-3 years); medium term (3-5 years) and long term (5 years and over).

(i) Short Term Objectives are largely those dealing with Conservation measures and programmes. Enhanced energy conservation by conducting comprehensive energy end use surveys and a national publicity campaign aimed at persuading domestic, commercial and industrial and public sector consumers to take simple conservation measures to reduce energy utilization, through increased efficiency which in some cases will involve retro-fitting. Other elements of this conservation programme will include fiscal measures referred to earlier. There will also be the introduction and establishment of all the feasible renewable energy resources (e.g. solar, wind, biogas) as soon as possible during the 1980's.

(ii) Medium Term Objectives

Medium term objectives are largely concerned with energy supply and demand diversification. Diversification of the present energy supply mix based on detailed technical studies including:

- (a) coal and peat as alternative fuel for electricity generation;
 - (b) utilization of garbage as fuel;
 - (c) utilization of municipal sewage for methane gas generation;
 - (d) further implementation of all economically feasible renewable energy sources to meet local energy needs.
- This phase particularly refers to medium and small

hydro projects.

- (e) Rationalization and implementation of an efficient and appropriate transport policy. For example the use of barges and increased use of the railway for transporting heavy and bulky goods. Efficient low energy urban and rural transportation for people is also being studied for implementation.

(iii) Long Term Objectives are largely concerned with institutional development, major energy projects, new and emerging renewable energy technology development, and energy planning and coordination. These are based on the following:

(i) Energy development measures

- a) A major oil and gas exploration onshore and offshore on the Pedro Banks.
- b) Completion of all the hydro-electric feasibility investigation and implementation of the mini and the mid and western hydro projects as well as the phased implementation of the Multi-purpose Blue Mountain Hydro Project.

(ii) Energy Planning and Coordination

- a) Continued development of the Energy Division with responsibility for policy planning analysis, coordination, and monitoring of the implementation and efficient function of all energy projects programmes in Jamaica.
- b) Offering enhanced encouragement and leadership in all sectors of the Energy Development programme. These will include support for training, research development and investment for the various national energy programmes.

5. IMMEDIATE POLICY ISSUE: CONTINGENCY PLANS FOR FUEL CONTROL

In view of the present world trends in the cost, supply and demand for oil and because of the increasing difficulty which Jamaica faces in providing the foreign exchange for the purchase of the necessary quantities of oil, the following observations are made:

- (i) It is difficult to forecast with confidence the mid and long term assurance of the availability of the necessary volume of oil to the country from the major suppliers.
- ii) Recent events in the United States, particularly California and Florida, seem to indicate that even rich industrialized countries can get into serious oil demand supply problems.
- iii) United States and many European countries, for example, in addition to an active conservation programme, are seriously considering contingency plans for rationing.
- iv) The government must and is now examining contingency plans in the event of not being able to obtain adequate supplies of oil at any time in the future.
- v) In order to exercise more control of energy matters, the Minister of Mining and Energy will seek to have legal powers to enforce certain policy issues.

6. The following Energy Projects will be given the highest priority beginning 1980.

- (a) Oil and Gas Exploration Programme.
- (b) Peat development for domestic and industrial energy production.
- (c) Hydro Electric Schemes - Blue Mountain - multi-purpose, "mid and western" and all mini-hydro projects.
- (d) Solar energy including the use of solar cells and all other feasible solar technology.
- (e) Biomass projects - including biogas and fuel alcohol.
- (f) Availability of foreign exchange to retrofit industry and buildings to improve energy efficiency.
- (g) Fiscal incentives for retrofitting and the use of non-petroleum energy resources.
- (h) The Jamaica Public Service Company to implement its new tariff structure by April of this year. In addition, it will be provided with the necessary foreign exchange on a phased basis to improve its electricity generation

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efficiency. It is also to discontinue the use of expensive diesel oil for electricity generation, and to force a 10% cutback to its major consumers (who will be required to apply energy conservation and fuel efficiency).

