

**REGIONAL SYMPOSIUM ON
ENERGY MANAGEMENT AND
ENERGY EFFICIENCY**

**RECOMMENDATIONS
AND SUMMARY OF PROCEEDINGS**

**5 - 7 February 2001
Caribbees Hotel
Castries
St. Lucia**

**Organised By
Organisation of Eastern Caribbean States
Natural Resources Management Unit
Castries, St. Lucia**

ACKNOWLEDGEMENTS

This Symposium was financed by the Canadian International Development Agency (CIDA) through the Environmental Capacity Development Project, a partnership initiative between the Organisation of Eastern Caribbean States (OECS) and CIDA. The Symposium was organised and delivered by the OECS Natural Resources Management Unit.

DISCLAIMER

The views expressed in this document are those of the authors and/or the organisations they represent. The mention of specific companies or of their products or brand names does not imply any endorsement by, and the views expressed do not necessarily reflect the views of, either the Organisation of Eastern Caribbean States or the Canadian International Development Agency.

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of the Organisation of Eastern Caribbean States concerning the legal status of any country, territory or city or of its authorities, or concerning the delimitation of its frontiers or boundaries.

FOR MORE INFORMATION

The Natural Resources Management Unit of the Organisation of Eastern Caribbean States may be contacted at:

**OECS-NRMU
OECS Secretariat
P.O. Box 1383
Castries
St. Lucia, W.I.**

**Tel: +1-758-452-1847
+1-758-451-8930
+1-758-453-6208**

Fax: +1-758-452-2194

e-mail: oeccnr@candw.lc

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying or otherwise, without the prior permission of the copyright owner. Applications for such permission, with a statement of purpose and extent of the reproduction, should be addressed to the Head of Unit at the above address.

ã Organisation of Eastern Caribbean States 2001

TABLE OF CONTENTS

	Page
List Of Abbreviations And Acronyms	i
Symposium Summary:	1
Context Of The Symposium	1
Objectives Of The Symposium	1
Recommendations The Symposium For Achieving Enhanced Energy Management And Efficiency In The OECS Associate and Member States	2

LIST OF FIGURES

Figure 1: Preliminary Identification Of Institutional Roles In Future Supply Of Electrical Power In OECS Countries	3
---	---

LIST OF ANNEXES

Annex A	Symposium Agenda
Annex B	Presentations
Annex C	Findings Of Workgroups
Annex D	List Of Participants

LIST OF ABBREVIATIONS AND ACRONYMS

AOSIS	Association Of Small Island States
CARILEC	Caribbean Electric Utility Services Corporation
CAST	Caribbean Alliance For Sustainable Tourism
CDM	Clean Development Mechanism
CIDA	Canadian International Development Agency
CEAP	Caribbean Energy Action Program
CEIS	Caribbean Energy Information Service
CERMES	University of the West Indies Centre for Resource Management and Environmental Studies
CHA	Caribbean Hotel Association
CLI	Climate Institute
CTO	Caribbean Tourism Organisation
CPACC	Caribbean Planning For Adaptation For Global Climate Change
CREDP	Caribbean Renewable Energy Development Programme
CUBIC	Caribbean Uniform Building Code
DFID	United Kingdom Department For International Development
DSM	Demand Side Management
ECLAC	United Nations Economic Commission for Latin America and the Caribbean
EDF	Electricité de France
EM	Energy Management
EPC	Environmental Policy Committee (of the OECS)
ESCO	Energy Service Company
GEF	Global Environment Facility
NGO	Non-Governmental Organisation
NRMU	Natural Resources Management Unit (of the OECS)
OAS	Organisation of American States
OECS	Organisation of Eastern Caribbean States
OLADE	Organisation Latino-americano de Energía (Latin American Energy Organisation)
REIA	Renewable Energy in The Americas (initiative of the OAS)
RE	Renewable Energy
RET	Renewable Energy Technology
SEP	Sustainable Energy Plan
SIDS	Small Island Developing States
TVET	Technical and Vocational Education and Training
UNFCCC	United Nations Framework Convention On Climate Change
UWICED	University of the West Indies Centre for Environment and Development

REGIONAL SYMPOSIUM ON ENERGY MANAGEMENT AND ENERGY EFFICIENCY

SYMPOSIUM SUMMARY

Context Of Symposium

In June 2000 the Organisation of Eastern Caribbean States (OECS)¹ Environmental Policy Committee (EPC) requested its Natural Resources Management Unit (NRMU) to develop options for enhanced energy efficiency and energy conservation in the Member States of the OECS. The results of the work undertaken by the NRMU were presented to EPC at its meeting of November 2000. Following this presentation, Ministers requested that NRMU prepare recommended policy and public awareness activities on energy management for the consideration of Ministers and subsequent adoption in the region.

A preliminary meeting to initiate response to the Ministers' instruction was held in November 2000. This meeting reviewed the work undertaken by NRMU and considered how best to respond to the Ministers' instruction. The meeting was attended by senior technical officers from each of the OECS Associate and Member States together with a number of regional and international agencies. At that meeting, it was decided that the most appropriate first response to the Ministers' request would be to hold a symposium to which all stakeholders would be invited in order to ensure that the required policy and public awareness activities are appropriately focussed and sensitive to the many various projects currently being either developed or undertaken in the Caribbean to address energy management. Accordingly, the symposium reported in this document was organised and held.

Objectives Of Symposium

The purpose of this Symposium was to provide a forum to review and discuss the various initiatives and programmes in energy conservation and management in the OECS region in order to:

1. Identify those areas in energy management and efficiency in the OECS that warrant attention.
2. Identify appropriate mechanisms and modalities for coordinating the various energy management initiatives and programmes either underway or being developed of relevance to the OECS Associate and Member States.
3. Assist the OECS in formulating the necessary policies and public awareness campaigns on energy management and efficiency to respond to the instruction of the OECS Environmental Policy Committee.

¹ The Associate and Member States of the OECS are: Anguilla, Antigua and Barbuda, British Virgin Islands, Dominica, Grenada, Montserrat, St. Kitts and Nevis, St. Lucia and St. Vincent and the Grenadines.

Recommendations Of the Symposium For Achieving Enhanced Energy Management And Efficiency In The OECS Associate and Member States

The Symposium recommended that the following actions are required to achieve enhanced energy management and efficiency in the OECS Associate and Member States:

1. *Participation In Current Initiatives*

The OECS Secretariat needs to work very closely with existing initiatives, either developing or underway. In particular, the OECS Secretariat should consider participating on the Steering Committee of the Caribbean Energy Action Program (CEAP) and Caribbean Renewable Energy Development Programme (CREDP) initiatives. The purpose of establishing this linkage will be to: (i) ensure congruency between activities that may be taken by the OECS or its Member States and those of CREDP and CEAP; (ii) identify gaps in CREDP or CEAP initiatives which OECS may have to address; (iii) ensure that the needs of the OECS Member States are fulfilled by the two proposed programmes; and (iv) inform CREDP and CEAP of the initiatives undertaken in OECS countries and which may be relevant to those projects.

2. *Policy Options*

The OECS Secretariat needs to develop a harmonised framework for Energy Management And Energy Efficiency Policy that could then be adopted at the national level by OECS countries. The required policy should address institutional restructuring along the lines presented in Figure 1 in order to ensure a reliable supply of energy within a framework that establishes, and creates opportunities for: (i) energy efficiency; (ii) flexible options for the generation and distribution of electricity; (iii) application of renewable energy; (iv) more effective regulation of the energy sector; and (v) fiscal and other incentives for application of renewable energy and energy efficient technologies. All institutional restructuring initiatives should include consideration of the sustainability (financial and otherwise) of those institutions independent of donor funding.

3. *Public Awareness*

Public awareness activities can be highly effective in achieving enhanced energy management and energy efficiency. However, care should be taken to not create consumer expectations regarding energy efficiency that cannot be met. Capacity building is needed in both the public and private sectors and work is required in the areas of technical standards and labelling in support of energy efficiency. Awareness activities need to be linked to policy, institutional and legislative frameworks, particularly those that reduce import tariffs for renewable energy and energy efficient equipment and through programmes such as "green certification" initiatives.

Specific recommendations for activities related to awareness include: (i) revision of the Caribbean Unified Building Code (CUBIC) to include energy efficiency and renewable energy issues; (ii) application of catalytic demonstration projects in the agricultural and industrial sectors; (iii) development of a database for the OECS countries of those signatories to the United Nations Framework Convention On Climate Change (UNFCCC) who have completed their inventory of the greenhouse gases; (iv) dedicated training in energy planning, the conduct of energy audits and energy accounting; (v) consideration by the Technical and Vocational Education and Training (TVET) initiative of the OECS to include focus on such issues as certification in energy technology and energy management at the technical level.

Figure 1
Preliminary Identification Of Institutional Roles In
Future Supply Of Electrical Power In OECS Countries

DESIRED POWER SUPPLY CRITERIA	INSTITUTIONAL ENTITY					
	Utility/ Independent Power Producer	Utility Regulator	Government	Consumer	NGOs	Equipment Suppliers/ Service Providers
Secure, Reliable and High Quality Supply	Effective operation of facilities	Monitoring of utility/independent power producer supply	Effective policy and legal frameworks	Compliance with business regime and standards	Advocacy and monitoring of power supply	Effective servicing of power suppliers and users
Effective Use Of Renewable Sources	Incorporate renewable energy in operations and energy generation mix	Monitor supply Require energy pricing frameworks supportive of renewable energy	Policy and legal frameworks supportive of renewable energy	Support for renewable sources of energy	Advocacy	Develop local capability to supply renewable energy sector. Undertake technology development and transfer
Optimise Demand Side Management/ Conservation	Buy – in and support for DSM initiatives	Provide support for DSM/conservation	Policy and legislation in support of DSM Delivery of DSM activities Labelling standards for energy efficient technologies/ products	Invest in energy efficient technologies and practices Compliance with DSM legislation/ policy	Advocacy and promotion of DSM. Delivery of DSM activities	Local availability of energy efficient technologies, products and services Compliance with DSM standards
Ensure Least Cost To Consumer	Operate efficiently	Transparent rate regulation based on life cycle costs for regulated utilities and sale price regulation from independent power producers	Policy/legislation requiring energy pricing based on life cycle costing	Timely payment of bills	Advocacy	Competitive pricing
Ensure Environmental And Financial Sustainability	Compliance with environment and other standards. Establish basis for profitability	Monitor compliance with environmental requirements and other standards	Policy/legislation in support of environmental and social standards	Behave in compliance with laws and business practice of energy suppliers	Advocacy	Compliance with environment and other standards Establish basis for profitability

This Figure identifies the roles that should be played by the various identified institutional "entities" in order to achieve the identified desired power supply criteria. For example, the Figure identifies that the role to be played by "equipment suppliers/service providers" in order to achieve "secure, reliable and high quality supply" of power is to ensure "effective servicing of suppliers and users".

A programme is being financed by GTZ on energy and sustainable development that includes workshops on energy management; as part of this programme, the OECS Secretariat should request (through the Latin American Energy Organisation) similar workshops for the OECS countries.

4. *Coordination of Assistance*

The OECS Secretariat should source and coordinate provision of technical assistance and financial assistance for the preparation of national sustainable energy plans, similar to that being prepared for St Lucia.

5. *Address The Transportation Sector*

Energy use in the transportation sector requires addressing. Strategies are required at the national level to rationalise and optimise the use of hydrocarbon fuels. Issues in this regard include the import of second-hand or refurbished fuel inefficient vehicles, and the need to promote the use of more fuel efficient vehicles.

