ENERGY TRANSITION INITIATIVE
Islands

Playbook Lesson Learned
Phase 3: Project Preparation

Solar Hot Water Heater Industry in Barbados

Barbados is addressing the challenge of offsetting high fossil fuel costs by using its abundant solar resources to power solar water heaters (SWHs) across the island. Barbados offers a valuable example of how to successfully execute market implementation of a commercialized renewable energy technology.

Rooftop SWHs are being successfully used in Barbados as a result of effective financial incentives and government support. *Photo from iStock 6923507*

Challenge

Before realizing the SWH success, Barbados had to overcome several other challenges according to the Climate and Development Knowledge Network publication "Seizing the sunshine—Barbados' thriving solar water heater industry,"[1] including:

- **Access to startup capital.** Despite having secured government contracts for SWH installations, banks were unwilling to invest in SWH commercial and residential installations.
- **Lack of consumer awareness and confidence in solar technology.** Developing an effective product and ensuring that the size of the SWH was appropriate for each household were crucial for maintaining sufficient water temperature.
- **High upfront cost and inconsistent financial incentives to encourage consumers to invest in a new system.** There is a history of fluctuating tax credits for SWHs in Barbados, including a complete removal of incentives from 1992 to 1996, resulting in suppression of industry growth.

Solution

The factors that led to Barbados successfully overcoming the market barriers to widespread implementation of SWHs were local high-level government champions, financial support, regulatory certainty, and consumer acceptance.

The SWH industry first emerged in Barbados in the early 1970s in response to oil prices increasing threefold in one year. At the time, fossil fuels supplied 95% of the country's energy needs. In 1973, Canon Andrew Hatch of Christian Action for Development made a SWH out of an old oil drum and fixed it to the roof of his church.

Recognizing the potential of the technology, in 1973 James Husbands founded Solar Dynamics, the first SWH company on the island, and soon had the opportunity to demonstrate the technology to Prime Minister Tom Adams in his own home. Adams saw the benefit of the SWH when his annual gas consumption was reduced by 70%. With Husbands and Adams as local champions for SWH, momentum and public engagement around the initiative grew.

[1] "Seizing the sunshine – Barbados' thriving solar water heater industry." Climate and Development Knowledge Network. Accessed Aug. 7, 2014. *http://cdkn.org/resource/cdkn-inside-story-seizing-the-sunshine-barbados-thriving-solar-water-heater-industry/*.

Next, government incentives brought competition to the business of manufacturing and supplying SWHs. Starting in the 1970s, the Barbados government introduced a series of measures to support the fledgling SWH industry.

By 2009 there were around 45,000 installed SWH systems in Barbados, or two in every five households. The government introduced further measures to support the industry by mandating SWHs for all new government housing developments. However, there were still challenges to getting early-stage funding from banks for commercial installation. To overcome this problem, the Barbados Institute of Management and Productivity provided a loan that could be quickly repaid after the project was completed.

Consumer acceptance was also key to SWH industry growth in Barbados. Once consumers saw that the technology was sized for their households and worked well, their confidence grew. This was important because other countries such as Jamaica had tried to establish a SWH industry to meet energy needs and reduce costs, but customers were dissatisfied because the installed SWHs were too small, resulting in water that was too cold.

High upfront costs were another barrier encountered by the SWH industry. To help address this issue, credit unions and distributors offered financial support, allowing consumers to spread the cost of the units over 3 years. Matching the credit term to the 3-year payback time of the SWH units meant that some consumers spent less money than if they had continued heating their water with gas.

Financial Incentives to Stimulate SWH Growth in Barbados

1974 – Fiscal Incentives Act

Just as the SWH industry was beginning to emerge, the government of Barbados introduced a tax exemption for the materials used to produce SWHs, saving 20% of the cost. The government also levied a 30% tax on electric water heaters, significantly increasing their price.

1977 – Government Purchase of SWH for State Housing

The government supported the growing SWH industry by mandating the installation of SWHs in new-build government housing developments.

1980–1992 – Homeowner Tax Benefit

In 1980, the government made the full cost of a SWH installation tax deductible to a maximum of $1,750 U.S. dollars (USD). This led to a peak in SWH installations in 1989 of more than 2,800 units. However, this incentive was stopped in 1992 as part of economic restructuring following the economic recession in the late 1980s.

1996 – Amended Homeowner Tax Benefit

In 1996, the Homeowner Tax Benefit was reinstated. In its amended form, Barbadians were allowed an annual tax deduction of $1,750 USD for home improvements, including mortgage interest, repairs, renovation, energy- and water-saving measures, and SWHs.

Key Takeaways

Today, the SWHs designed in Barbados are sold throughout the region, and Barbados is recognized as a leader in the SWH field. One company alone, Solar Dynamics, has installed more than 30,000 units on homes and businesses across the Caribbean.

Although challenges may vary by location, Barbados offers an example of why energy champions, financial incentives, and consumer confidence and acceptance are key to ensuring widespread adoption of a renewable energy technology such as SWHs to help offset high energy costs.

> "It was very important that successive governments were consistent in their support. … Governments need the fortitude to commit to [financial and regulatory support] for the long term."
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> —Leonard Nurse, Barbados Special Envoy for the Environment

Key lessons for countries wishing to replicate Barbados' achievement include:

- Local finance partners can establish channels of funding for pioneering companies that are struggling to access credit.
- Financial incentives, such as tax credits, can help manufacturers and consumers adopt new technology.
- A stable regulatory framework can provide confidence for investors and consumers.
- High-quality products supported by an enthusiastic, locally sensitive marketing strategy will build consumer awareness of the benefits of new technology.
- Manufacturer or supplier performance guarantees reduce consumer risk and facilitate deployment.
- Consumer credit schemes from manufacturers, distributors, or installers can lower upfront costs to consumers.

Key Elements of the Support Framework for the SWH Industry in Barbados

Direction of Influence	Factors That Helped Stimulate Growth of SWH Industry
Private Sector to Consumers	• High-quality products • Consumer guarantee • Finance to spread upfront cost of SWH • Community engagement and job creation • Clear quality of life benefits • Strong marketing and communications
Private Sector to Government	• Demonstrated the potential of the technology • Cost-effective technology that saves millions of dollars
Government to Consumers	• Involvement and participation through communications • Fiscal incentives (the Homeowner Tax Benefit) • Increased duty on gas and electric heaters
Government to Private Sector	• Fiscal Incentives Act 1974 • Government purchase of SWH for new-build developments • Created an environment of regulatory certainty and gave continuous support

Source: Climate and Development Knowledge Network

This lesson learned is one of many provided in the Energy Transition Initiative Islands Playbook—an action-oriented guide to help island communities successfully initiate, plan, and complete a transition to a clean energy system and eliminate dependence on imported fuels. See the full Islands Playbook at **www.eere.energy.gov/islandsplaybook**.

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ENERGY TRANSITION INITIATIVE Islands

The Energy Transition Initiative leverages the experiences of islands, states, and cities that have established a long-term vision for energy transformation and are successfully implementing energy efficiency and renewable energy projects to achieve established clean energy goals. Through the initiative, the U.S. Department of Energy and its partners provide government entities and other stakeholders with a proven framework, objective guidance, and technical tools and resources for transitioning to a clean energy system/economy that relies on local resources to substantially reduce reliance on fossil fuels.