

CLEAN ENERGY ISLANDS

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Global Sustainable Energy Islands Initiative
(GSEII)

Partnership Event – SIDS - Mauritius, Jan 10-14, 2005



Overview

- Climate Change and SIDS
- Global Sustainable Energy Islands Initiative (GSEII)
- Success Stories from SIDS
- Role of the Utilities
- Energy Efficiency
- Endangered Islands Campaign

Climate Change and Small Island States

- Small Island States produce only a tiny fraction of global greenhouse gas emissions
- Island States are among the most vulnerable to Climate Change
- Most island nations are dependent on high-cost fossil fuels and very expensive electricity
- A significant number of people don't have access to electricity
- Island States are especially suited to utilize modern renewable energy and energy efficiency technologies due to their economic and geographical conditions

Impacts

- Sea level rise – beach erosion, coastal inundation, coral damage
- Increase in extreme weather events
- Higher temperatures – 2 to 4 degrees
- Loss of habitat and species
- Economic, social and health impacts

An Example For The World

“The Small Island States can by promoting a clean energy environment set an example for the rest of the world. Too much of our national budgets (up to 12%) are spent on fossil fuels for diesel generation of electricity. This is a drain on our national budgets and does not work towards a solution to the problems of climate change. When the tanker comes in the foreign reserves go out.

Far too little attention has been given - amongst the Small Island States leadership and by the donor countries - to the development of alternative means of energy”

T. Neroni Slade

Chairman of Alliance of Small Island States (AOSIS)

Ambassador of Samoa to the UN

Tuvalu Speaks

“Our islands’ peoples, irrespective of occupation - in government, the private sector, in the villages or in service providers like the utilities – are going to be the first to suffer. My country, Tuvalu, barely six feet above sea level, is already seeing the impacts of extreme weather events including foreshore erosion, unusual flooding and the increased intrusion of seawater into freshwater lenses. Our people are already discussing resettlement and refugee status.

The urgency to switch to efficient, affordable and renewable energy sources is real. Every contribution counts. Our interest in moving to a less carbon intensive world is not just self-serving. The consequences of global warming that our nations encounter first will be felt later by others. “

Ambassador Enele S. Sopoaga of Tuvalu
Vice Chairman, AOSIS

A Voice from the Caribbean

The Government of Dominica has determined that dependence on foreign energy resources cannot be in our long-term national interest. First of all, the recent decline in our export income generation does not provide us with the ability to import energy resources on a long-term basis. Second, in view of our country's natural endowment of renewable energy resources, we have come to the realization that the only future for Dominica in the energy arena is development of renewable energy. This approach is fully consistent with our national goal to harness all our natural resources for the economic transformation of our country.

The Hon. Pierre Charles, Prime Minister of Dominica
– Johannesburg Summit, 2002

Global Sustainable Energy Islands Initiative (GSEII) - Objectives

- to help those Small Island Developing States (SIDS) seeking to become sustainable energy nations;
- to establish donor support and private sector investment for sustainable energy initiatives
- to increase awareness of the potential and advantages of renewable energy utilization and energy efficiency in the SIDS and provide practical examples
- to demonstrate that SIDS can set examples for the bigger and more polluting countries by cutting their greenhouse gas emissions;

PARTNER ORGANIZATIONS

- Climate Institute
- United Nations Industrial Development Organization
- The Organization of American States
- Energy & Security Group
- Counterpart International
- Winrock International
- International Network for Sustainable Energy

- Multilateral Funding Base:
 - ◆ Rockefeller Brothers Fund
 - ◆ UN Foundation
 - ◆ US Agency for International Development
 - ◆ Renewable Energy and Energy Efficiency Partnership

COMPONENTS OF GSEII

- Identification of Candidate Countries
- Development of Sustainable Energy Plans
- Implementation of Sustainable Energy Action Plans
- Capacity Building and Awareness
- International Outreach



1. Identification of Candidate Countries

- Criteria to include:
 - ◆ Government commitment,
 - ◆ the existence of a renewable energy base,
 - ◆ and local industry and utility capability

2. Development of Sustainable Energy Plans

- Setting up of a National Working Group on Sustainable Energy
- Targets for energy transformation
- Resource Assessments
- Policy Options and Reforms
- Identification of Renewable Energy and Energy Efficiency Project Opportunities
- Removal of barriers for RE and EE commercialization
- Approval by the Government and stakeholders