ANNEX A
SYMPOSIUM AGENDA

**Organisation of Eastern Caribbean States
Natural Resources Management Unit**

REGIONAL SYMPOSIUM ON ENERGY EFFICIENCY AND ENERGY MANAGEMENT

**5 – 7 February 2001
Caribbees Hotel, Castries, St. Lucia**

Monday 5 February

Session 1: Context and Objectives of Symposium; Session Chair: Dr. Vasantha Chase, Head, OECS-NRMU
Objective: Identification of why the symposium is being held

9:00 Chairperson's Greeting: Dr. Vasantha Chase, Head – OECS-NRMU
Invocation: Sirah Ferdinand, OECS-NRMU
Welcoming Remarks: Director – OECS Secretariat
Bishnu Tulsie, Chief Sustainable Development Officer, Ministry of Planning,
Development, Environment and Housing, Government of Saint Lucia
Keynote Address: Hon. Calixte George, Minister – Communications, Works, Transport and Public
Utilities, Government of Saint Lucia
Vote of Thanks: Valerie Isaac-St. Hill, OECS-NRMU

10:00 BREAK

Session 2: Who Is Doing What; Session Chairs: Doug Hickman and Valerie Isaac-St.Hill, OECS-NRMU
Objective: Identification of current activities

10:15 Overview Of Session
10:20 Sustainable Energy Plan For St. Lucia: Bishnu Tulsie, Manager, Sustainable Development Unit,
Government of St. Lucia
10:40 Renewable Energy In Barbados: Dr. Oliver Headley, Director, Centre for Resource Management and
Environmental Studies, Bridgetown, Barbados.
11:00 Renewable Energy In The Americas: Mark Lambrides, Project Manager, Organisation of American
States, Washington D.C.
11:20 Small Island States Energy Initiative: Tom Roper, Climate Institute, London, United Kingdom
11:40 Energy Efficiency In The Caribbean: Mentor Poveda, Organizacion Latino-americano de Energia
(OLADE), Quito, Ecuador
12:00 Caribbean Renewable Energy Development Programme: Mona Whyte, Caribbean Energy Information
Service, Kingston, Jamaica
12:20 Caribbean Planning For Adaptation To Global Climate Change (CPACC): Neville Trotz, CPACC
Project Manager, Bridgetown, Barbados
12:40 Clean Development Mechanism: Mona Whyte, Caribbean Energy Information Service, Kingston,
Jamaica

1:00 LUNCH

2:00 Policy Framework For Enhanced Efficiency Of Energy Use In The OECS States: David Lea, Lewis
Engineering
2:20 The Changing Electric Utility Sector: Basil Sutherland, CARILEC, Castries, St. Lucia
2:40 Identification of any other relevant initiatives

3:00 BREAK

3:15 Discussion Of Current Activities
4:30 Close of Day 1

Tuesday 6 February

Session 3: How Best To Meet The Requirements Of OECS Ministers; Session Chair: Dr. Vasantha Chase, Head - NRMU

Objective: To delineate broad actions to be undertaken by OECS-NRMU to meet the request of the OECS Ministers

9:00 Overview of Session

9:15 Panel-Led Discussion of Gaps and Needs

10:15 BREAK

10:30 Plenary discussion of need for actions within the following categories: policy development, awareness-building, private sector perspectives, participation of OECS Member States in on-going/new initiatives, capacity building, institutional restructuring, other. Discussion to culminate in agreement of categories of need and major related actions.

1:00 LUNCH

Session 4: Development Of OECS-NRMU Actions; Session Co-Chairs: Keith Nichols, OECS-NRMU, and Peter Murray, OECS-NRMU

Objective: To map OECS-NRMU actions to meet the requirements of Ministers

2:00 Introduction to Session 4

2:15 Plenary identification of action categories to be addressed by OECS-NRMU

3:00 BREAK

3:15 Break out groups to propose NRMU activities within the “broad action” categories in which NRMU participation is agreed to be useful.

4:30 Close of Day 2.

7:00 – 9:00 RECEPTION: BAY GARDENS HOTEL; TRANSPORTATION PROVIDED

Wednesday 7 February

Session 5: The Way Forward; Session Chair, George Goodwin Jr, Director – Functional Cooperation, OECS;

Objective: To reach agreement on overall timing and next steps of actions to be taken by OECS-NRMU

9:00 Overview of Session

9:15 Plenary presentation of break out group recommendations from Day 2

10:15 BREAK

10:30 Plenary discussion of OECS-NRMU activity, timing and next steps

12:30 LUNCH

1:30 Summary of OECS-NRMU activity, timing and next steps

2:00 Close of symposium.

ANNEX B

PRESENTATIONS

Address By Honourable Calixte George

MINISTER OF COMMUNICATIONS, WORKS, TRANSPORT AND PUBLIC UTILITIES, GOVERNMENT OF ST. LUCIA

Whilst the issue of Energy Management and conservation does not fall directly within the purview of my Ministry, I am happy to be given this opportunity to address you on these critical issues. Energy management has recently emerged as a priority issue for member countries of the Organization of East Caribbean States. We must presume that this is so because of the recognition that energy plays a significant role in both our economic and social development. As we seek to obtain continued economic growth in our respective island states, a prerequisite is the availability of appropriate levels of stable, reliable and cost effective energy. As we also seek to combat the effects of globalisation and the consequent increase competition, the issue of cost effectiveness and efficiency in energy generation and utilisation need to be brought into sharper focus. More specifically, we need to examine our energy inputs for electricity generation, water heating, cooling and transportation.

The energy sector in the Caribbean and more specifically the OECS is very diverse. These differences can be attributed to:

- economic conditions in each country
- energy policies of Government and financial institutions in each country
- indigenous energy sources and infrastructure.
- Levels of energy consumption
- Institutional capability for energy management

With the exception of Dominica and St. Vincent, productive energy in the OECS is supplied exclusively by fossil fuel, all of which is imported. This dependence on imported fuel makes the OECS member states increasingly vulnerable and “energy insecure” as world fuel prices increases. Energy consumers are spending an increasingly larger percentage of their income to pay for energy and there is little expectancy that energy costs will stabilize or decrease. Currently energy prices in the OECS are 200-300% higher than in North America.

The increasing urbanization of OECS countries, and growth in industry and hospitality services

continue to fuel an increased demand for electric power in homes, the tourism and transportation sectors. In St. Lucia, electricity demand has increased from an average of 16.33 Megawatts in 1995 to 21.56 Megawatts in 1999 and is projected to increase to 33.3 Megawatts by 2010. Peak power demand is approximately 30% above average. The consumption of diesel for electricity generation is expected to move from 411,457 barrels of diesel fuel in 2000 to 604,343 barrels in 2010. The consumption of diesel and gasoline in the transportation sector is also expected to rise from 82,214 barrels of diesel and 338,454 barrel of gasoline in 1999 to 148,380 barrels of diesel and 610,841 barrels of gasoline in 2010. The increased use of fuel is expected to result in significant increases in carbon emissions into the atmosphere.

Increasing consumption of fossil fuels to sustain these energy demands and the continued use of energy inefficient technologies results in increased emissions of greenhouse gases into our environment. The inter-government panel on climate change has concluded that these emissions are having devastating effects on our environment and threaten the survival of natural ecosystems that support all life forms.

The OECS needs to be concerned about the effect that our actions are having on the environment and more specifically, the effect it has on the amount of light that reaches the ocean floor; the effect on water quality; the impact on wave action along coastal areas as well as increases in air temperatures. While the greenhouse gas emissions previously alluded to are miniscule in comparison to that generated by industrial countries, we however need to be mindful of the fact that steps are being taken towards the imposition of restrictions on levels of emissions. The Kyoto Protocol which seeks to set guidelines for the allowable levels of green house gases, suggests that there will be a need to change energy production systems and methods as well as energy consumption patterns, if we are to adhere to the prescribed limits.

In recognition of the above, the OECS must appreciate that their social and economic development may be placed at risk, since OECS countries may be denied the opportunities to utilize industrial strategies and or technologies which were once used without restriction, by more industrialized and developed countries. The challenge to the OECS is to find ways to respond to the duality of economic development and environmental sustainability.

In recognition of the need, the St. Lucia government has over the last few years undertaken a number of initiatives for encouraging energy efficiency and conservation and for encouraging the use of renewable sources of energy. These initiatives includes:

- The removal of taxes and duties on renewable energy technologies
- Removal of consumption taxes on energy efficient compact fluorescent lamps.
- Setting up a Solar Photovoltaic system as a demonstration unit.
- Removal of consumption taxes on table top stoves in order to discourage wood burning in rural poor households.
- St. Lucia has entered into an agreement with a Canadian based firm to develop a wind farm capable to adding 13.5 Mega Watts to the national electricity grid.
- The signing of an agreement for continued geothermal explorations on the island.
- The development of sustainable energy plan in collaboration with the Washington Based Climate Institute. This plan sets targets for reduced consumption of energy obtained from fossil fuel and also sets target for increasing the percentage of energy obtained from renewable sources. A meeting for stakeholders to discuss the plan is scheduled for February 8th, 2001.
- The Government is also currently reviewing the policy framework under which the power sector operates.

Responding to the twin challenges of economic development and environmental sustainability may require substantial financial outlays as we seek to develop, access and adapt cleaner energy technology. We recognize though, that in many instances, what is required for sustainable energy use is a program directed at improvements in the efficiency with which energy is used in the OECS

as well as increased utilization of lower cost renewable forms of energy.

A few years ago, the Ministry of Planning and sustainable development, through the adoption of an energy conservation plan at its offices in Castries, was able to generate annual savings of \$95,000.00 in electricity costs. This was achieved not by retrofitting but by adopting some common sense practices and the prudent utilization and management of the building and the energy consuming devices housed within it.

In recognition of the dilemma which faces us as a country grouping, the OECS Ministers of the Environment instructed the OECS-NRMU to undertake initiatives aimed at improving energy conservation and energy management in the sub-region. This three day symposium which starts today, is but one of the steps to be taken in pursuit of this objective.

I wish to take the opportunity to thank the organizers the OECS-NRMU and the sponsors, the Canadian International Development Agency for hosting this workshop.

As you begin your deliberations, I implore you to consider the following:

- The workshop should pay particular attention to technology transfer methodologies, such that appropriate technologies which are developed or adapted for the sub-region will find broad acceptance amongst stakeholders.
- In developing and adapting technologies, a primary objective should be the development of new employment and business opportunities within the energy sector, for the people of the OECS.
- We think it is desirable that as far as possible, mature technologies should be chosen over experimental ones, such that the technology's reliability and cost effectiveness is assured.
- An action plan should be developed, which clearly outlines the energy issues facing the OECS and the measures to be taken to resolve them.

Finally, you need to ensure that the solutions you prescribe are acceptable to the stakeholders involved in energy generation, utilization, conservation and management. I therefore urge you to work assiduously over the next three days to achieve that end.

Sustainable Energy Plan for St Lucia

*Bishnu Tulsie, Manager, Sustainable Development Unit,
Government of St Lucia*

The key background features of St Lucia as it relates to energy use are: its relatively small physical size, low population, high demand for economic growth as well as the linkage between economic activity, particularly a rapidly growing tourism industry, and energy consumption.. In terms of energy use, the following main issues can be highlighted:

- Limited commercial energy resources.
- Shortage of trained human resources
- Dependence on petroleum imports.
- The main end user is the transport industry.
- Relatively small industrial energy consumption.
- Increasing importance of energy used for the tourism sector.
- Increasing energy demand.
- Gradual increase in the use of Renewable Energy Technologies (RETs).
- Potential for energy efficiency initiatives.
- Potential for the use of RETs – geothermal.

Currently, a Sustainable Energy Plan for St Lucia is in the process of formulation. However, in terms of other initiatives, difficulties had been experienced with a geothermal energy project. Little had resulted from the energy initiatives of the late 1970's and early 1980's, driven by the falling oil prices and loss of will to proceed. In terms of barriers, financing is an issue in the investigation of renewable energy especially against the background of limited public and government awareness and lack of energy efficient equipment on the market. The regulatory framework for providing power is also not supportive of some of the initiatives that government would desire to undertake. Another barrier is the apparent lack of interest by the utility company in energy efficiency and conservation and renewable energy projects.

The Government of St Lucia took the decision three years ago to address one of the major

problems - the absence of any policy framework and lack of direction as far as the development of the energy sector is concerned. In the late 1970's and early 1980's, St Lucia established an "energy desk", which developed into the department responsible for energy planning. This department promoted energy initiatives but in an uncoordinated manner. It was decided therefore and an announcement was made at the Fifth Conference of Parties to the UNFCCC Convention that an energy plan would be developed. The OAS and the Climate Institute have been partners in the development of this initiative. The plan has four main areas:

- The supply of power and options to diversify
- Options to reduce the demand
- Energy efficiency and conservation.
- Public education and awareness.

Some parts of the Plan are already being implemented and there is a proposal for a wind farm. All the technical issues have been resolved already and financing in place. It is therefore anticipated that once the utility company has sorted out the issues involved in purchasing power from independent producers, the former's board of directors will agree for the projects to proceed.

