

FLORIDA SOLAR



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CONTRACT REPORT

AHATA Solar Energy Resort Training Program

FSEC-CR-1754-08

Final Report

April 7, 2008

Submitted to:

Aruba Hotel and Tourism Association

L.G. Smith Blvd 174

P.O. Box 542

Aruba, Dutch Caribbean

Submitted by:

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A Research Institute of the University of Central Florida

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Abstract:

The Florida Solar Energy Center/University of Central Florida developed a Solar Energy Resort Training Program at the request of Aruba Bucuti Beach Resort Association, Aruba (AHATA) in the Caribbean Islands. The Aruba Resort Association has been interested in learning about and applying renewable energy technologies to their resorts to reduce energy consumption and cost. This report describes the activities and implementation of Florida Solar Energy Center's support to the Association to assist in the consulting, education and implementation of solar energy technologies into the resort industry in the country.

FINAL TRIP REPORT
Aruba Solar Energy Resort Training Program
April 7, 2008

1.0 Traveler Names(s): William Young, Patrick Robinson, and John Harrison, Florida Solar Energy Center, Cocoa, Florida, research institute of the University of Central Florida, Orlando, Florida, USA.

2.0 Length of Project: 6 days in country including travel days. Travel started on Sunday 3/9/08 with workshops on Tuesday and Wednesday with the trip ending on 3/13/08.

3.0 Country of Assignment: Aruba, Netherlands Antilles, WI.

Aruba is one of several Caribbean islands in the Netherlands Antilles, just a few miles north of the Venezuelan Coast in the Northern Hemisphere. The 77 square mile island has about 100,000 people consisting of Dutch, Spanish, English and Aruba Indian. Aruba is an autonomous member of the Kingdom of the Netherlands overseen by the Constitutional Monarchy with a democratically elected government. The Chief of State is the Governor, appointed by the Queen and the Head of Government is the Prime Minister, elected as executive of the Parliament.

Aruba located close to the equator has a constantly warm climate with northeasterly tropical trade winds. The small size of the island and the lack of large mountains makes the island aired with the constant winds. The island has great solar energy resources available throughout the island, of which less than a dozen solar applications are in use, including wind, photovoltaic, and solar thermal.

But, like most Caribbean Island countries, Aruba, has no conventional energy resources. Imported oil has been the Aruba's source of energy for the utility power plant that produces electricity for the whole island. Electricity costs have reached 32 cents per kilowatt for the local resident or resort doing business on the island. The government controlled utility restricts the interconnection of solar systems to the grid.

4.0 Description of Recipient Organization: Aruba Hotel and Tourism Association

Aruba Hotel and Tourism Association (AHATA) is a tourism organization on the island of Aruba. It is a private not for profit organization with 150 members in the tourist industry, consisting of transportation, shops, restaurants, sport adventures, attractions, hotels, and casinos. The association provides communication and resources to the members for education, business intelligence, advocacy, quality, safety, and preservation of the environment. Our contacts there were: Rob Smith, CEO, Sanju Luidens-Daryanani, Director of Membership, and Ayerim Maduro-Lacle, Event Coordinator.

5.0 Scope of Work:

We received a request for renewable energy technical assist by the Aruba Hotel and Tourism Association to implement solar energy into their resort industry. Energy cost around the world is increasing as energy supplies decrease. AHATA members want to learn about renewable to reduce energy consumption and cost. What can they do about implementing renewable with present utility restriction?.

An educational program was developed between AHATA and FSEC to provide technical consulting and training on photovoltaic and solar thermal energy to members of AHATA. Three members of FSEC staff modified existing solar energy training courses to provide the education needed for the Aruba resort industry to understand the design, operation, installation and maintenance of solar systems. The FSEC training team traveled to Aruba and conduct a two day workshop and evaluate present solar systems on AHATA members facilities. Related educational materials were printed and distributed to workshop attendees.

5.0 Results/Impact of Assignment:

The workshops were conducted as design and attendance was as planned. The SHW workshop had 34 attendees and the PV workshop had 32 attendees. The pre-workshop survey showed that 30 percent of the attendees were aware of solar energy and 3 percent knew some technology. The workshop attendees evaluations ranked the workshops with high scores and only one attendee gave a average ranking.

The site evaluations of resorts with solar systems were judged by the FSEC staff as quality applications and installation. The use of SHW in a distributed application for laundry service was a very effect way reduce energy consumption and the utility restriction.

