

## CASE STUDY

# Energy Efficiency: Making It Work Nationwide



Amid a looming energy gap resulting from increasing demand for energy, power consumers in the Philippines are burdened with one of the most expensive electricity rates in Asia, if not the world. Photo credit: ADB 2010.

*The formula: installing energy efficient lighting systems in government offices and parks, distributing fluorescent lamps nationwide, and establishing a green labeling system for buildings.*

## Overview

In the Philippines, higher power demand is stretching generation capacity. The Philippines has one of the most expensive power rates in the world (\$0.26 per kilowatt-hour in 2013). The steep cost of power results from reliance on imported fuel for power generation, scattered geography, inefficient transmission and distribution systems in some areas, a regulatory framework that contains a complex margin of protection mechanisms for supply and transmission companies, and debt and cost recovery issues for legacy infrastructure. Given the impending shortage of energy supply, the cost of electricity will likely increase.

With assistance from the Asian Development Bank, the government implemented the Philippine Energy Efficiency Project as an interim measure to mitigate a projected energy supply deficiency and reduce power consumption in residential and public sectors.

The project retrofitted 135 government office buildings and almost 4,000 public park and streetlights with energy-efficient lighting systems, distributed 8.6 million compact fluorescent lamps nationwide, and established a green labeling system for buildings.

These actions yielded a cumulative energy savings totaling 321 gigawatt-hours per year and facilitated development of the Green Building Rating System, which has certified 32 government buildings for sustainability.

## Project snapshot

<b>Dates</b>	<ul style="list-style-type: none"> <li>• <b>January 2009:</b> Loan Approval Date</li> <li>• <b>December 2013:</b> Project Completion Date</li> </ul>
<b>Cost</b>	<ul style="list-style-type: none"> <li>• <b>US\$ 31.1 million:</b> Loan amount</li> </ul>
<b>Institutions and Stakeholders</b>	<p><b>Financing</b></p> <ul style="list-style-type: none"> <li>• Asian Development Bank</li> </ul> <p><b>Executing agency</b></p> <ul style="list-style-type: none"> <li>• Department of Energy</li> </ul> <p><b>Others</b></p> <ul style="list-style-type: none"> <li>• Republic of the Philippines: Borrower</li> </ul>

## Solutions

### Implementing short-term strategies

One of the short-term strategies taken by the government was the promotion and implementation of energy efficiency initiatives.

Under the *Philippine Energy Efficiency Project*:

- government office buildings, public parks, and traffic light systems were retrofitted with energy-efficient lighting systems
- compact fluorescent lamps were distributed to residents nationwide
- integrated building and industry efficiency rating standards were established
- an energy service company was set up

## Overcoming initial obstacles

Overcoming initial obstacles allowed for the reallocation of a significant portion of the \$7.5 million budget earmarked for the energy service company creation to retrofitting additional government buildings. The balance was allocated to retrofitting public lighting and traffic lighting systems.