There are many lessons to be learnt from this project, for example, capacity displacement, and technical issues of maintenance bearing in mind that St Lucia is in the hurricane zone. This wind farm will therefore be a useful demonstration when implemented for small island states.

With regard to geothermal energy, there has been several and costly failed attempts. It has been realised that exploration must be undertaken away from the Sulphur Springs. Currently, efforts are being made to acquire all the necessary funding to continue this initiative. In terms of solar energy, demonstration projects have been identified but these are at the higher end of costs.

The users of energy must be targeted on a whole range of issues from the benefits of renewables to conservation and efficiency. There is a need to set standards and extend the public education and awareness campaigns. From a survey conducted a few years ago, it was observed that a small group

of users in St Lucia account for approximately sixty percent of the power generated. Therefore, this small group could be targeted with specific activities. Also, the mechanism to encourage the development of energy service companies is also being examined as part of the Plan.

Renewable Energy in Barbados

*Dr. Oliver Headley, Director,
Centre for Resource Management and Environmental Studies*

A monthly distribution of solar energy – the main renewable energy (RE) for the Caribbean region – was presented utilising overhead transparencies. It was indicated that there were a number of factors namely, political, economic, sociological and technological, which impinge on RE in the region. Also, there are other driving factors one of which was climate. Additionally, the amount of carbon dioxide and other greenhouse gases is increasing, resulting in the harmful effect of melting of the polar ice caps.

Barbados now has a significant number of solar water heaters both in residential and hotel properties, partly due to Government's fiscal incentives. Also solar driers have been profitably used for example, in drying onions, hay and plastics in Antigua, Barbados and Trinidad respectively. Financial support for these research

projects was obtained from international funding agencies.

The sugar factories which burn bagasse for processing and electricity, contribute approximately 15–18 % of Barbados' primary energy. The power company is interested in photovoltaic (PV) energy which is also used to power air conditioners and ice machines as well as lighting for the Harrison's Caves.

The intention is that Barbados will have 40% renewable energy capability by the year 2010 through bagasse cogeneration, wind turbine farms, waste combustion, ocean thermal energy conversion, distributed PV and the production of hydrogen from renewable energy to power fuel cell vehicles.

Renewable Energy in The Americas

*Mark Lambrides, Project Manager
Organisation of American States, Washington DC*

Renewable Energy in The Americas (REIA) is an initiative being undertaken by OAS through the Unit for Sustainable Energy and the Environment which involves a number of areas outside energy. REIA which was created by an organisation called the US Export Council for Renewable Energy was launched in 1994. After several years of work, there was a move to take REIA's initiatives into

more neutral entities, consequently the effort was made to transfer REIA to OAS.

Currently, REIA is engaged in the services aspects of renewable energy. Primarily, a considerable amount of the Project Manager's work is in policy and regulatory reform to establish a framework to allow clean energy technology to take hold. Much work has been done in providing regulatory

services between the private and public sectors, attempting to engage both types of organisations together with NGOs in making an effect on the Project.

A great deal of REIA work is undertaken in partnership with organisations to respond to the needs of member countries and in one case - the Sustainable Energy Caribbean Islands Initiative is an activity that REIA is currently engaged with the Climate Institute WINROCK International, OAS and other organisations. Some of the work that REIA is currently engaged in involves assisting St Lucia in the development of a sustainable energy plan. In the case of the Dominican Republic, REIA is involved in privatisation, looking at the impact of clean energy and providing alternatives for the incorporation of clean energy technologies; this work is being done by WINROCK International. In the case of Guatemala, REIA is working on a similar activity as in St Lucia i.e. formulating the renewable energy law. In this area of policy and regulatory reform, REIA has prepared a Renewable Energy Policy manual. The manual was written largely from the perspective of South America where privatisation of the energy sector has taken place, but much of it is applicable to other countries.

REIA is also involved in the Caribbean Renewable Energy Development Project

(CREDP) and is working together with OLADE in an effort to initiate the Caribbean Regional Energy Action Project (CEAP). REIA is working specifically with the governments of Guyana and Suriname to develop proposals for rural electrification. REIA has also been working actively in hemispheric initiatives; at the Summit of the Americas there is an Energy Chapter and REIA has been working closely with the Hemispheric Energy Initiative.

Some of the challenges that this Region faces in terms of incorporating renewable energy into its overall co-generation plan are:

- Renewable energy systems requires the bulk of its resources upfront unlike fossil fuel plants.
- Project preparation time, resource assessment, land, concessions etc.
- Global emissions are not accounted for fossil fuel plants in the overall cost accounting.

To address these challenges, governments must:

- Start setting goals for the sector
- Set clear objectives for achieving these goals
- Encourage collaboration between the private sector and public sector in meeting these objectives.
- Consider the way in which energy is costed in terms of the initial costs and long terms costs.

Small Island States Energy Initiatives

Hon. Tom Roper, Climate Institute, London, UK

The Working Group I of the IDCC reported that there is likely to be an increase of up to 5.8 degrees celsius between now and the end of this century. Also, it is likely that there will be both an increase in intensity and potentially, an increase in number of extreme weather conditions such as hurricanes and monsoons. The small islands are more vulnerable to this type of weather and the Climate Institute (CI) has been very much involved in discussions with AOSIS in particular, in looking at ways in which these member countries can be assisted in changing their energy

systems. The Small Island States can, by promoting a clean energy environment set an example for the rest of the world. Recently, Mr. Slade, Chairman of AOSIS and Ambassador of Samoa to the UN made the point that “too much of our national budget (up to 12%) is spent on fossil fuel for diesel generation of electricity”.

In terms of barriers, there is generally a lack of commitment on the part of government ministers and officials in both developed and developing countries. It was significant that about two years

ago, the Caribbean and Latin American Development Bank produced a report which stated that out of all the issues that arose from the Barbados Declaration in 1994, energy was the least important in terms of government's responses and investment as well as private investment.

It is particularly difficult for SIDS to obtain international attention and consequence assistance. In response to Mr. Slade's challenge, five organisations (Climate Institute, Counterpart International, Forum for Energy and Development, OAS and Winrock International) came together to develop a new initiative to assist countries that wish to advance themselves as sustainable energy islands. The aim of CI is to help transform SIDS' energy systems to renewables and encourage energy efficiency as well as to link energy with national development and climate change policies. The CI is also very concerned to provide a link between the Island countries and those with the financial and technical expertise to implement sustainable energy plans.

The Institute's tasks are to:

- Identify and recruit candidate countries
- Develop sustainable energy plans
- Implement the plans
- Build capacity and awareness
- Enhance publicity – local, national and international
- Replicate and expand country commitments to regional and global levels.

In developing a Sustainable Energy Plan (SEP), there is a need to:

- Develop an agreed programme protocol with government ministers
- Assemble a project team
- Inform and involve the community
- Involve local stakeholders including utilities
- Conduct resource and technology assessments to identify opportunities.
- Identify commercially viable projects and funding mechanisms.
- Obtain government agreement to the SEP.

Caribbean Energy Action Programme (CEAP)

UNDP/GEF/OLAD PROJECT: DEVELOPMENT OF ENERGY EFFICIENCY IN THE CARIBBEAN

*Mentor Poveda, Organizacion Latino-americano de Energia (OLADE)
Quito, Ecuador*

The project to develop energy efficiency in the Caribbean is under the framework of the Caribbean Energy Action Program (CEAP). This program intends to create the conditions needed to diversify energy supply so as to meet the requirements of industry and the population of all the countries, including those that are not members of OLADE, through international-institutional coordination, in order to optimise both the resources and the results of the energy projects implemented by different international and local institutions.

This energy efficiency project is aimed at dismantling barriers to energy efficiency in the

electric energy sector of 16 Caribbean countries, 9 OLADE member countries and 7 non-member countries. Taking into account the current situation of the electric power sector, this project is aimed at tapping this subsector's potential to improve efficiency in electric power distribution and use. It is felt that the project's activities should focus on the region's electric power distribution utilities, because they would be able to provide the means to gain access to the consumers of electric power service.

As for the demand-side of electricity, in the Caribbean region, the most representative sectors for electric power consumption are tourism, the residential sector, and the commercial sector. It is believed that these consumers will obtain many

benefits from their investments when participating in programs promoting the efficient use of electricity.

The project is under the responsibility of the following institutions: Latin American Energy Organization (OLADE) as the principal Executing Agency, Caribbean Energy Information System (CEIS), University of the West Indies Centre for Environment and Development (UWICED), Caribbean Electric Utility Services Corporation (CARILEC), and Organization of American States (OAS).

The overall project objective is to dismantle the barriers to application, implementation, and dissemination of least-cost energy efficiency technologies and to promote the efficient distribution and use of electrical energy in the countries of the Caribbean.

At the present time a preliminary phase is being developed, with the objective of identifying the barriers to the satisfaction of the players of the energy sector, supported by the credibility that OLADE, UWICED, OAS, CEIS and CARILEC have in the region. On the basis of the barriers that are identified, projects will be set up to incorporate activities for the elimination of the these barriers, with the consensus of the energy sector leaders of the Caribbean.

In brief, this phase has two main objectives:

- Identification of the barriers against the energy efficiency.
- Presentation of a project proposal for the elimination of the identified barriers.

The implementation of the actual phase lies with five subcommittees for the following areas of activities:

- Energy Policy and Regulation
 - Financing Alternatives
 - Commercial Enterprise Development
 - Energy Efficiency Awareness and Information Management
 - Training and Human Capacity Building
- One of the participating institutions will be in charge of each activity.

Each subcommittee has specific objectives, which should be addressed without neglecting the other areas; likewise, the analysis conducted for each objective should be done in coordination with all other different topics.

Objectives for each subcommittee

Energy Policy and Regulation: Ensure the participation of energy policymaking institutions and regulatory agencies in order to establish a legal framework that establishes an environment that is propitious for the development of efficiency.

The energy policy and regulatory component will address the current legal framework for the energy sector in each country. On a country-by-country basis, this will include a description of the organizational configuration of the sector and an overview of the current and regulatory framework. Furthermore, energy policy reform plans will be described. Accordingly, the project team will highlight the key barriers and opportunities for deployment of energy efficiency initiatives. These findings will form the basis for recommending regional and national policy and regulatory strategies that will enable a favourable environment for energy efficiency.

Financing Alternatives: Identify financing needs and sources to carry out the energy efficiency programs. The study will help to identify unmet needs, and financial solutions and operating means in the regional financial system will be proposed.

In the area of financing alternatives for energy efficiency the project will review existing institutions, mechanisms and criteria for finance among local, regional, and multinational organizations. Likewise, it will assess interest and financial requirements among private industry in the region, as well as the electric utilities. This analysis will include an assessment of the specific financing requirements for distinct phases of project development (i.e., pre-feasibility, feasibility, project finance) in sector. This will permit the analysis of deficiencies in the financial sector with regards to potential investments in

energy projects. As a result of this component, recommendations will be offered regarding the need to establish new, or strengthen existing, financing programs that will address the needs of energy efficiency projects.

Commercial Enterprise Development: Review of market opportunities to develop companies that finance efficiency programs and develop linkages between national energy sector institutions and suppliers of equipment and services in the area of energy efficiency. Creation of a regional and international cooperation base to support long-term energy activities.

A critical component of this project will evaluate and strengthen opportunities for commercial enterprise development. This area will include an evaluation of the existing private institutions throughout the region and beyond, with capability and willingness to engage in projects of this nature. It will solicit input regarding the commercial requirements for investment in the sector. The project will seek to ensure the availability of energy efficiency equipment via private companies. Likewise, it will be critical to enable the provision of specialized energy efficiency services (Such as those provided by ESCO's) throughout the region. The project will identify opportunities to establish linkages among suppliers of products and services and highlight the market potential offered by the countries of the region.

Energy Efficiency Awareness and Information Management: Development of programs that address the lack of knowledge on the part of consumers, producers, and electric power utility staff about the benefits that are associated to the implementation of energy efficiency programs. This objective can be reached by consolidating

agencies providing information on efficient equipment and technological development.

Developing sufficient support for energy efficiency programmes requires broad energy efficiency awareness and information management. In many cases there is a lack of experience regarding the potential benefits offered by energy efficiency. This is particularly salient among the leaders of local institutions, such as electric utilities, industry, commerce, and the tourism sector. It is also critical among residential customers as well as all consumers of electric services. This project will recommend strategies for building awareness among all relevant players in the sector. A key input for this analysis consists of the management of energy data and statistics, as well as commercially available technologies and services.