6.0 Recommendation Made:

The use of niche distributed applications to reduce energy consumption while addressing the utility restriction is our recommended approach to implementing renewable energy on the island. A viable plan addressing the restriction needs to be developed between the government, utility and consumers for further solar implementation and further solar industry development. Other islands have reduced or eliminated tariffs and restriction.

A technical collage, such as EPI, has the potential for local education of solar technicians, code officials, and sales personal on the island for their solar industry to grow. The government will need to develop quality standards and practices to assure further quality solar installation.

7.0 Follow Up Required, Planned:

This project completed its task of creating awareness and understanding need for the AHATA members to make educated discussions for implementing solar energy into their facilities. Further education is need by most of the members before they can design and install systems themselves. FSEC can return and conduct further more detailed training or AHATA members to seek training elsewhere. There are two organizations on the island that have gained enough experience with the solar applications they have done to represent a start of a solar industry on the island.

8. Daily Activity Summary:

Day 1 Date: Sunday 3/9/08 **Location:** Orlando International airport, Florida

AM Bill Young, Patrick Robinson, and John Harrison left home and traveled from Orlando airport to Oranjestad airport in Aruba via American Airlines.

PM Upon arrived we rented a car and arrived at Holiday Inn Resort Hotel. After dinner, we drove around the island locating AHATA and the seminar hotel.

Day 2 Date: Monday 3/10/08 **Location:** AHATA, Oranjestad, Aruba

AM We met Ron Smith and Sanju Luidens-Daryanani with AHATA at there facilities. We talked about his organization, the energy needs of the resorts on the island, the focus of the workshop, the operation of the government, the operation of the utility, and the interconnect of solar systems to the utility. The government controlled utility restricts the interconnection of solar systems to the grid. We picked up our workshop materials we mailed to there facilities.

PM We arrived at the Marriott Resort and delivered the workshop materials to the meeting room and setup for the seminar.

Day 3 Date: Tuesday 3/11/08 **Location:** Marriott Resort, Palm Beach, Aruba

AM We arrived at the Marriott and met Ayerim Maduro-Lacle, AHATA, and Daniel Aguirre, Marriott. We finished setup for the Solar Hot Water session of the workshop and completed registration. Patrick started with an introduction of FSEC, then began the solar thermal workshop and John completed the workshop session

PM John completed the Solar Hot Water session and Bill closed the day activities..

Day 4 Date: Wednesday 3/12/08 **Location:** Marriott Resort, Palm Beach, Aruba

AM We arrived at the Marriott and Bill started the Photovoltaic session of the workshop. Bill had the attendees complete a pre-workshop technology survey. .

PM Bill completed the Photovoltaic workshop and had the attendees completed a workshop evaluation form. We made appointments with three attendees to complete a site visit at their facilities to see their solar systems. We ended the workshop with presenting certificates to attendees.

Day 5 Date: Thursday 3/13/08 **Location:** Westin Hotel, Manchebo Beach, Aruba

AM Bill met Freddy Vargas with EPI and traveled to their school to present Photovoltaics to their technology department and tour their facilities. They had a PV, SHW, and wind demonstration equipment for training that were still being developed. John and Patrick were invited to attend a lecture by AHATA on Aruba Heritage and Tourism by UCF professor, Dr. Michael Scantlebury. UCF and Aruba University have a collaborative agreement between hospitality colleges. We met Leon Mullers with CHS to site visit the Dutch Marines base and toured the new 32 kWp grid-tied PV array on the motor pool designed and installed by CHS. We toured the SHW systems on the cafeteria installed several years before. Both systems were quality work.

PM We met Danny Biemans and traveled to Bucuti Beach Hotel to tour their facilities. There were 4 ICS SHW systems for laundry that were quality installations. We met Humphrey Figaroa and traveled to Aruban Resort to tour their facilities. They had a swimming pool system for their spa. These projects were quality systems. During the planned tours we organized 2 additional tours of homes in the area as the tours were open to all workshop attendees. The homes owners installed the systems themselves. One home had a bio-diesel generator, two wind generators and a PV system. The other home of a FIT graduate, had a wind generator and a 1 kWp PV system. These home systems were not grid-tied due to utility restrictions. These home systems had questionable code compliance and craftsmanship.

Day 6 Date: Friday 3/13/08 **Location:** Aruba airport, Oranjestad, Aruba

AM We arrived at the Aruba airport for American Airlines flight to travel home.

PM We arrived at the Orlando International Airport and carpoled home. .

9. Contacts

Aruba Hotel and Tourism Association

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