

Introduction

Lighting alone comprises 19% of total global energy consumption. The Energy Efficient Lighting Project seeks to address this inefficiency by providing energy efficient light bulbs to residents of Pacific and Caribbean islands. Energy efficient CFLs (compact fluorescent light bulbs) could significantly reduce electricity demand and lower utility bills. Each CFL that replaces a 60 watt incandescent bulb will prevent approximately 500 pounds of CO₂ emissions and save \$94 in electricity costs over the bulb's lifetime (when paying \$0.25/kWh). Although these light bulbs have a higher initial cost, subsidies by GSEII carbon offset projects have made the CFL bulb widely available at a reduced cost. For families with low or average incomes, saving money on the monthly electricity bill promotes saving and a sustainable lifestyle.

The Energy Efficient Lighting Project began with a focus on St. Lucia, Dominica, and Grenada. Electricity costs on St. Lucia (US \$0.15 - \$0.22 per kilowatt-hour (kWh)) were particularly high, which prompted the St. Lucian government to commit to a comprehensive transformation of its energy sector in 2001. Every year since 2003, St. Lucia has held its "Energy Awareness Week" to encourage the use of renewable energy.

In the Pacific, GSEII promoted energy-efficient lighting on the Marshall Islands, whose national utility produced electricity from diesel generators. Electricity costs in the Marshall Islands tripled from \$0.12 to \$0.37 per kWh from 2005 to 2009, while paychecks remained consistent. Thus, some private sector workers were allocating nearly 60% of their income to pay electricity bills.

Since CFLs consume 75% less energy than incandescent light bulbs, the electrical savings are immense. For example, among the Pacific utilities, APSA (American Samoa) conducted a lighting program for business, and for a cost of \$166,000 quickly achieved \$266,000 in electricity savings. According to the GE Energy Smart CFL Savings Calculator, a typical household in Majuro, Marshall Islands, saves \$76.29 annually and \$418.00 over the new bulbs' lives when replacing three 60 watt and one 100 watt bulbs with CFLs, at a rate of \$0.25/kWh. In addition, switching to CFLs prevent approximately one ton of CO₂ emissions over the bulbs' lives, roughly a 75% reduction in CO₂.

Project Description

GSEII launched the Energy Efficient Lighting Project in 2004 to donate energy efficient bulbs and monitor their widespread distribution to government officials, homeowners, businesses, and schools.

St. Lucia: In 2006, over 10,000 energy efficient bulbs were provided to St. Lucia's Ministry of Planning for the purposes of national distribution. This has helped St. Lucia accommodate its growing demand for electricity due to increasing tourism and population. The bulbs were donated by Climate Care (UK), in association with the Climate Institute. The local project was launched as a finale to the GSEII-organized Energy Week in December 2004, which operated under the theme of "A Vision for St. Lucia's Energy Future." Held annually, each Energy Week includes national documentaries, green symposiums, energy exhibitions and school competitions.

This efficient light bulb project is part of a larger Energy Plan for St. Lucia which seeks to reduce energy demand by 35 in 2010. An eventual goal is to ban incandescent bulbs on the island entirely.



Students participate in Energy Awareness Week in Saint Lucia

The CFLs used in 2006 were 15 watts, which provide sufficient light to properly illuminate a room. The previously-used incandescent light bulbs typically ranged from 60-100 watts. Annual operating costs were calculated to be reduced from \$3900 to \$730 and life cycle costs were estimated to be slashed by \$13,600 with the use of energy efficient bulbs, compensating the initial higher purchase cost after a few months. Energy efficient lighting mitigates the demand for fossil-fueled energy, thus saving St. Lucians thousands of dollars annually on energy bills, as well as mitigating environmental impacts. In October 2008, the Cabinet agreed to carry on the Energy Saving Light Bulb Project within the Ministry of Communications, Works, Transport, and Public Utilities. The continuation of the project was initiated by the Cuban Government, which provided an additional 250,000 light bulbs.

Dominica: In March 2006, the University of Vermont and Climate Care distributed two hundred CFLs to Dominica. In 2007, five thousand additional light bulbs were distributed alongside an energy awareness campaign to explain the economic and environmental rationale for switching to a new type of light bulb. GSEII's efforts on the island were overshadowed, however, by a much larger Cuban initiative that distributed 280,000 bulbs in 2007. GSEII refocused its efforts elsewhere.

Grenada: The Climate Institute with Climate Care initiated a similar project in Grenada, but the project was also cancelled after the Cuban government again partnered implemented a large-scale bulb distribution program.

Marshall Islands: GSEII implemented The Energy Efficient Light Bulbs Project in 2006 to target low-income residents who are most affected by high electricity costs. In 2008, Climate Care installed 10,000 energy efficient light bulbs in Majuro, the capital and largest city. The Marshalls Energy Company installed 1/3rd of the households with CFLs and monitored energy consumption with its local substations, Marshalls estimated that the use of these bulbs would reduce fuel demand and save about \$150,000 annually.



Evaluation of Project Results

The GSEII Energy Efficient Lighting Project served as a pilot initiative and set an example in the Caribbean and Pacific to expand upon sustainable projects. In 2006, for example, Cuba launched the Energy Revolution program to eliminate inefficient tungsten filament bulbs domestically then across the Caribbean. In Haiti alone, Cuban social workers have installed two million bulbs since 2006. These types of projects have been carried out in countries around the world in cooperation with various groups in the Philippines, Poland, Vietnam and Guam, to name a few.

Problems Encountered and Lessons Learned

The GSEII Energy Efficient Lighting Project can be successfully replicated on other islands with small-scale efforts and consumer awareness programs. However, in

order to transform an island's use of incandescent bulbs to CFLs or another efficient bulb, one must influence the larger market. This would include working with the government to modify tariffs to favor efficient bulbs and making the bulbs widely available for purchase. Technology adoption could also be sped by a national education campaign on the new bulb's benefits and perhaps a government or private subsidy to lower bulb prices while it develops a market share.

The GSEII efficient bulb program could be more efficient in the future. Distribution was not paired with a bulb recycling program, so the obsolete incandescent bulbs were either saved or thrown away. A companion recycling program would help to minimize environmental effects.

Project partners found energy consumption and monitoring results difficult to obtain. As a result, few empirical statements can be made about actual savings. It is unclear, for example, how many of the distributed bulbs were taken home but never installed, or if any users switched back to incandescent bulbs. Future efforts would integrate some form of follow-up survey to ensure project effectiveness.

One important consideration is to be sure that the energy efficient bulbs are of high quality. If the bulbs burn out after a relatively short period of time, users are likely to return to cheaper, incandescent bulbs. Lower-quality CFLs have been known to flicker while turning on and/or produce an odd color of light. These factors can influence the perceived value of the bulbs and slow or squash technology adoption. High quality bulbs would persuade consumers of their value in both the short and long term.

Distribution and installation took longer than anticipated due to a lack of sufficient manpower. In the Marshall Islands, the bulbs sat in a warehouse for over a year before the government was able to put together a team to distribute them. Bulb distribution is a relatively simple process and can be taken for granted after shipping bulbs to an island. However, it is important to coordinate with the government or an on-the-ground organization ahead of time to quickly distribute the bulbs.

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