Training and Human Capacity Building: One of the most important barriers already identified is the perception of the managers of the electric power utility regarding excess risk in energy efficiency investments. This lack of knowledge can be partially addressed by training professionals in these power utilities. And overall, successful energy efficiency programs require well-trained professional individuals.

The training and human capacity building component will assess the existing level of expertise among the electric utility staff, government officials, and other relevant energy institutions. Successful integration of energy efficiency programs requires a well-trained professional base of technical, administrative, financial, and political individuals. To the extent that the region's energy institutions lack the appropriate capacity to initiate and/or implement such programs, this project will recommend solutions for developing such capability, via regional and national training programs.

Caribbean Renewable Energy Development Programme

*Mona Whyte, Caribbean Energy Information Service
Kingston, Jamaica*

During the past two decades, over 120 projects and studies on various aspects of renewable energy have been undertaken within the Caribbean region. According to the data available, solar energy studies account for some 35%, biomass 35%, hydropower 18%, wind 8% and geothermal projects 3% of the total.

The cost of these projects has been estimated at US\$30M. But despite these investments, except for a few isolated cases, (the use of solar energy in Barbados for example), the impact of renewable energy on the economic development of the respective countries within the region continues to be minimal. This is also against a background of widespread application of renewable energy technologies in many other countries, namely:

- Solar energy – Israel
- Photovoltaics – Netherlands, Switzerland
- Geothermal – New Zealand
- Wind energy – Germany, India, USA and Curacao

In the Caribbean, funding agencies and the respective governments generally had presumed that once resources and technologies were available, renewable energy development in the region would logically follow. Based on detailed investigations, however, it is now recognized that other non-technical and non-financial considerations have been severely impeding the implementation of sustainable renewable energy programmes. It was therefore considered important to identify, quantify and minimise those factors which militated against the development of renewable energy technologies in the Caribbean.

In October 1997, a survey of barriers to renewable energy technologies in the Caribbean was undertaken as a joint effort by:

- The University of the West Indies-Centre for Environment Development (UWICED)

- The UWI Centre for Resource Management and Environment Studies (CERMES)
- The Scientific Research Council's (SRC) Caribbean Energy Information System (CEIS)

The participating countries, included Antigua and Barbuda, Barbados, The Bahamas, Belize, British Virgin Islands, Cuba, Dominica, Guyana, Grenada, Jamaica, Montserrat, St. Kitts and Nevis, St. Vincent and the Grenadines, St. Lucia, Suriname, Trinidad and Tobago.

The Survey results pointed to a number of barriers to renewable development and stressed issues related to *policy, capacity, awareness* and *financing* as the major inhibiting factors.

As a result of the findings of the 1997 Survey, a UNDP/GEF/PDF "Block B" project on the Caribbean Renewable Energy Development (CREDP) was developed to investigate the removal of barriers to renewable energy through broad based information gathering, analyses and documentation of the natural energy resources of each Caribbean island. This was seen as a feasibility phase and a precursor to a much larger project for the Region and was expected to enhance understanding of the barriers to renewable energy development which had existed.

It was anticipated that the PDF "Block B" would be a catalyst for all RE initiatives and culminate in the presentation of Project Brief would be submitted to the Council of the Global Environment Facility (GEF) of the United Nations Development Programme (UNDP).

There were five (5) components to the feasibility phase:

- *Renewable energy policy assessment and design:* in which the policies, legislation and

regulation of participating countries were assessed to identify policy barriers to renewable energy development and the policy changes that would facilitate this development.

- *Renewable energy financing assessment design:* financing mechanisms were developed and tailored to renewable energy products and projects (e.g., lease to own or small scale credit schemes for solar, photovoltaic and water heating systems). The feasibility of a dedicated fund to finance renewable energy projects throughout the Region was also be explored.
- *Renewable Energy capacity – building programme development was the third component.* This began with a needs assessment exercise to identify priority areas for capacity building in the renewable energy field, and determined how best to build capacity in the relevant areas.
- *Renewable energy information network strengthening:* This activity began with a survey of target groups to determine the information needs to be addressed in order to reduce the barriers to renewable energy development.
- *Project design workshop and project document:* A workshop was convened of representatives of national governments and

regional organizations to combine the outputs from the four activities mentioned earlier into an integrated renewable energy development project with overall objective to:

- a. Reduce greenhouse gas emissions through the application of renewable energy technologies.
- b. Establish the foundation for a sustainable renewable energy industry with bankable investment projects instead of one shot efforts.
- c. Create a framework with which regional and national renewable energy projects are mutually supportive.
- d. Create a framework for financial strategy.

The results of the PDF “Block B”, executed by the Caribbean Energy Information System (CEIS) in close co-operation with all countries and other regional institutions, reflected an analysis of the various barriers to RE and a preliminary project proposal was formulated by an external consultant. The findings were discussed in regional workshop in Grenada in February 2000. A project was then submitted to the GEF Council for funding approval and incorporation into their work programme.

Clean Development Mechanism

*Mona Whyte, Caribbean Energy Information Service
Kingston, Jamaica*

The Clean Development Mechanism (CDM) is a proposed method by which developing countries should be able to benefit by selling carbon dioxide credits from projects that achieve greenhouse gas reduction. The overall objective of this Mechanism or Project is to examine regional capacity building in the Caribbean in order to enable the Region to develop regional capacity on

CDM and related areas. The CDM Project has an advisory group comprising CEPAT, US Centre for Clean Air Policy, Global Change Strategies Inc. (GCSI - a Canadian company), CARICOM Secretariat and CEIS. The advisory group met and discussed activities that the Region should be involved in. In March 2000, a preliminary meeting of a number of representatives from the

Region devised a work plan which was finalised by April 2000. The power sector was identified as being the key sector to start the baseline study in, followed by waste, tourism and transportation sectors. A team of regional experts was selected mainly from the utility companies namely, Trinidad and Tobago Electricity Corporation, Bahamas Electricity Corporation, the Belize Electricity Corporation and Daniel & Daniel Engineering Inc.

The goal, from a regional standpoint was to simplify and renew projects, attract investment and achieve development. Work in this area focussed mainly on plant filter capacity additions. Data were collected on the three most recent capacity additions at fuel sites in each country. Based on the analysis of the data, the study found that the Caribbean power sector met the criteria for a regional baseline approach. Also most of the power sector companies were generating electricity from oil with similar technology, with the exception of Trinidad and Tobago and Belize. Additionally, it was observed that the CDM potential in the Caribbean is estimated to generate US\$140 million in 35 emission reductions particularly during the period 2008-2012. It was also found that most of the countries had individual a per kilowatt hour initial rate for recent capacity additions that are similar to the overall regional emission rate. In addition, it was estimated that by 2012, emissions from new power additions would add some 85 million tonnes of fuel emissions. However, it was found that with 15% more of these additions from clean air technology, the Region could obtain 1.5

million tonnes of fuel reduction. Nevertheless, in developing new CDM projects, the current statistics need to be updated to reflect more recent estimates. The study also recommended that some additional bench-mark studies be examined.

According to preliminary investigations, the use of waste products is seen as having great potential, particularly in industry and even more so with the Land Fill Gas Capture Project. The possibility of defining and setting a single benchmark that could apply for the Region as a whole was advised. Thus, any project having a value higher than the regional bench mark would be able to claim internal emission studies for the saving. A small group met at a regional workshop in St Lucia and focussed primarily on the issue of technology for landfill gas which was identified as an area to examine. The group found that it was feasible to pursue a baseline exercise in that area, but subject to more detailed examination, in particularly, the volume and production of waste.

The approach for the tourism sector needs to be further explored and would involve other institutions such as CTO, CHA and CAST.

With regard to the transportation sector, it was found that opportunities for fuel substitution were limited. While the vehicle fuel efficiency project can be pursued, most of the opportunities were country or fuel specific and would require significant institutional capacity building.

Caribbean Planning For Adaptation For Global Climate Change

*Neville Trotz, CPACC Project Manager
Bridgetown Barbados*

Caribbean Planning For Adaptation For Global Climate Change (CPACC) has its origin in the SIDS conference in Barbados, 1994 where the governments asked the OAS to assist the Region

in defining a project dealing with climate change adaptation. The OAS with their own resources, assisted the Region through a series of national consultations to define a project which eventually was funded by the GEF. The project duration is

four years, commencing 1997 and terminating in December, 2001.

The overall objective of the Project is to support Caribbean countries in preparing to cope with the adverse effects of global climate change, particularly sea-level rise in coastal areas, through vulnerability assessment, adaptation, planning and related capacity building.

In terms of organisation of the Project, the GEF is the funding mechanism in which the World Bank is the implementing agency and the OAS, the executing agency. At the regional level, the project is implemented through a small unit-Regional Project Implementation Unit (RPIU) under UWICED which is based in Barbados. However, the most important unit in terms of implementation is the National Implementation Coordinating Units.

The Project has four regional components namely:

- Design and establishment of sea level/climate monitoring network.
- Establishment of data bases and information systems.
- Inventory of coastal resources and use.
- Formulation of a policy framework for integrated adaptation planning and management.

The pilot components are being undertaken in specific countries. Coral reef monitoring is in Jamaica, the Bahamas and Belize; the coastal vulnerability and risk assessment in Grenada, Barbados and Guyana; the economic evaluation of coastal marine resources in Trinidad and Tobago, Dominica and St Lucia; the formulation of economic/regulatory proposals in Antigua and Barbuda and St Kitts and Nevis; and the green house gas inventory in St Vincent and the Grenadines.

Specific achievements so far include:

- Establishment of a sea level and climate monitoring systems.
- Improved access and availability of data.
- Increased appreciation of climate change issues at the policy-making level.

- Addressing country needs for expanded vulnerability assessment.
- Establishment of coral reef monitoring protocols.
- Creation of a network for regional harmonisation.

There are some other CPACC initiatives which are external to the Project; these include working with:

- UWI on a Master of Science programme in Climate Change.
- UWI, UKCIP, and the Hadley Centre development of regional "down-scaled" climate change models.
- CEIS on the Clean Development Mechanism.
- CIDA on risk management for the private sector.
- Petrotrin on private sector and media workshops.
- Petrotrin on the establishment of a small internal Climate Institute.

A mid-term review of CPACC conducted by the World Bank found that the Project had:

- Made good progress towards achievement of expected technical and institutional outputs.
- Contributed to increased awareness of CARICOM countries and their participation in global fora on climate change.
- Provided critical inputs to improved knowledge on mitigation and adaptation in the region.
- Played a major role in support of regional consultation process of UNFCCC through the institutional capacity building aspect of the project.

CPACC is due to terminate in December 2001. However, Ministers have requested that a suitable institutional mechanism be established to ensure the region's continuing capacity to address climate change issues. As a result, consultations have been held with institutions and it has been proposed that RPIU should evolve into a regional climate change centre.

Approval was given to a proposal that was considered by the Council of Ministers of Trade

and Economic Development (COTED) and sent to the CARICOM Heads of Government meeting in St Vincent. It was also endorsed by the wider forum of Ministers of Environment of Latin American and the Caribbean. Recently, a further endorsement was made by a joint meeting of CARICOM Ministers of Finance and Planning and Environment held in Belize.

Currently, legal instruments are being examined for the establishment a Climate Change Centre. The proposed governance would be as follows:

- Overall political and policy direction by CARICOM Council of Ministers.
- A Board of Directors responsible for technical oversight and financing of the Centre.
- A technical secretariat to be the implementing arm of the centre.

Financial support of the Centre is being designed through the implementation of: projects under the Multilateral Environmental Agreement especially UNFCCC; climate change programmes supported by bilateral donors such as CIDA and DFID; and the establishment of a trust fund.

The Centre will be the hub for climate change issues in the region and its main functions will be:

- To collect, analyse and disseminate climate change observation data.

- Facilitate Caribbean position to UNFCCC.
- Realise regional and national equitable benefits under the Kyoto Protocol financial mechanism.
- Assist in public awareness and education campaigns.
- Develop special programmes.
- Promote information exchange with SIDS and Latin America.
- Develop regional research programmes.
- Execute Implementing Adaptation to Climate Variability and Change in the Caribbean - IMPACC

With the CPACC Project due to end in December 2001, the process of preparing a PDF Block B grant proposal to the GEF for funds is being finalised. This will allow the Region once more to consult nationally and regionally on the definition of a follow up project - IMPACC. The Climate Change Centre will be the executing agency for IMPACC which is expected to commence in the second quarter of 2002.

