

# Unique World-wide Overview of Renewable Energy on Small Islands

## Introduction

The last few years has shown an increased focus on renewable energy on islands. A few examples: in 1997, Samsøe was announced the official Danish Renewable Energy Island (REI); in 1999, two global conferences on Renewable Energy Islands took place respectively in the islands of Tenerife (Spain) and Aeroe (Denmark); in 1999, the Global Secretariat on Renewable Energy Islands was established at FED and in 2000, four Small Island Developing States (SIDS) - St. Lucia, Dominica, Vanuatu and Tuvalu - announced their intentions of becoming renewable energy nations.

However, among almost islands around the world the potential for renewable energy is by far yet tapped. For the majority of islands expensive and environmentally damaging fossil fuels are still the only or major energy sources utilised. One of the major reasons for the under-exploitation of renewable energy is lack of knowledge and awareness on islands among key energy decision-makers on governmental and utility level and the public in general. Consequently one of the objectives of the study Renewable Energy on Small Islands, is to document that renewable energy on islands is a feasible option in regard to technology, economy, environment and organisation.

## Why Small Islands are Very Important in a Renewable Energy Perspective

One of the main findings is, first of all, that islands are evident targets for renewable energy secondly, they can be marvellous front-runners and show-cases on a national, regional and global level for renewable energy technologies. Why is this the case?

**A world-wide overview of renewable energy utilisation on small islands was published in August 2000 by the Danish non-governmental organisation Forum for Energy and Development (FED). The study shows that islands are evident targets for renewable energy. Below Mr. Thomas Lyng Jensen, Global Secretariat for Renewable Energy Islands located at FED, presents major findings from this study**

### High Visibility:

Islands are land areas surrounded by water. This means they are well-defined entities not only in terms of geography, but also in terms of energy production, population, economy and so forth. They can be seen as closed systems where input, output and outcomes can be easily controlled and observed. Thus, islands can become highly visible laboratories for renewable energy technology, organisation, and financing. REI's provides a useful way to make future energy-systems visible and concrete.

### Large Scale Demonstration Possible:

A dramatic large-scale shift to renewable energy on continents/mainlands is unrealistic in the short and medium term. Both with regard to technology, financing and organisation. If decision-makers world-wide are to be inspired to aim at a broader use of renewable energy as part of sustainable development, it is necessary to demonstrate renewable energy in a large-scale, integrated and organised form, and situated in a well-defined area - i.e. a REI. Islands can cheaper, faster, and easier reach a higher share of renewable energy in its energy balance than a much bigger mainland. The very smallness of the islands, so often viewed, as a disadvantage, is in this context actually an advantage.

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### More Positive Attitudes:

Many islands take a sympathetic attitude to the utilisation of renewable energy also at the political level. One reason being the threat from global warming. Even though islands contribute only negligible to global emission of greenhouse gasses, many islands around the world are among the immediate victims of climate change and instability caused by fossil fuel consumption in industrialised countries. Islands thus have a strong interest in changing energy patterns for instance by demonstrating new sustainable ways of satisfying energy needs. Another reason for the more positive attitude found on islands is the near total absence of fossil fuel





resources. In many mainland countries, developing as well as industrialised, one major barrier for promotion of renewable energy resources is the presence of an economic and political elite that has very strong interests in the utilisation of fossil fuels either for export or domestic purposes. Most islands' main resources are the oceans, the population and geography (tourism). Next to none have fossil fuel resources.

#### Competitive Advantage:

Most small islands around the world today are dependent on imported fossil fuels for their energy needs, especially for transport and electricity production. Because of the small size and isolated location of many islands, infrastructure costs such as energy are up till three to four times higher than on the mainland. The high price for fossil fuels combined with the limited demand increases the unit cost of production for conventional power production. This creates a competitive situation for renewable energy technologies on islands. Furthermore, most of the islands are endowed with good renewable resources, primarily sun and the wind.

#### Experiences Applied in non-island Areas:

Experiences gathered on islands can be used, not only on islands, but in principle everywhere. REI's can serve as demonstration projects for mainland local

communities, not only in developed countries, but also in developing countries. There are about 2.5 billion people living outside a national grid in developing countries. These people also need electricity services and experiences from REI's are highly relevant in this context. Furthermore, through concentrated efforts some small island states can serve as demonstration nations. Despite their size small island states could set an example to the world's nations.

#### Islands with high Utilisation of Renewable Energy Sources

The study shows that there are today islands that have utilised modern renewable energy technologies - also on a large-scale. The following can be concluded regarding the islands in the overview.

- a) Around the world a few islands have already decided to become Renewable Energy Islands (REI) in the short or medium term. An REI is an island that is 100% supplied from renewable energy sources.  
Samsøe (Denmark), Pellworm (Germany), Aeroe (Denmark), Gotland (Sweden), El Hierro (Spain), Dominica and St. Lucia have an explicit target of becoming 100% self-sufficient from renewable energy sources.
- b) Around the world a few islands have already some of the characteristics of a Renewable Energy Island (REI).

La Desirade (France), Fiji, Samsøe, Pellworm and Reunion (France) are currently producing more than 50% of their electricity from renewable energy sources. Please be referred to table 1 for detailed information about these and other islands with a very high utilisation of renewable energy for electricity production. 21% of the islands in the overview that utilise renewables for electricity generation produce between 25-50% of their electricity from renewable energy sources. Nearly 70% of the islands in the overview that utilise renewables for electricity generation produce between 0.7-25% of their electricity from renewable energy sources. A few islands are using solar water heaters on a very large scale (Barbados and Cyprus).