Finally, it is worth noting that the recent USAID report on aspects of The Renewable Energy Sector Assessment of Jamaica, December, 1979, states that the renewable energy projects "will create a sound base for the steady diversification of the nation's energy resources in the coming decade". It further states that "Almost 10.3% of Jamaica's energy imports can be replaced by - solar energy 3.5% and biomass 6.8% if fully exploited over the next five years. If the net fuel savings of a coal fired/ electrical generating plant are included, the potential savings may rise to 13.4%. If the new electrical tariff structure that Jamaica Public Service Company adopts can result in even a 1% saving in fuel through more efficient generation and use, then up to 14.4% could be saved on the direct importation of oil for energy conservation".

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APPENDIX I

ENERGY CONSERVATION MEASURES

Energy Conservation is the only short-term means of achieving a significant reduction in our dependency on imported oil for our commercial energy needs. To date, the implementation of the conservation programme has relied largely on voluntary action by energy consumers, particularly through the activities of the National Advisory Council on Energy Conservation (NACEC). This has been successful to a degree. However, a number of other proposals are being considered (some as contingency plans) particularly if the availability of petroleum products become scarce and uncertain.

Presently, the Esso Oil Refinery is being requested to reduce the overall importation of all petroleum products by 10% over the 1979 volumes. The Marketing Companies would, in turn, reduce allocations to the retail outlets. The retail outlets will be allowed to operate as they see fit in distributing the supplies available and the Ministry will be monitoring the system closely.

The following are some special proposals which can be phased in as soon as possible, if implementation has not yet started.

- (1) Encouragement of 'transportation pooling' particularly car pooling and use of school buses.
- (2) Public Sectoral Energy Use/Control.
- (3) Improved operating efficiency and new tariff structure for J.P.S.
- (4) Energy audits
- (5) Energy supply monitoring (from source).
- (6) Control of public sector vehicles
- (7) Rationalization of transportation
- (8) Public Education.

(1) TRANSPORTATION POOLING:

All public and private sector institutions (particularly schools), and civic groups are being requested to promote car (and general transport) pooling and efficient energy utilization.

(2) PUBLIC SECTORAL ENERGY USE:

Public sector organizations have been requested to ensure efficient use of all their energy resources and to establish mechanisms for controlling all energy utilization. They will be required to make a monthly report to the Ministry of Mining and Energy on their progress.

A Manual for energy Co-ordinators setting out guidelines for energy controls is currently being prepared.

(3) JAMAICA PUBLIC SERVICE IMPROVED EFFICIENCY/DEVELOPMENT PROGRAMME:

The Jamaica Public Service Company (JPS) is currently operating at approximately 50% of its installed electricity capacity. Through its Ministry, it has been requested to set targets for improved performance efficiencies and to minimize the use of gas turbines which have been creating serious adverse effects on the energy conservation programme. Arrangements now exist for the Jamaica Public Service to be provided with the foreign exchange necessary for procuring spare parts for fuel/generating efficiency. The effect of this will be felt by the middle of the year and should result in significant reduction in fuel consumption during the period 1980/81.

(4) ENERGY AUDITS:

Energy audits for industrial and commercial plants as well as a retro-fitting programme for energy efficiency is currently being undertaken by the Ministry. It is expected that energy efficient industrial operations and buildings will be properly identified and maintained and encouraged.

Firms showing initiative in energy savings will be given priority access to foreign exchange for acquiring energy saving devices. Tax incentives are now being studied to encourage energy efficiency.

(5) SUPPLY MONITORING:

Monitoring of petroleum supplies from the Oil Refinery to and by the Marketing Companies is to be more carefully enforced. The programme is now being implemented in the Ministry. This is being done to ensure that reduction in supplies as previously identified is achieved.