At the same time, discussions are being held with CIDA's Climate Change Development Fund on a project proposal similar to that in the South Pacific. It is anticipated that the Climate Change Centre will also be the executing agency for that project.

Policy Framework For Enhanced Efficiency Of Energy Use In The OECS States

*Mr. David Lea
Lewis Engineering Inc*

*Martin Adelaar
MARBEK Resource Consultants Ltd.*

Lewis Engineering Inc. was contracted by the OECS-NRMU in July 2000 to develop a study to determine policy options and opportunities for improved energy efficiency and energy conservation the OECS sub-region. A draft report was prepared and the major observations were that energy (electricity, motive and stationary engine and other fuel) in most OECS countries is

supplied almost exclusively by fossil fuel, 100 percent of which must be imported. Energy consumers are spending an increasingly large percentage of their disposable income to pay for energy, without any assurance from governments or utilities that programmes or policies will be implemented to stabilised or reduce energy costs.

The investigation confirmed that the OECS economies can generate significant economics benefit through investments in energy efficiency and renewable energy. It is estimated that there is an economic potential for energy use reduction in the range of 10% to 20%. In effect, these opportunities represent the potential for the OECS to embark on a sustainable energy initiative that would result in significant environment and social benefits as well. As in the case of other countries, there is the opportunity to co-ordinate or integrate this initiative with efforts to foster cleaner production in industry and commerce. To summarise, the key observations emerging from the investigation are as follows:

1. There is currently no structured energy management plan or policy in OECS.
2. There is general agreement among stakeholders of the need and importance of energy management.
3. Energy costs in the OECS are, on average, 200 - 300 percent higher than the North America average.
4. There is general lack of awareness of energy management among energy consumers, building designers, and facility managers.
5. The potential for renewable energy utilising wind and solar systems is excellent.

In the view of the findings of the study, it is recommended that the OECS establish a multi-year sustainable energy program commitment. For the purposes of discussion, this program will have the following vision statement:

“improvement of the efficiency with which energy is used in the OECS economies, as well as increased utilisation of renewable forms of energy program. The program is a key component of the OECS commitment to Cleaner Production. The program provides the resources and structure to effectively meet practical and realisable objectives. This is a long commitment to ensure effective capacity building and sustainability.”

The OECS Sustainable Energy Program will be implemented consistent with the following principles:

Long - term Commitment: Resources should be committed for a minimum 5 years. The experience in other developing country jurisdictions indicates quite clearly that a commitment of this degree is necessary to build capacity among trade allies, institutional staff and establish other critical program elements.

Practical Solutions: the program should be oriented to providing practical solutions in meeting reasonable goals. A key advance of this approach is that a small number of large energy users can be singled out for a near-term focus of activities with high potential for significant and short-term results.

Addressing Key Barriers: The program will be designed to address the key barriers impeding accelerated market penetration of energy management actions.

Measurement, Monitoring, Reporting: The program should be supported by an ongoing measurement and monitoring system which is critical to reporting on results relative to stated objectives.

On the assumption that this will be initially a five year program, it is recommended that the roll-out presented below be considered for development and implementation of the program. The proposed work breakdown structure for the program involves three components. All three components will be implemented in parallel, but the first two components will receive the most focus in the short term:

Program Component # 1: Build and Maintain the Program

The objective of this component is to establish the foundation for program success through development of the program approach, identify, administration and professional capacity. This work component will focus on developing and maintaining the program operation. To be effective the program will have to achieve a professional capacity to deliver its services and develop an administrative regime to track and manage its budget. The work activities would include:

1. *Complete program design*: This would require extensive consultations with key stakeholders in the OECS as well as externally.
2. *Establish funding and structure*: There is a strong potential for the OECS to seek support from various international development banks and bilateral agencies for some co-funding of the program. It will also be important to secure some funding from each OECS state in order to demonstrate commitment to the program prior to applying for funding.
3. *Establish and maintain Program allies*: this will involve establishing a regular forum and structure for communication among key allies such as utilities, government agencies, and industry associations (e.g. Caribbean Association for Sustainable Tourism).
4. *Develop internal capacity*: this will involve the design and implementation of a training curriculum for program staff. To expedite this action and reduce the costs, existing curriculum from other jurisdictions should be examined for their potential adaptability for use in the OECS.
5. *Develop policy, legislative and regulatory proposal*: this will create the basis for sustainability of the initiative.
6. *Operate to initiate program*: the program will assemble, negotiate and market projects designed to generate certified greenhouse gas emission reduction credits.

Program Component # 2: Education Awareness And Capacity Building

The objective of Program Component # 2 would be to: increase awareness among large and small energy users and energy management (EM) trade allies of the economic and environmental benefits of energy management opportunities; demonstrate technology, method, and techniques necessary to implement successful EM projects; build capacity among the trade allies to deliver quality and reliable EM services and products; and reduce risk, in the short term, associated with energy management investments. This Program Component would comprise a range of activities designed to educate the market on energy management opportunities and create awareness as the basis for generating demand for EM products and services.

Some of the key program activities would be:
 Demonstrations (general and for large users):
 Education and Awareness activities for the public
 Trade Ally Capacity Building

Program Component #3: Transformation Of The Institutional Environment

The objective of this Program Component is to help develop the institutional environment and capacity necessary to catalyse and foster a sustainable energy management market. This Program Component relates to the capacity among OECS institutions to introduce fundamental policy, legislative and other changes necessary to address several crosscutting barriers to EM. The recommended activities include:

1. *Foster studies necessary to assess and offer solutions to key institutional barriers*; this would include the transportation sector, which traditionally has been the most difficult of the sectors in which to foster EM. This should also include establishment of a research chair in energy efficient design that can assist with the training of future leaders of energy management projects and programmes in the OECS.
2. *Mandate testing of energy using products*. The focus would be on those products that represent the bulk of energy use and emissions (lighting, air-conditioning, motors, boilers, domestic appliances, etc.). This testing would become the prelude to an eventual energy performance labelling initiative.
3. *Revise building codes*; this would include minimum standards for energy performance in new construction.
4. *Impose a regular regime under which electric utilities would effect energy management*; Electric utilities would be required, and have financial leeway, to develop and implement EM programs.
5. *Remove or reduce import duties on EM products*; These products would include energy efficient products (such as high efficiency appliances, lamps etc.) and renewable energy technologies such as DHW solar unit, photovoltaic systems, and wind turbines.

The Changing Electric Utility Business

*Basil Sutherland - Executive Director, CARILEC
St Lucia*

Past developments in more industrialised countries eventually trickle down to our part of the world, albeit inappropriately at times. Over the next several years, therefore, it is expected that utilities will come under increasing pressure from governments, independent regulators and consumers to become more efficient, and by passing on these savings, eventually lower the real prices of electricity to consumers. Furthermore, global competition for locations to develop industrial enterprises and tourism projects demands that because electricity has become such an important input into the production of these services, electricity tariffs should be as low as possible.

There is already clamouring for competition in the telecommunications sectors in several countries in the Caribbean, and it is therefore only a matter of time before governments and regulators in this part of the world start clinging to the notion that the electric utility business must also be restructured and opened up to competition. In fact this is beginning to happen in Jamaica, Trinidad and the Dominican Republic, where several IPPs are already in operation.

However, caution must be exercised as some of these trends could well result in diseconomies of scale and scope in the operations of small utilities that make up the majority of countries in the Caribbean region. If not handled with caution, the increased transaction costs involved in managing competition in the various areas of the industry could well result in higher prices to the consumer – exactly the opposite result to that intended by the policy makers.

Also, faced with the prospect of changing technology, for although in the Caribbean retail wheeling may not be around the corner, distributed and dispersed generation are becoming economically viable as aero-derivative combustion turbines, micro turbines, fuel cells and stand alone wind turbines used in hybrid and photovoltaic systems will allow many customers,

particularly large ones, to move away from the “hard wired” utility grid. If the reliability of these new technologies is proven over the next decade or so, many long established large customers could eventually move off-grid, relying on the utility transmission and distribution infrastructure only for infrequent backup.

Although the type of competition which exists in the United Kingdom and the United States does not ever seem like a practical proposition in Caribbean countries, the utilities will nevertheless need to begin preparing for other types of competition, and begin to ask the question as to what could happen if they are not fully prepared for the transition to competition. They will also need, for instance, to ask questions such as – what will happen if their customers decide in collaboration with other customers with similar load profiles and interests to build their own generating facilities, using the grid merely for backup?

In dealing effectively with these potential challenges, the utilities and governments will need to tread very carefully, and as a group, the utilities will need to develop an effective lobby with policymakers and regulators to have a voice in and guide the development of regulatory policy to avoid costly mistakes which will be to the disadvantage of customers in the long run. Regulation makes all – regulators and utilities alike – engage in a lot of non-value added work. The overriding question which should be asked is whether a task adds value to the customer. If everything to meet a value-added standard, there would be a lot less undertaken in our utility companies and in regulatory agencies as well. Costs to the consumer would be reduced and resources would be channelled to what is most important to the customer – the services purchased. The California debacle provides a lot of insights as to what can go wrong if regulation or deregulation is inappropriately applied. If utilities fail, everyone loses – consumers, investors and government. The very special

position enjoyed by a utility company calls for special treatment in the development of a regulatory environment. It is suggested that, *inter alia*, the following considerations be accommodated when articulating regulatory policy:

- The utility should be regarded as a public/private partnership rather than a purely private enterprise even if it is privately owned.
- To satisfy efficiency requirements, rewards to the utility should as far as possible be incentive-based.
- The regulator's approach to economic regulation should not be as a defender of consumers' interests but rather as an arbitrator of the interests of consumers, investors and government.

One of the greatest challenges that utilities will face in a new competitive environment is the lack of market certainty. At this time, the electric utility industry does not really know what customers will expect or want in a competitive environment. Much will depend, however, on the regulatory environment in which they will be required to operate and the extent and types of competition that are eventually demanded. The extent to which individual utilities are able to identify customer needs and meet them first, will determine their future viability, assuming market forces are allowed to work.

Other important factors that are likely to affect electric utilities relate to changes in other markets. The advent of long-distance competition in the United States telecommunications industry has allowed a gas utility to enter the long-distance telephone business by stringing fibre optic cable through its gas pipelines. This example clearly illustrates that given a sufficient market, a firm that has a customer base and cheap access to right-of-way can successfully enter the telecommunications business. Also, by diversifying into energy management, housing and environmental services, utilities can expect to add value to customer relationships in numerous ways.

Given that the future of telecommunications appears to be in wireless communications, it is quite likely that the state-of-the art electric utility which already has a large customer base and large investments in meter reading, billing and payment collection systems could very shortly be entering the telecommunications and data communications services market (probably encouraged by regulators anxious to encourage telecommunications competition).

Over the next several years, because a utility's customers will become its most valuable asset, learning about their specific needs will be a strong competitive advantage for any utility company.

It is therefore likely that in the future, a utility company will not be a utility as we have come to know it, but rather, it will be something more – a general services or energy service company, offering air conditioning services, telecommunications services and cable television services, energy auditing and energy management services etc. We may even see electric utility companies forming strategic alliances with petroleum product retail companies to deliver customers' power and energy needs directly on site, without making use of the grid systems. This could be done using on-site fuel cells powered by gaseous fuels supplied by the petroleum product retail company.

In an environment of deregulation and competition, what is important is the product delivered, the quality of the product, the timeliness of product delivery and the other customer needs met. And in all of this, utilities will need to realize that a competitive environment demands more concentration on what customers want than does a monopoly environment. Customer service must therefore be among the highest priorities for the successful utility of the future.

The future of electric utilities will also be intimately bound up with the utilisation of e-commerce to reach out to customers to add value to the services offered, both now and in the future. In several of our countries, however, efforts in this direction will be hampered if inadequate telecommunications facilities are not upgraded. It will therefore be vitally important to increase the bandwidth of existing tele-communications

services – and perhaps there will be a role for the electric utilities to play in this.

The customer has little concern for how the electricity distribution network operates or what load growth means to service reliability and investment requirements. It must be continually remembered that the customer demands access to lower price opportunities and, in a competitive environment, will seek both from competitors if necessary. As the local energy supply company, utilities must provide these choices and emphasise and deliver the type of customer service that will beget customer satisfaction.

