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CARIBBEAN INTERAGENCY MEETING ON PREPARATIONS
FOR THE UN CONFERENCE ON NEW AND RENEWABLE
SOURCES OF ENERGY

BARBADOS
10 - 12 December 1980

NEW AND RENEWABLE SOURCES OF ENERGY
OF INTEREST
TO CARIBBEAN COUNTRIES
AND
POTENTIALLY ATTRACTIVE APPLICATIONS
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INTRODUCTION

The United Nations Conference on New and Renewable Sources of Energy Preparatory Committee has identified the following sources for consideration viz:

- Solar Energy
- Wind Energy
- Hydropower
- Energy from Biomass
- Fuelwood and Charcoal
- Geothermal Energy
- Ocean Thermal and Wave Energy
- Peat
- Oil Shale and Tar Sands
- Animal Draught Power

These sources being considered by the Conference are at different stages of technological and economical development and problems surrounding their application are not only of this general nature. Individual national constraints associated with geographic and site location arise together with problems of appraisal and economic and social feasibility.

It is the objective of this paper to set the stage in order to look at each of these from the point of view of their relative importance in the following countries of the Caribbean:

- Suriname
- Guyana
- Trinidad and Tobago
- Jamaica
- Barbados
- Grenada
- St. Vincent
- St. Lucia
- Dominica
- Bahamas

A. SOLAR ENERGY

The Caribbean countries being considered are geographically situated in a high solar insolation region and are endowed with continuous sunshine throughout the year.

Solar energy for low temperature applications is technically feasible as the state of the art for such applications has already been applied worldwide. Such applications are varied. Those of relevance to Caribbean countries are water heating, sterilising, drying of agricultural and animal products and salt production by evaporation of seawater or inland brines. The latter is of importance to the Bahamas whereas the others can find application in all of the countries under consideration.

Solar energy for the cooling of buildings is still being developed although its application is being tried in Barbados. Of special importance is tropical solar architecture or the passive cooling of buildings, which can potentially find wide application in the countries being considered.

Solar energy for high temperature applications utilising fixed or tracking concentrators is probably not of immediate relevance to these countries.

B. WIND ENERGY

The Windward Islands all have some potential for extracting energy from the wind. Quantitative aspects of this potential is largely unknown in these countries. Similarly, the potential in other countries is virtually unknown. Applications of wind energy fall into two categories, viz:

- (a) wind-driven mechanical systems, and
- (b) wind-driven electrical systems

Examples of these, of varied importance in the different countries being considered are small scale systems (below 15 kw):

- (a) (i) for pumping water for domestic and agricultural purposes and compressing air, and
- (ii) for grinding, threshing and winnowing, and
- (b) for generating electricity, especially at the farm level.

Unfortunately, although historically horizontal axis wind systems have had wide application in the Caribbean the art and technological know-how have

virtually disappeared. Similarly, the author is only aware of demonstration experience in the Caribbean in vertical axis wind turbines, predominantly at the university research level. Present economic activities have placed more stringent demands on wind systems for application in industry.

Therefore, although wind energy can play some role in virtually all of the countries being considered, each potential application will require careful appraisal. The state of the art for large scale use of wind energy to generate electricity for distribution over long distances is still being developed. Most island countries have expressed interest in wind energy.

C. HYDROPOWER

Hydropower can be an important indigenous source of commercial energy in the following Caribbean countries: Suriname, Guyana, Grenada, St. Vincent, St. Lucia, Dominica, Jamaica. Of these hydropower is already exploited commercially in Suriname, Jamaica, St. Lucia, St. Vincent and Dominica. Both Guyana and Suriname have known potential for large scale hydropower generation. Jamaica is said to have potential for mini-hydropower generation whereas St. Lucia and St. Vincent have potential for micro-hydropower generation. Grenada has no known potential although some potential is assumed to exist. For St. Lucia, St. Vincent and Grenada mini and micro-hydro development could result in significant savings of imported fuel in view of their small energy demand.

D. GEOHERMAL ENERGY

The islands of Dominica, St. Lucia and St. Vincent offer the possibility of exploitable geothermal energy. In Dominica the potential is suspected to be considerable on the basis of extensive surface manifestations. Similarly, St. Lucia's potential may also be considerable on the basis of geothermal exploration work done to date. In view of the small energy requirements of these countries geothermal development could play a significant role in meeting their electrical energy requirements.