3. Implementation of Sustainable Energy Plans

- Facilitating private sector investments
- Ensuring access to financing (World Bank, Global Environment Facility, International Finance Corporation, Regional Development Banks, Renewable Energy and Efficiency Fund, etc.)
- Project development and business development assistance
- Facilitate financing through sale of carbon offsets such as the Clean Development Mechanism

4. Capacity Building and Awareness Activities

- Training Seminars, Workshops
- Community Education and Awareness Campaigns
- Sharing of Experiences with other regions and islands

5. International Outreach

- Publicize the leadership of the small island states to utilize sustainable energy technologies combat climate change
- Build support for the island states sustainable energy activities
- Influence the international negotiations on Climate Change

GSEII - CARIBBEAN

- **ST. LUCIA - SUSTAINABLE ENERGY DEMONSTRATION COUNTRY PROJECT**
 - Prime Minister Kenny Anthony Announced St. Lucia's intention in November 2000 at the Hague Climate Change Conference
 - Sustainable Energy Plan (SEP) developed, which was approved by the Cabinet in July 2001. SEP calls for 35% reductions in GHG Emissions by 2010 in the Power Sector
 - Implementation Plan Developed and is in Progress
 - Next Major Steps:
 - Broader National Energy Policy - Reforms
 - Capacity Building and Awareness Programs - Solar Water Heaters Initiative
 - Geothermal and Wind Farm Projects

GSEII - CARIBBEAN

- **GRENADA** - The Green Island State
 - Government of Grenada Requested GSEII Assistance in Developing a Sustainable Energy Plan (SEP)
 - Team of Local Stakeholders Formulated and Draft Sustainable Energy Plan has been developed

Hurricane Ivan hit Grenada in August 2004

- **Efforts are being made to incorporate elements of Sustainable Energy Plan in the Reconstruction efforts**
- **Pilot projects of Solar PV systems for clinics and hurricane shelters are proposed**
- **10,000 Energy Efficient bulbs will be installed as part of energy efficient reconstruction**

GSEII - CARIBBEAN

- **DOMINICA - The Nature Island**
 - Government of Dominica Requests GSEII Assistance in Developing a Sustainable Energy Plan (SEP)
 - Sustainable Energy Plan finalized in 2004
 - Next Major Steps:
 - ☞ **Sustainable Energy Plan sent for Cabinet Approval**
 - ☞ **Geo-Caraibes Project underway**
 - ☞ **Energy Efficiency in the Transmission lines - UNIDO**

Identified Potential Projects in St. Lucia, Grenada & Dominica

St. Lucia	<ul style="list-style-type: none"> • LUCELEC Point de Caille 4.25 MW Wind Farm • St. Lucia Cooperatives League and Credit Unions Solar Hot Water Heating Financing Program • St. Lucia Ciceron Landfill Gas to Energy Project • Poultry Litter to Energy Project • Sulphur Springs Geothermal Project • Energy Efficient Lighting Project • Energy Audits & Training Project for Hotel Industry • Energy Efficiency and Renewables Awareness Campaign
Grenada	<ul style="list-style-type: none"> • 225 kW Wind Turbine on Carriacou island • Grenada Nutmeg Shell to Energy Project • Grenada Cooperatives League and Credit Unions Solar Hot Water Heating Financing Program • Energy Efficient Lighting Project • PV system for Grenada Chocolate Company energy supply
Dominica	<ul style="list-style-type: none"> • Large Scale Geothermal Project Pre-feasibility Development • Energy and Power Losses Reduction in DOMLEC Distribution System • Dominica Cooperatives League and Credit Unions Solar Hot Water Heating Financing Program • Pilot Phase for a potential 4MW Wind Farm • DOMLEC Micro Hydro Project • Energy Efficiency Lighting Project

Republic of Marshall Islands – National Energy Policy Vision

- “Renewable energy is the most appropriate long-term alternative sources to replace imported petroleum products for electricity production in the Marshall Islands; solar photovoltaic (PV) is already technically and financially attractive for relatively small remote island demands when properly planned, operated and maintained.”
 - Solar is especially viable due to the high cost of imported petroleum from distant markets.