The effects of increased competition, reduced technology cycles, and changing expectations of workers and consumers have caused organisations to face rapid and unprecedented change. This in turn has created a “*change challenge*”, which organisations wishing to remain competitive must face. This challenge occurs because the operational and strategic norms that led to successes in the past are not necessarily appropriate any longer. But past success has led to complacency and organizations may have become too dependent on past norms for future survival to be assured.

In principle, this challenge can be met by changing the mindset of employees at all levels in the organisation. The established command and control mindset– must be replaced with new thinking embracing speed, simplicity and customer service, and must be supported by a self-confident, empowered work force.

Given that global environmental and national economic imperatives are dictating that more efficient use be made of imported fuel, it will become necessary for the electric utilities, acting in their own long-term self interest, and also as responsible corporate citizens, to lend support to the OECS Ministers of the Environment to achieve the objectives of policy development for energy conservation and management.

However, the Ministers for their part should ensure, that the specific policies for energy conservation and management are developed within the context of the overall energy policies and strategies for each of the countries. As far as they relate to the operation of electric utilities, such overall energy policies should, *inter alia*, make sure that:

- Appropriate regulatory oversight is urgently put in place.
- Electricity rate setting mechanisms reflect the true cost of power.
- The utility periodically prepares indicative least cost expansion plans for publication which have reliability targets that are set at economically optimum levels.
- The principles under which utility companies purchase electricity from co-generators are clearly established; and,
- Bidding for any power generation projects procured in the private sector are carried out in an structured and transparent way.

As a complement to the above policies, utilities can assist in achieving the objectives of energy conservation policies in several ways, the most important of which are the implementation of measures to:

- Reduce technical losses to economically optimum levels
- Improve the fuel efficiency of its prime movers
- Set up demand side management programmes
- Give support to the development of renewable energy production where such projects are economically feasible.
- Improve public access to information on the utilities activities.

Energy Use, Conservation and Efficiency in the Hotel Sector

Francene Clouden - Caribbean Alliance For Sustainable Tourism

Caribbean Alliance for Sustainable Tourism (CAST) is a fully owned subsidiary of the Caribbean Hotel Association. Its mission is to enhance the region's hotel and tourism operators by providing high quality education and training related to sustainable tourism.

CAST's main interest in energy relates to the exceedingly high cost of energy which make it the second highest operational cost for a hotel. A study undertaken in Jamaica approximately three years ago, indicated that the main user of electrical energy in a typical hotel is air conditioning, the second largest being lighting. The International Hotel Environment Initiative (IHEI) has a set of "benchmarks" which are based on kilowatt hours per metre squared (kwh/m²). From the Study, it was found that for hotels under seventy-five rooms i.e. approximately 60% of the hotel base in the Caribbean, the most efficient hotels used 12 kwh/m² per guest night. For those hotels larger than 75 rooms, the most efficient ones used 16 kwh/m² per guest night. Therefore these are used as guidelines to assist hotels in monitoring their energy consumption. However, it was generally found that this is usually above 20 kwh/m², regardless of the size of the hotel or type of facility.

The study found that the reason for this high consumption was that generally in hotels there is a lot of inefficient use of energy. This was due mainly to a lack of awareness on the part of both management and staff, as well as a lack of knowledge and skills in energy management, especially for the smaller hotels. It was also found that there were no fiscal incentives to purchase energy efficient equipment or technologies.

It has been found that frontline staff must be adequately trained for management policies to have a major impact on energy conservation. Implementing very simple and low cost operational changes has been found to a significant effect on energy conservation.

CAST has developed air conditioning maintenance training and general awareness training, as well as various publication, the main on being the environmental tool kit for Caribbean hotels. A recent and popular publication entitled "Environmental Technology for Caribbean Hotels" was done in collaboration with ECLAC. Energy audits is another popular service area that CAST has offered over the past two years. Funds have been received from USAID to undertake research papers on environmental aspects, one of which focuses on the energy consumption in hotels in the Dominican Republic. There is a recently developed "Rent an Engineer" programme for small hotels. Green certification is another area which has resulted from energy audits and this is considered a marketing tool by the hotels. CAST is working with USAID to establish a green fund particularly for small hotels which could be accessed through local commercial banks.

Some issues that CAST advocates as it relates to efficient use of energy are:

- Incentives for using energy efficient technology.
- Attractive rates of interest to purchase efficient technology.
- Development of standards and building codes

Energy Use, Conservation and Efficiency at Wyndham Morgan Bay Resort, St Lucia

Carl Hunter - Director of Engineering

About two years ago, an audit and gap analysis were undertaken. These analyses indicated that there were a number of opportunities to make minor changes which would achieve energy savings.

In terms of drinking water, there were no flow restrictions on the water supplied to all guests' rooms. Thus, aerated taps were installed which greatly reduced the amount of water used in the guests' rooms. Another opportunity which was found, was the installation of water dams in toilets such that the flushing pressure was maintained but the amount of water used for flushing was significantly reduced. It was observed that the entire 240 guest rooms only accounted for approximately 30% of the total volume of water used in the Hotel, with the balance being used for operations. Therefore, the staff were trained to conserve water. Also a "green team" was developed within the Hotel and ideas sought on how best to reduce the amount of water used. With regards to waste water, a significant amount of work was done on effluents and currently, a trickle down filtration system and ultra violet to cure the effluent is being utilised. It is anticipated that by the end of 2001, a fully closed system is used so that all the water after use by guests and operational will be purified with the waste water and eventually used for irrigation.

With respect to boilers providing the hot water needs of the kitchen, the flat roof presented an ideal opportunity to install some ITS solar system. This resulted in the ability to switch off one boiler completely and hence generate significant savings. With regard to electrical energy, many of the compressors of the refrigeration unit in the kitchen were over ten years old. Therefore, more highly efficient ones were bought and changed from a two-speed pump system to one of greater capacity, allowing it to be shut down for six hours every night. The low efficiency 15,000 BTU air conditioning units were replaced with 12,000

BTU units obtaining the same high cooling environment in every room.

In terms of hot water heating, the situation existed whereby every two guest rooms used 2.5 kilowatt water heaters, resulting in extremely high electricity usage. Therefore, throughout 2001, a conversion to solar thermal is being made and this will generate savings of up to 20% of the Hotel's entire electricity bill.

Solid waste production has been dramatically reduced from approximately four tonnes to one tonne daily. This was largely due to collaborative work between the Purchasing Managers and suppliers. As a result, individually packaged food was replaced by bulk purchasing which was decanted into smaller serving containers to serve guests. In addition, the hotel went into partnership with a pig farmer; the waste generated from the kitchen was separated such that the farmer used the paper to heat the swill. Additionally, glass waste is used by a concrete company.

Wyndham Hotel also works with the local community by opening up the hotel to demonstrate all those environmental initiatives that are taking place. However, there is still much more to be achieved. The target from the audit was to achieve an overall 35% reduction in energy cost; currently, only 25% has been obtained.

WINROCK International

Mary Grady

WINROCK is a non-profit organisation engaged in development work. There are five areas of work, namely, agriculture, natural resources management, leadership and human development, clean energy and a volunteer programme. For the Clean Energy group, there are offices in ten

countries around the world which are called Renewable Energy Project Support Offices. The focus is on policy guidance, capacity building, technical assistance and finance. There is an office in the Dominican Republic and a lot of work is being done with hotels to develop clean energy projects as well as working with the government on policy issues.

UNDP Global Environment Facility

Jose Blanco

There are three implementing agencies for GEF; the UNDP supports projects that build human and institutional capacities needed for developing policies utilising clean technologies, and managing resources crucial to preserving the global environment. Part of the basic criteria for a GEF support is that GEF does not finance national sustainable development. UNDP-GEF projects are typically complementary to a national or regional sustainable development initiative.

There are three operational programmes relevant to energy management:

- Operational programme No. 5 is to remove barriers to energy conservation and energy efficiency.
- Operational programme No. 6 is the promotion of adoption of renewable energy by removing barriers and reducing implementation costs.
- Operational programme No.7 is to reduce the long term costs of green house gas emitting energy technologies.

Currently, the UNDP-GEF is supporting two regional initiatives in the Caribbean region on climate change.

Initiatives of UN Economic Commission For Latin America and the Caribbean

Donatus St. Aimee

The bulk of Economic Commission For Latin America and the Caribbean (ECLAC) work is advocacy, bringing people together to examine issues which are not dissimilar from today's discussions. In 1994, there was an initiative involving all the stakeholders in the energy sector where the spring-board for similar meetings like this was established. ECLAC remains convinced that issue of renewable energy and energy management are not only critical to the Region, but even more so for the utility sector. The utility companies have to play a central role in terms of the promotion of these energy issues. In 1997, ECLAC co-sponsored with CARICOM a meeting in Canada which examined a regional position for the World Solar Summit and some projects were submitted to the latter's meeting held in Harare. The attendance of organisations here at this Symposium is an indication that these initiatives of 1994 and 1997 are beginning to bear fruit. The challenge therefore is to extend and rationalise these resources to take implementable decisions within the context of global energy issues. The need is to work with the utility companies in conjunction with the policy makers in the region to begin to address the issue of not only energy conservation and energy management but also energy security. Energy security is critical, particularly in the light of the effects of natural disasters and limited capacity in renewable energy.

Initiatives on Energy Efficiency and Energy Management Initiatives by the Electric Utility Companies

St Lucia Electricity Services Ltd.

Mr. C. Edmunds - Systems Planning Engineer,

The St Lucia Electricity Services Ltd. (LUCELEC) is about to develop its new long terms plan for the period 2001- 2016. One of the main aspects of the Plan is the addition of renewable energy technologies for all generation sizes once they are economically feasible. Although in recent times, there has been much consumer dissatisfaction about the rising cost of electricity, it is our view, that currently there is little to replace diesel in terms of cost. However, LUCELEC is exploring all alternatives that could be used. LUCELEC is very concerned about meeting the consumer demand at a reasonable price. One aspect that will be examined very closely is demand-side management especially for larger customers. The other issue is that there have been few initiatives in renewable energy, largely due to the relatively high cost involved. Additionally, one of LUCELEC's major activities over the years was rural electrification as evidenced by a 98% penetration rate. The transmission system in the north of the Island has to be expanded to deal with the growth of hotels there. On the other hand, in the south there is a large amount of capacity, both in terms of sub-stations and lines and it is not anticipated that further development in the south will significantly alter existing capacity, contrary to the north. The issue of rural-urban drift is therefore a major concern. A shift in development projects towards the south could assist in reducing the amount of capital required for meeting capacity in the north.

St Vincent Electricity Services Ltd.

Earl Regisford - Manager Engineering,

St Vincent Electricity Services Ltd (VINLEC) utilises a mix of hydro and diesel in the generation of electricity. The contribution to overall generation from hydro is approximately 30%. Over the years, VINLEC has been keeping abreast of developments in the area of renewable

energy. A study was undertaken in the Year 2000, examining the generation expansion requirement for the next 15 years and further development in hydro, geothermal, solar and the new technology in --- were taken into consideration. Analyses indicated that the least cost option is to continue to invest in diesel generation. With regard to further investment in hydro, it was found that the economic cut off point - where it would become feasible to make further investment in hydro is with the price of oil being at around US\$32 per barrel. Also the high capital intensive requirements for investment in hydro is a critical factor which must be considered particularly in terms of the cost to the consumer. VINLEC is still interested and given the current volatile situation with respect to oil markets, the intention is to undertake a feasibility study in hydro during the next few months. Currently, VINLEC is involved in a study with the EDF and a French company examining the feasibility of wind energy generation on two of the Grenadine Islands. However, factors such as capacity, quality and reliability of supply are critical.

The diesel operations are continuously being reviewed particularly with respect to emissions standards. Recently, a "green" engine was installed meeting the requirements for emissions similar to that of the USA.

Dominica Electricity Services Ltd.

Mr. Robert Watson - Chief Commercial Officer

In addition to the supply side, and examining the generation mix, Dominica Electricity Services Ltd. (DOMLEC) has started looking at the demand side. DOMLEC has just started an active demand-side management programme with a small target and immediate results to the customer. For the small customers, DOMLEC has started an education campaign in the form of series of energy efficiency tips aimed at saving the Consumer money. For the larger customers, a series of energy audits will be offered.