E. FUELWOOD AND CHARCOAL

The tightening economic situation in the sub-region and steady increases in the price of commercial fuel together with interruptions of domestic supply, are suspected to have caused increased use of fuelwood and charcoal in all of the countries under consideration with the exception of Trinidad and Tobago. These sources have traditionally played an important role in villages and rural communities in Guyana, Jamaica, Dominica, St. Lucia and Grenada.

The continued use of fuelwood and charcoal presents an important area for policy formulation by governments; both from the point of view of economic exploitation of forests on the one hand, and protection of the environment and forestry conservation on the other.

F. BIOMASS ENERGY

The Caribbean countries under consideration all have an agricultural tradition with a corresponding capability. Nevertheless, in some cases this capability is rapidly disappearing. In terms of the potential contribution of energy crops in meeting small demands, use could be made of this capability and it could be expanded. It would seem that the opportunity afforded by steady annual sunshine to grow photosynthetically efficient crops that would lend themselves to energy use either directly or indirectly, should not be overlooked.

Presently, in sugar-producing countries some use is made of bagasse to produce electrical power. The use of agricultural waste is, however, not as widespread as it could be. With the exception of Trinidad and Tobago all countries have expressed an interest in anaerobic fermentation for bio-gas production, and aerobic fermentation for power alcohol production. The generation of adequate continuous supplies of biological feedstocks for these processes in the countries, needs to be investigated. Interest in algal farming as a method of waste disposal, has not been expressed in the sub-region but should be important as a method of generating feedstock for bio-gas digesters.

G. OCEAN ENERGY

Only Barbados has experienced interest in ocean wave energy but the potential probably exists in St. Lucia and Dominica as well. This technology is however, still in its infancy. None of the countries has expressed interest in developing ocean thermal energy in the medium to long term, except St. Vincent and the Grenadines.

H. OIL SHALE AND TAR SANDS

Of the countries under consideration only Trinidad and Tobago has known deposits of tar sands, which have not been properly evaluated.

I. PEAT

Only Jamaica seems to have considerable quantities of this resource, for which an estimate is available.

J. ANIMAL DRAUGHT POWER

This is an energy source which has historically played an important role throughout the sub-region. Presently, with the exception of Trinidad and Tobago, it still plays a role to a varied degree in all of the other countries under consideration. The role is said to be greatest in Jamaica but Guyana and Suriname are also said to employ large numbers of animals in their agricultural sectors. With the exception of Jamaica very little quantitative information exists.

This area is certainly one in which policy needs to be formulated by the governments concerned.

CONCLUSION

The following Table gives an indication of the New and Renewable Sources of Energy of interest to the Caribbean countries being considered. It comprises information gathered from Reference 2 and information coming from technical assistance requests made to the United Nations Conference on New and Renewable Sources of Energy Secretariat and interest expressed to the Regional Advisor for the United Nations Conference.

<u>SOURCE AND TECHNOLOGY</u>	<u>INTERESTED COUNTRIES</u>
<u>Solar Energy</u>	
(a) Hot water systems	All countries except Trinidad and Tobago
(b) Solar drying of agricultural produce	All countries except Trinidad and Tobago
(c) Salt production by evaporation of seawater	Bahamas
(d) Solar cooling	Barbados, St. Vincent and the Grenadines
(e) Solar ponds	Bahamas, Barbados, St. Lucia
(f) Photovoltaics	Bahamas, Jamaica, Suriname, St. Vincent and the Grenadines
(g) Solar thermal electrical systems	St. Vincent and the Grenadines
<u>Wind</u>	
(a) Wind electrical systems - grid-connected	Bahamas St. Vincent and the Grenadines, Barbados
(b) Wind mechanical systems	Grenada, Guyana, Dominica, St. Vincent and the Grenadines, St. Lucia, Bahamas, Suriname
<u>Hydropower</u>	
(a) - large-scale	Guyana, Suriname
(b) - mini - and micro hydro	Jamaica, Dominica, St. Lucia, St. Vincent
<u>Geothermal</u>	
	Dominica, St. Lucia, St. Vincent
<u>Fuelwood and Charcoal</u>	
	Guyana, Jamaica, Grenada, St. Vincent and the Grenadines, St. Lucia, Dominica

SOURCE AND TECHNOLOGY

INTERESTED COUNTRIES

Biomass Energy

(a) Biogas and alcohol systems

All countries except Trinidad and Tobago

Ocean Energy

(a) Thermal

St. Vincent and the Grenadines

(b) Wave

Barbados

REFERENCES

1. CARIBBEAN ENERGY SURVEY - Document of the World Bank, Report No. 2511 - CRB, 7 May 1979 and 3 July 1979
2. CARIBBEAN ENERGY SURVEY - Inter-American Development Bank, April 1980