Energy And Development

More than 1.6 Billion people don't have access to electricity – 70% of Pacific Island Residents Energy use is linked to both economic and social development

Electricity is vital to the delivery of social services such as health, education, water & sanitation

It enables job creation and frees time for productive pursuits

Small Utility Characteristics

- Geographic Isolation (high cost transport, tenuous supply line)
- Few generation sources (low diversity)
- High Energy Costs (imported equipment, spares, fuel & oil, external expertise)
- Variable loads (daily, seasonal, growth)
- Variable Power Quality and Reliability

Pacific Utilities

PPA Members	Max Demand (MW)
Guam Power Authority	278.5
Papua New Guinea Electricity Commission	133.6
Fiji Electricity Authority	91.5
New Caledonia, Enercal	79.1
Saipan	71.5
Électricité de Tahiti	71.3
New Caledonia, EEEDC	65.5
American Samoa Power Authority	23.0
Samoa, EPC-	15.3
Solomon Islands Electricity Authority	10.7
Marshalls Energy Company	10.1
Vanuatu SDED	8.7
Tonga, TEPB	7.6
Pohnpei Utility Corporation	6.2
Chuuk, PUC	3.4
Cook Islands, TAU	3.0
Yap, PSC	2.7
Kiribati, PUB	2.4
Wallis & Futuna, EEEDWEF	2.0
Kosrae, KAU	1.8
Marshall Is, KAJUR	1.5
Samoa, POWEROK	1.0
Niue, NPC	0.6
Tuvalu, TEC	0.6
Total	905.6 (MW)

Thursday Island Wind System



Ergon Energy, Torres Str

- 2 x 225kW Vestas Turbines
- Peak demand about 3.7MW on diesel system
- low penetration (modern PS controls already installed)
- fuel savings were 440,000 litres of diesel per year with both turbines
- No major outages, performance has exceeded expectations, longer service intervals and diesel life

French Leadership - Guadeloupe

- Renewables supply 25% of all energy needs and costs less:
 - ◆ Geothermal – from the volcano
 - ◆ Small hydropower – the mountain foothills
 - ◆ Wind turbines – designed to resist hurricanes
 - ◆ PV Solar for rural power supply – 2000 units
 - ◆ Solar thermal for water heaters – 15000 units
 - ◆ Bagasse as a sugar industry byproduct
 - ◆ Ethanol from molasses
 - ◆ Energy from waste

- 350,000 energy efficient lamps installed in 44,000 households

Off-Grid Water Pumping



Remote Well Development

- improved water quality, reduced labour fetching water

Storage and Treatment

- storage allows gravity feed, central treat (filter, UV, chem, desalination)

Reticulation

- Level 1 - central collection
- Level 2 - distributed collection
- Level 3 - piped to user

Off-Grid Hospital/ Institution/ Clinic



Mains-style Power

- AC power via Inverter
- Battery Storage
- Backup Generator

Refrigeration/ Freezers

- Separate System for critical loads (vaccine storage)

Emergency Lighting

- Portable Solar Lantern

More Renewable Energy Examples

- Barbados
 - ◆ More than 30,000 Solar Hot Water Heater Systems – payback for individuals: 2.5 years
- Curacao
 - ◆ A 3 MW wind farm to reduce high fuel costs
- Galapagos
 - ◆ A wind farm to replace 50% of diesel power and reduce the risk of disastrous oil spills
- Cape Verde
 - ◆ 20% reduction in diesel use through energy efficiency measures and wind turbines

Some Leaders in Efficiency

- St. Lucia – Energy Week
- The Maldives
 - ◆ Villa Shopping and Trading
 - ◆ Coco Palm Resort
- Barbados
 - ◆ Casuarina Beach

St. Lucia Energy Week

- December 6th to 10th – Theme: A Vision for St. Lucia's Energy Future
 - ◆ Minister of Energy's address on Television and Radio
 - ◆ Energy Supplement Placed In The Local Newspapers
 - ◆ Energy Exhibition and School Project Competition – 50 participants, 10 projects
 - ◆ Seminar On National And Regional Energy Initiatives
- Energy Efficient Lighting Project - Climate Care, UK & Ministry of Planning & Environment, St. Lucia
 - ◆ Voluntary scheme – **outside Kyoto**
 - ◆ Climate Care paid for 6,000 lamps
 - ◆ Each lamp saves import of half a barrel of oil

Be Efficient – Cut Your Costs

Energy is normally 4 to 5 percent of hotel expenses

- Steps to reduce costs include:
 - ◆ Better original design, retrofits, energy audits
 - ◆ Staff training and involvement
 - ◆ Key cards for lighting, cooling and heating
 - ◆ Lighting upgrades, efficient lamps and sensors
 - ◆ Efficient room cooling and heating equipment, thermostats, fridges
 - ◆ Solar hot water heaters
 - ◆ More efficient kitchen and laundry equipment and maintenance
 - ◆ Waste water reuse
 - ◆ Waste reduction
 - ◆ Water efficient taps, shower heads, toilets
 - ◆ Involvement of guests in efficiency measures