Grenada

A representative from Grenada Electricity Services Ltd (GRENLEC) was absent. However, a participant from that Island informed the Symposium that GRENLEC should be soon commissioning its new power plant which was funded by a European bank and must therefore meet their standards. GRENLEC was looking into installing wind turbines on the island of Carriacou which would significantly reduce the high cost of diesel there from the mainland - Grenada.

St Kitts and Nevis

*St. Kitts: Mr. Rabindranuath Singh, Manager,
St. Kitts Electricity Department*

Two new generators were just recently installed. These provide the bulk of the electricity for the

whole Island and are compliant with respect to emissions. It should be noted however, that this electricity company is fully government owned.

Antigua and Barbuda Public Utility Authority

Mr Linden Francis

Electricity Generation Manager

The Antigua and Barbuda Public Utility Authority is fully owned by government and has not yet embarked on any formal renewable energy project per se. The Authority is very much involved with the government, in its enabling activities for communication under the UNFCCC. There is a steering committee which is preparing a document

ANNEX C

FINDINGS OF WORKGROUPS

FINDINGS OF WORKGROUPS

Delegates to the workshop participated in workgroups to develop recommendations on:

1. Public awareness requirements associated with energy management and efficiency.
2. Policy options in support of enhanced energy management and efficiency.
3. Private sector perspectives on requirements for achieving enhanced energy management and efficiency.
4. The role of OECS Member States in regional initiatives related to energy management.
5. Institutional restructuring necessary to achieve enhanced energy management and efficiency.
6. Capacity development needs associated with enhanced energy management and efficiency.

The findings of the workgroups are presented below.

1. Public Awareness Requirements

The workgroup made the following recommendations:

- (i) The OECS Ministers of Environment should emphasize energy as a priority of the Region at international conferences.
- (ii) Caribbean Energy Information Service (CEIS) should distribute their energy bulletin to the OECS Secretariat for distribution to their focal points and discussion with environment ministers of OECS Member States. A hot link from the OECS website to the CEIS and other regional energy websites should be established.
- (iii) Energy management programs should incorporate a permanent sustainable process for on-going public awareness. OECS should ensure that national institutions are sufficiently strengthened to allow this process.
- (iv) Energy efficiency messages addressed to the transportation sector should be developed.
- (v) The Steering Committees of regional energy management programmes will develop public awareness messages associated with those programmes and these will be disseminated to the OECS and OECS Member States.

2. Policy Options

The workgroup identified that the following broad requirements as a frame to guide enhanced energy management policy in the region:

- (i) Identification of common policy objectives at the regional level.
- (ii) Linkage of policy options to development goals of OECS Member States.
- (iii) Need for buy-in at political level to achieve endorsement of policies.
- (iv) Creation of a common vision to guide direction.
- (v) Creation of adequate legislative capacity to support policy direction.
- (vi) Creation of criteria to guide policy development process.

The work group identified the following broad barriers to development and implementation of enhanced energy management policy in the region:

- (i) Lack of vision and goals.
- (ii) Lack of public awareness, education and resulting poor attitudes to energy management.
- (iii) Lack of adequate legislative enabling environment for enhanced energy management.
- (iv) Inadequate technology transfer mechanisms.

(v) Inadequate financing

In order to address these barriers the following actions are recommended:

Barrier # 1 – Vision/Goals

National goals/objectives are required for the energy sector. These goals and objectives should reflect short and longer term priorities and should be consistent with national development strategies.

Required action: Development of OECS Member State-level energy management plans.

OECS role: Coordinate/facilitate development of plans, monitor their implementation and effectiveness.

Desired outcome: Clear energy management objectives at the national level.

Barrier # 2 – Awareness Education/Attitude.

Increased public awareness at all levels, supported with up to date information, is required in order to inform and influence decision-making.

Required actions: Development and dissemination of information on equipment energy use; development and dissemination of baseline energy use profiles and appropriate indicators of efficient energy use; design of regional template for public awareness implementation programme delivered by and with stakeholders;

OECS role: Develop initial information and public awareness regional template.

Desired outcome: Demand for political support for enhanced energy management and efficiency.

Barrier # 3 – Lack of Legislative Enabling Environment

A legislative environment that is conducive to enhanced energy management and efficiency is required.

Required actions: Review/assessment and, as necessary, development of legal frameworks to foster sustainable energy use consistent with international standards.

OECS role: Access international experts and financing to conduct reviews and assessments; develop harmonised legal template that can be adopted at Member State level to develop required legal framework; monitor development/implementation of required frameworks by Member States.

Desired outcomes: National enabling legislation; achievement of specific energy management targets; establishment of regulatory body for power producers; establishment of energy use performance standards and incorporation of energy use into building codes; creation of "Green Power" (renewable energy) targets.

Barrier # 4 – Lack of Appropriate Technical Transfer Mechanisms

Institutional capacity is required that supports technical applications for energy sustainability.

Required actions: Technology benchmarking and analysis of technology application gaps; development of Government energy procurement guidelines; model technology transfer contract -training; preventative maintenance training; creation and support of local sustainable energy businesses.

OECS actions: Prepare technology benchmarking and gap analysis; develop harmonised government energy procurement guidelines that can be adopted at Member State level; develop/implement training with local stakeholders.

Desired outcome: Technical applications appropriate to socio-cultural and development imperative.

Barrier # 5 – Access To Affordable Financing for Renewable Energy Project Financing

Creation of an environment conducive to lending in support of energy projects is required that is characterised by reasonable transaction costs and attractiveness to multi-lateral donors and investors.

Required actions: Hold regional workshop with financiers with exchange among bankers; compile potential investment portfolio; create tax incentives for consumer, supplier and financier investments in enhanced energy management.

OECS action: Hold workshop; compile portfolio of potential projects; identify potential tax incentives.

Desired outcome: Increased number of bankable projects.

3. Private Sector Perspectives

The workgroup identified the following important to attracting private sector participation in enhanced energy management and efficiency initiatives:

- (i) Develop awareness campaigns that focus on energy conservation opportunities and potential cost savings.
- (ii) Create energy service companies (ESCOs) that can deliver energy savings on a commercially attractive basis.
- (iii) Build capacity and technical assistance capability related to energy auditing, contracting for energy efficient equipment and maximising energy efficiency in the transportation sector.
- (iv) Develop/adopt technical standards in support of energy efficiency and label equipment and vehicles accordingly.
- (v) Reduce Import Tariffs on renewable energy and energy efficient technology
- (vi) Undertake pilot projects in the public transportation sector to demonstrate the application of fuel cells; natural gas; electric vehicles; and ethanol
- (vii) Develop public/private partnerships in energy efficiency to demonstrate government leadership by example.
- (viii) Create financial/fiscal incentives associated with enhanced energy management and energy efficiency with focus on dollar savings; special lines of credit with preferential terms and tax credits
- (ix) Create economic incentives associated with enhanced energy management and efficiency, with a focus on local manufacturing benefits and jobs.,
- (x) Revise CUBIC to include consideration for energy efficiency and renewable energy, particularly with respect to building/facility siting, design and architecture.
- (xi) Create marketing incentives in support of renewable energy, including design and implementation of a "Green Energy Certification" initiative.

4. Role Of OECS Member States In Regional Energy Management Initiatives

There should be OECS institutional representation in regional energy projects at the project conception and formulation stages. The OECS Secretariat should:

- (i) Be included on project steering/advisory committees of regional projects. OECS representation on the steering committee of both the CEAP and CREDP initiatives was recommended and representatives of those projects indicated that space on each committee had been allocated; the OECS Secretariat and CEIS energy focal points would determine a mechanism to ensure OECS representation on both steering committees. Also, the OECS Secretariat should also ensure that the concerns of overseas protectorates are raised at steering committee meetings.
- (ii) Facilitate common positions among member states, by preparing briefs and position papers as appropriate.
- (iii) Provide a linkage to the political decision makers on planned and on-going initiatives.
- (iv) Co-ordinate and facilitate OECS Members States participation and follow-up action in regional and international initiatives; including CSD-9; Summit of the Americas, etc.

The OECS should promote alternatives not only in terms of grid connectivity but to also to increased efficiency in other enterprises e.g. agriculture.

5. Institutional Restructuring Of The Energy Sector

The workgroup identified institutional responsibilities in the design of enhanced energy management and efficiency based on achieving the following objectives:

- (i) Secure supply of energy
- (ii) Use of renewable sources of energy
- (iii) Application of demand side management and conservation
- (iv) Selection of energy generation mix on the basis of least life cycle cost
- (v) Ensuring environmental sustainability

For the purpose of the workgroup, the following institutional actors were identified:

- (i) Energy suppliers
- (ii) Energy regulators
- (iii) Government
- (iv) Consumers
- (v) Non governmental organisations
- (vi) Equipment and services suppliers

With respect to the matrix shown as Figure 1, the OECS should undertake:

- (i) A gap analysis to identify at the national level the extent to which the desired institutional roles are currently filled.
- (ii) Development of a policy frame to achieve gap closure and concretise already established desirable relationship, utilizing lessons learned from the Region and elsewhere, as appropriate.
- (iii) Consider creation of an OECS Regional Energy Regulator.

6. Capacity Building

The Workgroup identified that:

(i) *Existing Capacities in OECS Relate to:*

- Energy – related utility companies (including CARILEC), Community colleges, post secondary and vocational institutions. The region has “capacities” in terms of renewable energy resources which can be utilised, example geothermal, wind.

(ii) *Capacities Elsewhere in the Caribbean Include*

- UWI/ CERMES and UWICED, University of Guyana, St. Georges University, Caribbean Solar Energy Society, CEIS, UWI Centre for Energy Studies, University of Surinam, various Universities in Cuba, OLADE, CAST and CARILEC.

Priorities, Actions and Responsibilities

The workgroup identified the following priorities and actions necessary to implement the priorities, with responsibility for implementing the various actions as identified by the bracketed entity:

<u>Priority:</u>	Development of educational and schools curricula
<u>Actions:</u>	Determine required products of the education system (government / private). Determine content of curricula in relation to target levels (government / private). Infuse content into curricular (government).
<u>Priority:</u>	Technology transfer mechanisms
<u>Actions:</u>	Identify where efforts need to be placed (Government/Private). Determine then develop/adapt appropriate technology (government/private/NGO). Create mechanisms for transfer (government/NGO's) Apply/market appropriate technologies (Government / private/ NGO's/CBOs).
<u>Priority:</u>	Establishment of units responsible for energy efficiency in appropriate Ministries, including Bureaux of Standards
<u>Actions:</u>	Increase involvement of technically competent individuals in decision making (Government). Create/establish responsible units (Government).
<u>Priority:</u>	Develop “Research and Development” and training capacity, including creation of centres of excellence in tertiary institutions.
<u>Actions:</u>	Develop (government/private) and promulgate (government) appropriate legislation to encourage innovation, research and enterprise in energy management technology; this would include the creation of relevant incentives. Train utility and Ministry staff in assessing and evaluating renewable energy technology (Government/ private/ training institutes).
<u>Priority:</u>	Expand capacity for OECS – based energy “consultants”.
<u>Actions:</u>	Identify existing expertise (Government/Private/NGO's/CBO's/Training Institutes). Create database of expertise (OECS) Establish linkage with regional and other database (OECS/Government/training institutes). Improve OECS' skills in energy management by training, attachments, TCMS and other means (Government/-private/ NGO's/ CBO's/training institutes).