Close checks on the foreign exchange being allocated for oil purchases will also be enforced (in co-operation with the Bank of Jamaica) in order that the available funds may be appropriately spread over the entire year.

(6) CONTROL MOVEMENT OF PUBLIC SECTOR VEHICLES:

Controlled operations of all public sector vehicles, (including JOS) and energy resources are to be enforced. It is proposed that full control over access to vehicle should be given to an individual 'The Energy Controller' with the necessary authority.

(7) "TRANSPORT RATIONALIZATION POLICY"

A national transport policy study is now underway. As part of this the 'transport rationalization policy' alternative means of transporting goods will be encouraged. For example, hand trucks for moving light loads in warehouses, and construction sites where high energy use vehicles are used indiscriminately.

Transportation of heavy and bulky items by rail and barge will be encouraged. The control on car imports with c.c. ratings in excess of 2000 to be enforced. Lighter, smaller cars will be given preferential importation status.

(8) PUBLIC EDUCATION:

A new thrust of the public education programme will be to promote the choices of renewable energy resources e.g. solar and biogas and their social implications. In addition, the following programmes are to be intensified:

- (a) Public Education aimed at the household and industrial sectors concerning do's and don'ts of conservation.
- (b) Parish Seminars for various community groups, who will be trained to train others in the Public Education Energy Conservation and the acceptance and use of alternative energy resources.

APPENDIX II

Foreign Policy on Energy

The subject of energy is of top priority in the formulation and conduct of Jamaica's foreign policy. In keeping with this, Government has taken a number of initiatives at the bilateral, regional and global levels.

2. At the bilateral level, we have maintained close contact with Venezuela, our major oil supplier. Nigerian oil supplies are already on-stream; and, we have recently secured an undertaking from the Government of Mexico for the supply of 10,000 barrels of oil per day. These supplies, which could be available around the middle of this year, are to be the subject of detailed discussions within the next few weeks. In all of these discussions, the Government's objective is to secure our oil supplies on the most favourable terms taking account, in particular, of the rapid escalation in prices and the difficult foreign exchange situation which we are now facing.

3. The arrangements which are being worked out with Venezuela and Mexico fall within the scope of the broader regional initiative for the development of a Latin American energy policy. Jamaica's active participation in the Latin American Organisation for Energy Development (OLADE) will therefore be sustained because we regard it as the logical forum for the development of a regional focus on energy questions.

4. The Havana Summit of the Non-Aligned Movement made an important contribution to multilateral efforts to achieve a global energy policy. An important initiative

in this context was the dialogue between a small group of energy deficient developing countries and a number of OPEC countries. As a follow-up to this, Jamaica presented to Kuwait certain proposals dealing with pricing, supply arrangements and financing for development which will form the basis of submissions to the collective body of OPEC on behalf of the oil importing developing countries.

5. Beyond all this, however, the Government's foreign policy also recognises that the longer term resolution of the energy problem demands that it be addressed on a global basis and that the longer term aspects must be tackled now. There are two critical factors that dictate this. The first is that rapidly escalating oil prices threaten the very foundation of social stability and economic management in the entire world. The second is that the known reserves of petroleum which provide the bulk of the world's energy are being rapidly depleted.

6. In this regard, Jamaica proposed to the United Nations General Assembly in 1977 the establishment of an International Energy Institute which would deal with such issues as the provision of financing for exploration and development of new and renewable forms of energy; and, the development and transfer of energy technology to the developing countries. These efforts are being sustained.

7. Following discussions at the Non-Aligned Summit in Havana the energy problem has once again been placed on the international economic agenda through the adoption at the last U.N. General Assembly of a resolution initiating a global round of negotiations which will deal with all aspects

of energy and their implications for major international economic issues in the areas of money and finance, raw materials, trade and the transfer of technology. Jamaica will continue to collaborate at the bilateral and regional levels in the effort to achieve a global energy plan which will tackle this issue which bears so importantly on the future prospects for all of mankind.

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