Funding Mechanisms

- Kyoto – Clean Development Mechanism
- World Bank Prototype Carbon Fund
- Global Environment Facility/UNDP
- World Bank / Regional Development Banks / International Finance Corporation
- Donor Programs – European Union, US AID, AUSAID
- Private Sector Investments

CDM Project Types

- FUEL CONSUMPTION
 - ◆ Community or Large Scale PV
 - ◆ Wind Power
 - ◆ Hydro
 - ◆ Waste to Energy
 - ◆ Biomass

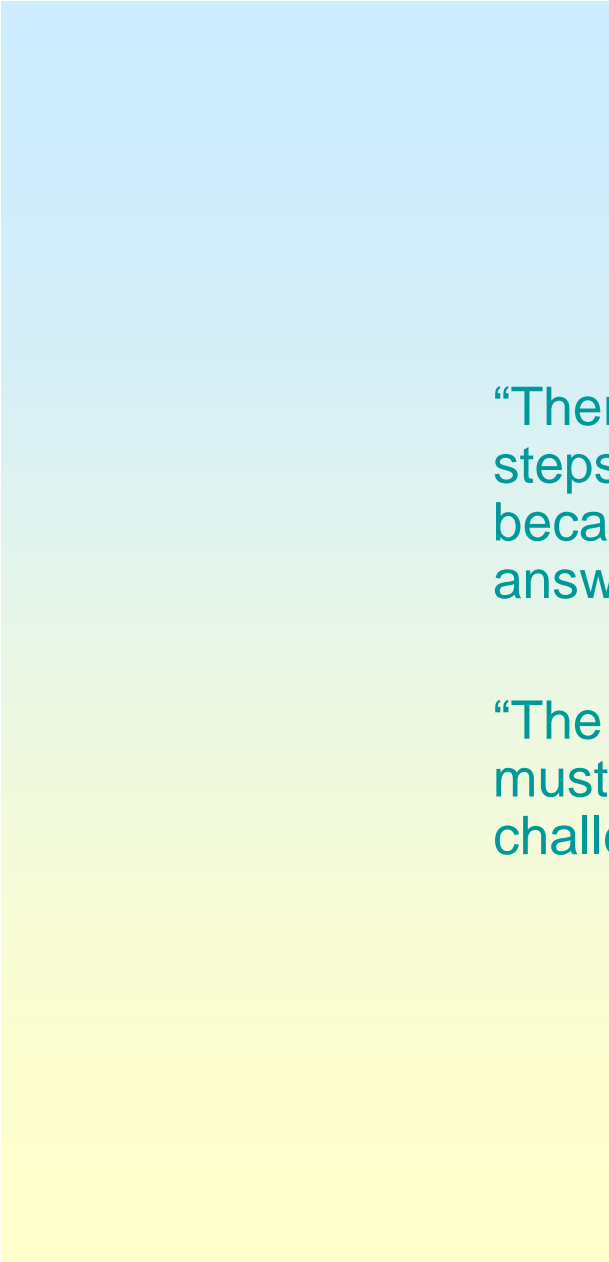
- ENERGY EFFICIENCY
 - ◆ Improve Generation and Distribution
 - ◆ High Efficiency Lighting and Appliances
 - ◆ Solar Water Heaters
 - ◆ Improved Building

- TRANSPORTATION
 - ◆ Vehicle Efficiency
 - ◆ Fuel Substitution
 - ◆ Transit Systems



“Eco-efficiency is more than just a convenient rallying cry for companies concerned about sustainable development and the environment. It’s actually one of the signs that a company is well managed.”

Frank Popoff
Chairman, Dow Chemical Company



“There are no easy answers. No silver bullets. Just steps on a journey which we should take together because we all have a vital interest in finding the answers.”

“The cultures of politics, of science and of enterprise must work together if we are to match and master the challenges we all face.”

Sir John Browne, CEO, BP

Endangered Islands Campaign

- to enhance the capacity of island nations to respond to climate change by changing their energy systems toward renewable and indigenous energy sources,
- to develop anticipatory coastal and emergency preparedness measures to lessen damage to people, structures, and fragile ecosystems, and improve building codes and land use planning
- to implement specific climate adaptation measures in three Caribbean nations
- to build international support by various awareness and outreach activities to build support for mitigation and adaptation measures undertaken by participating SIDS
- to establish partnerships and twinning relationships between SIDS and coastal cities in the US and Canada as well as small islands in the developed world

Conclusion

Sustainable energy is not only an environmental necessity...

It makes economic and social sense