ANNEX D

LIST OF PARTICIPANTS

**REGIONAL SYMPOSIUM ON ENERGY MANAGEMENT AND
ENERGY EFFICIENCY**

**CARIBBEES HOTEL
CASTRIES, ST. LUCIA**

5 - 7 FEBRUARY 2001

LIST OF PARTICIPANTS

ANGUILLA

1. Mr. Lesile Vernon Richardson
Director of Environment
Chief Minister's Office
P.O. Box 60
The Valley
Anguilla

Tel: 264-497-2518

Fax: 264-497-3389

E:mail: richardsonl@anguillanet.com

2. Mr. Fritz Smith
Director of Construction, Housing,
Estates & Facilities Management
Ministry of Infrastructure
The Valley
Anguilla

Tel: 264-497-2651

Fax: 264-497-3651

E:mail: smithf@anguillanet.com

ANTIGUA

3. Mr. Lyndon E.S. Francis
Antigua Public Utilities Authority
P.O. Box 416
St. John's
Antigua

Tel: 268-480-7460

Fax: 268-480-7455

E:mail: francisle@candw.ag

4. Mr. Daryll S. Matthew
Ministry of Tourism & Environment
Environment Division
Queen Elizabeth Highway
St. John's, Antigua

Tel: 268-462-6265

Fax: 268-462-6265

E:mail: mintourenv@yahoo.com

BVI

5. Mr. Jerry Samuel
Development Economist
Development Planning Unit
Ministry of Finance
Central Administration Complex
Road Town
Tortola
BVI

Tel: 284-494-3701 ext 2175

Fax: 284-494-3947

E:mail: jdsamuel@surfbvi.com

DOMINICA

6. Mr. Webster W. Shillingford
 Assistant Secretary
 Ministry of Communications and
 Works
 Government Headquarters
 Kennedy Ave
 Roseau
 Dominica
- Tel: 767-448-2401
 Fax: 767-448-4807

7. Mr. Livingston A. Cassell
 Permanent Secretary (Ag)
 Ministry of Agriculture and the
 Environment
 Government Headquarters
 Roseau
 Dominica
- Tel: 767-448-2401/6113
 Fax: 767-448-7999
 E-mail: pscassell@cwdom.dm

8. Mr. Robert Watson
 Chief Commercial Officer
 Dominica Electricity Services
 (DOMLEC)
 P.O. Box 1593
 Roseau
 Dominica
- Tel: 767-448-2680
 Fax: 767-448-5397
 E-mail: ecodomlec@cwdom.dm

GRENADA

9. Mr. John Auguste
 Senior Energy Officer
 Ministry of Works, Communications
 and Public Utilities
 Botanical Gardens
 St. George's
 Grenada
- Tel: 473-440-2410
 Fax: 473-440-4122
 E-mail: psworks@caribsurf.com

10. Mr. Patrick A. Moore
 Chief Environmental Health Officer
 Ministry of Health and Environment
 Ministerial Complex
 Tanteen
 St. George's
 Grenada
- Tel: 473-440-2846
 Fax: 473-440-4127
 E-mail: healthgrenada@caribsurf.com

MONTserrat

11. Mr. Gerard A.L. Gray
 Director of Agriculture
 Ministry of Agriculture, Lands
 Housing & Environment
 P.O. Box 272
 Brades
 Montserrat
- Tel: 664-491-2075
 Fax: 664-491-9275
 E-mail: graygal@candw.ag

ST. Kitts & Nevis

12. Mr. Rabindranauth Singh
 Chief Engineer & Manager
 St. Kitts Electricity Department
 Ministry of Communications, Works
 and Public Utilities
 Central Street
 P.O. Box 35
 Basseterre
 St. Kitts
- Tel: 869-465-0277
 Fax: 869-466-7308
 E-mail: rpsingh-2000@yahoo.com

13. Mr. Bernard Welsh
 Assistant Engineer
 St. Kitts Electricity Department
 Central Street
 Basseterre, St. Kitts
- Tel: 869-465-2013/2000
 Fax: 869-466-7308

NEVIS

14. Mr. Edgar Wiggins
General Manager
Nevis Electricity Company Ltd
Main Street,
Charlestown, Nevis

Tel: 869-469-7245
Fax: 869-465-7249
E-mail: nevlec@caribsurf.com

ST. LUCIA

15. Mr. Bishnu Tulsie
Chief Sustainable Development and
Environment Officer
Ministry of Planning, Development,
Environment and Housing
Graham Louisy Administrative
Building
Waterfront
Castries, St. Lucia

Tel: 758-451-8746
Fax: 758-451-6958
Email: bisnu-sde@candw.lc

16. Mr. Crispin E. d'Auvergne
Ministry of Planning, Development and
Environment and Housing
Graham Louisy Admin. Building
Waterfront
Castries, St. Lucia

Tel: 758-468-4461
Fax: 758-451-6958
E-mail: crispin-sde@candw.lc

17. Ms. Judith Ephraim
Professional Cadet
Ministry of Planning, Development,
Environment and Housing
Graham Louisy Admin. Building
Waterfront
Castries, St. Lucia

Tel: 758-468-4461
Fax: 758-451-6958
E-mail: Judith-sde@candw.lc

18. Mr. Cornelius Edmund
System Planning Engineer
St. Lucia Electricity Services Ltd
(LUCELEC)
P.O. Box 230
Castries
St. Lucia

Tel: 758-453-6508
Fax: 758-453-6520
E-mail: xched@candw.lc
lucelec@candw.lc

ST. VINCENT & THE GRENADINES

19. Mr. Alston Stoddard
Coordinator, Science & Technology
Ministry of Trade, Industry and
Consumer Affairs
Kingstown
St. Vincent and the Grenadines

Tel: 784-456-1223
Fax: 784-457-2880
E-mail: mtrade@caribsurf.com

20. Mr. Lennox Ian Morris
Senior Planning Engineer
St. Vincent Electricity Services Ltd
P.O. Box 856
Kingstown
St. Vincent and the Grenadines

Tel: 784-456-1701
Fax: 784-456-4681
E-mail: lmorris@vinlec.com

21. Mr. Earl Regisford
Manager, Engineering
St. Vincent Electricity Services Ltd.
P.O. Box 836
Kingstown
St. Vincent and the Grenadines

Tel: 784-456-1701
Fax: 784-456-2436/4681
E-mail: eregisford@vinlec.com

AGENCIES

22. Mr. Cornelius Fevrier
Programme Manager
CARICOM Secretariat
P.O. Box 10827
Bank of Guyana Building
Georgetown, Guyana
- Tel: 011-592-225-8044
Fax: 011-592-7341
E-mail: cfevrier@caricom.org

CARILEC

23. Mr. Basil Sutherland
Executive Director
Caribbean Electric Utility Services
Corporation (CARILEC)
P.O. Box 2056
Castries, St. Lucia
- Tel: 758-452-0140
Fax: 758-452-0142
E-mail: bsutherland@carilec.org

CEHI

24. Mr. Herold Gopaul
Information Services Director
Caribbean Environmental Health
Institute (CEHI)
P.O. Box 1111
The Morne
Castries, St. Lucia
- Tel: 758-452-2501
Fax: 758-453-2721
E-mail: cehi@candw.lc

CHA/CAST

25. Ms. Francine Clouden
Technical Services Manager
1000 Ponre de Leon 5th floor
San Juan, PR00907
Puerto Rico
- Tel: 787-725-9139
Fax: 787-725-9166
E-mail: fclouden@caribbeanhotels.org

CPACC

26. Dr. Ulric Trotz
Project Manager
Caribbean Program for Adaptation to
Climate Change (CPACC)
Lazaretto Complex
Black Rock
St. Michael, Barbados
- Tel: 246-417-4581
Fax: 246-417-0461
E-mail: trotzcpacc@sunbeach.net

UNDP/GEF

27. Mr. Jose Blanco
UNDP/GEF (Regional Bureau for
Latin America and the Caribbean
San Jose
Costa Rica
- Tel: 573-2050
Fax:
E-mail: bioman@racsa.co.cr

OLADE

28. Mr. Mentor Poveda
Latin American Energy Organisation
(OLADE)
Ave. M. Sucrey Fernandez Salvador
Quito
Ecuador-South America
- Tel: 593-2-598122/293529
Fax: 593-2-531691
E-mail: mpoveda@ecnet.ec

CLIMATE INSTITUTE

29. Mr. Nasir Ajmal Khattak
Program Officer
Climate Institute
333½ Pennsylvania Ave. S.E.
Washington, D.C.
USA
- Tel: 202.547-0104
Fax: 202-547-0111
E-mail: nkhattak@climate.org

AGENCIES Cont.

30. Hon. Tom Roper
Project Leader/B
Climate Institute
42 Sovereign House
19-23 Fitzroy St.
London

Tel: 44-207-580-5629
Fax: 44-207-580-8568
E:mail: tom.roper@btinternet.com

SLHTA

31. Mr. Carl Hooper
Director of Engineering
Wyndham Resorts
c/o Wyndham Morgan Bay Resort
Box 2167
Gros-Islet, St. Lucia

Tel: 758-450-2511
Fax: 758-450-3024
E:mail: essentialtech@candw.lc

32. Mr. Rodinald Soomer
Executive Vice President
St. Lucia Hotel and Tourism Assoc.
P.O. Box 545
American Drywall Building
Vide Boutielle
Castries, St. Lucia

Tel: 758-452-5978/453-1811
Fax: 758-452-7967
E:mail: slhta@candw.lc

LEWIS ENGINEERING INC

33. Mr. Wayne Lewis
President
Lewis Engineering Inc
Suite 810, CIBC Building
1809 Barrington St.
Halifax, Nova Scotia
Canada, B3J3K8

Tel: 902-423-8188
Fax: 902-423-8030
E:mail: waynelewis@lewiseng.ns.ca

34. Mr. David Lea
Consultant
Lewis Engineering Inc
Suite 810
1809 Barrington ST.
Halifax, Nova Scotia
Canada

Tel: 902-423-8788
Fax: 902-423-8030
E:mail: davidlea@lewiseng.ns.ca

35. Mr. Martin Adelaar
500-1355 Bank St.,
Ottawa
Canada K1H8K7

Tel: 613-523-0784
Fax: 613-523-0717
E:mail: adelaar@marbek.ca

OAS

36. Mr. Mark Lambrides
REIA Technical Secretariat
Organisation of American States
1889 F. Street NW
Washington D.C.
USA

Tel: 202-458-6261
Fax: 202-458-3560
E:mail: mlambrides@oas.org

CERMES

37. Prof. Oliver Headley
Director
Centre for Resource Management
& Environmental Studies (CERMES)
University of the West Indies
P.O. Box 64
Bridgetown
Barbados

Tel: 246-417-4339
Fax: 246-417-4204
E:mail: ohedley@hotmail.com

UN-ECLAC

38. Mr. Donatus St. Aimee
Economic Affairs Officer
United Nation Economic
Community for LA and Caribbean
Third Floor
CHIC Building
63 Park Street
P.O. Box 113
Port of Spain
Trinidad & Tobago

Tel: 868-623-5595

Fax: 868-623-8485

E:mail: dstaimee@eclacpos.org

CEIS

39. Mrs. Mona Whyte
Project Manager
Caribbean Energy Information System
Hope Gardens
P.O. Box 350
Kingston 6
Jamaica

Tel: 876-927-1779

Fax: 876-977-1740

E:mail: mwhyte@uwimon.edu.jm

OMEGA ELECTRONIC

40. Mr. Canisius Marcellin
Manager
Omega Electronic Beausejour
Gros-Islet
P.O. Box 4090
Bocage
Castries
St. Lucia

Tel/Fax: 758-450-9391

OECS

41. Mr. Wayne Sandiford
Senior Economic Affairs Officer
Central Secretariat
P.O. Box 179
The Morne
Castries, St. Lucia
- Tel: 758-452-2537/8
Fax: 758-453-1628
E:mail:

42. Dr. Vasantha Chase
Head of Unit
OECS-NRMU
P.O. Box 1383
The Morne
Castries
St. Lucia

Tel: 758-453-6208/21847/18930

Fax: 758-452-2194

E:mail: oeccsr@candw.lc

43. Mrs. Valerie Isaac-St. Hill
Programme Officer
OECS-NRMU
P.O. Box 1383
The Morne
Castries
St. Lucia

Tel: 758-453-6208/21847/18930

Fax: 758-452-2194

E:mail: oeccsr@candw.lc

44. Mr. Keith E. Nichols
Programme Officer
OECS-NRMU
P.O. Box 1383
The Morne
Castries
St. Lucia

Tel: 758-453-6208/21847/18930

Fax: 758-452-2194

E:mail: oeccsr@candw.lc

45. Mr. Peter A. Murray
Programme Officer
OECS-NRMU
P.O. Box 1383
The Morne
Castries
St. Lucia

Tel: 758-453-6208/21847/18930
Fax: 758-452-2194
E:mail: oeccnr@candw.lc

46. Mr. Doug Hickman
Field Manager
ENCAPD Project
OECS-NRMU
P.O. Box 1383
The Morne
Castries
St. Lucia

Tel: 758-453-6208/21847/18930
Fax: 758-452-2194
E:mail: oeccnr@candw.lc

47. Ms. Hermina Edward
OECS-NRMU
P.O. Box 1383
The Morne
Castries
St. Lucia

Tel: 758-453-6208/21847/18930
Fax: 758-452-2194
E:mail: oeccnr@candw.lc