- c) Islands with very big utilisation of renewable energy for electricity production are mainly utilising hydropower. In the overview more than 50% of the islands with more than 25% of the electricity generated from renewable energy resource are utilising hydropower. Of the islands producing more than 25% of electricity from wind power all (but one) are connected by sea cable to another electricity grid.
- d) Wind power is by far the most utilised renewable energy resource in electricity production. Over 50% of the islands in the overview that have utilised renewables for electricity generation have used wind power. Over 25% and nearly 10% of the islands in the overview utilising renewables for electricity generation use hydropower and biomass respectively.
- e) Most islands are situated in the North Atlantic Ocean. Just over 40% of the islands in the overview using renewables are situated in the North Atlantic Ocean. Around 12-14% of the islands in the overview using

renewables are situated in the North Pacific Ocean, South Pacific Ocean and Caribbean Sea respectively.

f) By far the majority of islands are non-sovereign.

Nearly 75% of the islands in the overview that have utilised renewables are connected formally to a country from the developed world.

Only 25% of the islands in the overview that have utilised renewables are politically independent islands - they are all developing countries.

**Report Available on the Internet, by e-mail and in Print**

The report can be downloaded for free in PDF-format on the Internet at the homepage of FED:

<http://www.energiudvikling.dk/publikation.php3>

or forwarded by e-mail (as an PDF-attachment) or in print by request to FED on the following address:

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Table 1: Renewable Energy Share of Electricity Production for some of the Investigated Islands

Island	Total Percentage of Electricity Production from Renewable Energy Sources	Percentage of Electricity Production by Type of Renewable Energy Source	Year	Renewable Energy Goal/ Plan/Strategy
La Desirade (Guadeloupe, France)	100%	Wind: 100%	1998	There is a renewable energy plan for the Guadeloupe archipelago - 25% of the electricity consumption from renewable energy in 2002
Fiji	79.6%	Hydro: 79.6%	1997	There is a national energy/renewable energy policy
Samsøe (Denmark)	75% <sup>2</sup>	Wind: 75%	2000	100% of energy consumption from renewable energy sources by 2008
Pellworm (Germany)	65.93%	Wind: 64.96% PV: 0.97%	1998	100% of energy consumption from renewable energysources
Reunion (France)	56.1%	Hydro: 39.6% Bagasse: 16.5%	1998	
Dominica	48%	Hydro: 48% Hydro: 42.6%	1998	100% of energy consumption from renewable energy sources in 2015. A national energy policy does not exist today
Flores Island (Azores, Portugal)	42.6%	Hydro: 38.5%	1999	
Samoa	38.5%	Geothermal: 30.6%	1997	Samoa does not have a comprehensive energy policy
Sao Miguel Island (Azores, Portugal)	37.6%	Hydro: 7%	1999	
Faeroe Islands (Denmark)	35.1%	Hydro: 34.9% Wind: 0.2%	1999	There is no energy plan for the Faeroe Islands
St. Vincent and the Grenadines	32.8%	Hydro: 32.8%	1997	The is no national energy policy
Marie Galante Island (Guadeloupe, France)	30%	Wind: 30%	1998	There is a renewable energy plan for the Guadeloupe archipelago - 25% of the electricity consumption from renewable energy in 2002
Corsica (France)	30%	Hydro: 30%	1999	
Miquelon (St. Pierre and Miquelon, France)	30% <sup>3</sup>	Wind: 30%	2000	50% of electricity consumption from renewables by 2003

<sup>1</sup> A blank cell means that information is not available.

<sup>2</sup> Estimation from July 2000 and onwards.

<sup>3</sup> Estimation.

## Global Sustainable Energy Islands Initiative (GSEII)

Where Island 2010 aims to develop and promote 100% renewable energy initiatives on islands in the European Union, the Global Sustainable Energy Islands Initiative (GSEII) focuses on Small Island Developing States (SIDS) world-wide.

The Initiative is made by a consortium consisting of Forum for Energy and Development (FED) and the four other international non-governmental organisations Counterpart International, Climate Institute, Winrock International and the Organization of American States. The GSEII has been organised to support the interests of all SIDS and potential donors by bringing renewable energy and energy efficiency projects, models, and concepts together in a sustainable plan for SIDS. The GSEII seeks to display national efforts to significantly reduce greenhouse gas emissions.

### Global Objectives

- ➡ To develop SIDS as sustainable energy nations.
- ➡ To establish donor support and private sector investment for this sustainable development.
- ➡ To increase awareness of experiences, potential, and advantages of renewable energy utilisation and energy efficiency on SIDS and other island nations.

### Regional and Island Nation Objectives

#### The Caribbean:

- ➡ To develop St. Lucia into a sustainable energy nation, thereby fulfilling its commitment made at COP5.
- ➡ To further develop sustainable energy plans for one or more Caribbean SIDS to become sustainable energy nations.
- ➡ To develop regional energy efficiency and renewable energy private business activities, including solar thermal, photovoltaics, biomass, and wind turbines.
- ➡ To establish funding schemes for large-scale dissemination of sustainable energy.

#### The Pacific Region:

- ➡ To develop wind energy activities on Niue and one more island nation as regional door-opener projects.
- ➡ To develop sustainable energy plans for one or more SIDS to become sustainable energy nations.
- ➡ To develop regional energy efficiency and renewable energy private business activities, including solar thermal, photovoltaics, biomass, and off-grid wind turbines.
- ➡ To establish funding schemes for large-scale dissemination of sustainable energy.

#### The Indian Ocean:

- ➡ To develop a sustainable energy plan for one SIDS to become a sustainable energy nation.