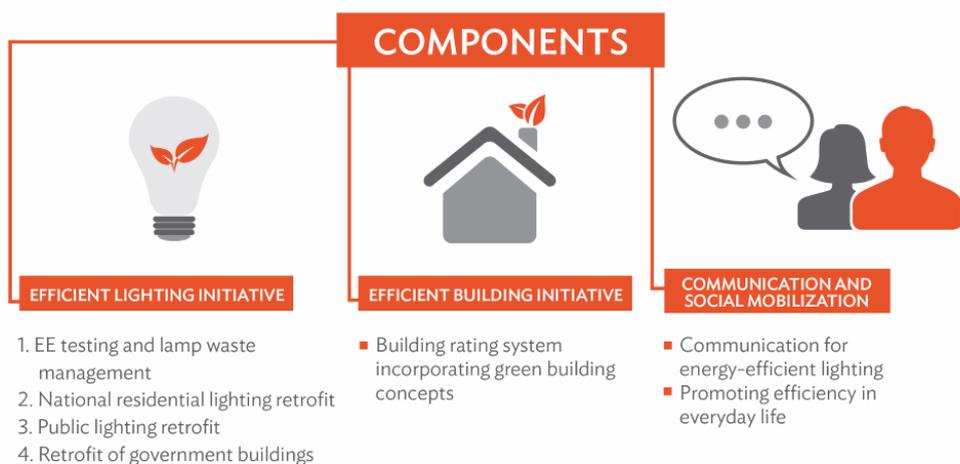
## Focus on retrofitting

Retrofitting government office buildings with energy efficient lighting systems was the Philippine Energy Efficiency Project's most successful component. The program initially aimed to upgrade the lighting systems in 40 government office buildings in order to contribute a 7,000 megawatt-hours reduction in energy demand and cut the government agencies' electricity expense at least \$1.7 million per year. Reduced energy demand was also expected to lower greenhouse gas (GHG) emissions by 5,000 tons per year.

Lighting loads in buildings and residences account for about 30%–40% of the Philippines' total electricity consumption. Office buildings built before 2000 were more likely to have fluorescent lamps with magnetic ballasts and, in most cases, incandescent bulbs with minimal use of natural lighting. Therefore, the Department of Energy raised the target to 135 government buildings,<sup>4</sup> increasing energy savings and lowering emissions.

Retrofitting began in September 2012 and was completed in June 2013. Three key factors contributed to the successful implementation of the project: enabling government policies, an efficient project implementation plan, and availability of financial resources.

## Components of the Philippine energy efficiency project



EE=energy efficiency.

Source: E. Reyes. 2012. Philippine Energy Efficiency Project. Presentation at the PEEP-EBI Inception Workshop. F1 Best Western Premier Hotel, Bonifacio Global City, Taguig City.

# Results

Between January 2009 and December 2013, the project retrofitted 135 government office buildings and almost 4,000 public park and streetlights with energy efficient lighting systems. It also distributed 8.6 million compact fluorescent lamps nationwide and established an efficient building rating system for new and retrofitted buildings, based on similar ratings models in many other countries, and certified 32 government buildings as "green".

Retrofitted government office buildings reduced the cumulative lighting load about 2.72 MW (34%), or 9.6 GWh, per year, saving almost a third of the buildings' average energy consumption. The average level of illumination improved 50%. The payback period for the investment was 2 years without lighting replacement units and 4 years with replacement. Thus, government agencies complied with AOs 110 and 183, reduced electricity costs, and helped mitigate impending power shortages. This saving would not have materialized without the strong collaboration between Asian Development Bank and the Department of Energy during project implementation.

## Lessons

### Enabling policy

Notably, an enabling government framework for energy efficiency contributed to the project's success. The government-decreed AOs provided directions on energy management at a time when energy

efficiency was an unfamiliar concept among public agencies. It also became a starting point for projects such as the Philippine Energy Efficiency Project to initiate more energy efficiency activities. Government energy policies, a road map, laws, and executive legislation are critical for providing a robust and sound legal basis for project proponents and stakeholders.

### Flexibility

A flexible approach to project design and scope is essential. Initially, external forces made adjustments necessary. Although the original plan included only 40 buildings, the project management team expanded the target to 135 building while maintaining implementation efficiency.

### Energy efficiency lighting is a sound investment.

Energy efficient lighting systems will result in significantly lower energy demand, consumption and, more importantly, energy savings. Whether borrowing from the markets or using internal resources to implement energy efficiency measures, energy efficient lighting systems is a feasible option when considering return on investment and payback period. This success may further stimulate the government to retrofit cooling and refrigeration systems and motor loads of government buildings while involving the private sector.

# Resources

Smarter, more energy-efficient street lighting system to be installed in Singapore

Scaling Up Energy Efficiency in Asia: ADB's Take

Energy Efficient Street Lighting in Asia

The Philippine Energy Efficiency Project: Lighting Up the Philippines in an Efficient Way



**Rehan Kausar**

Portfolio Specialist, Southeast Asia Department, Asian Development Bank

Rehan Kausar is a portfolio specialist at the Asian Development Bank in Manila, Philippines in the Southeast Asia Department. He primarily focuses on project implementation and project-related issues across the developing member countries of Southeast Asia. He started his career in the energy sector for 15 years after which worked as a consultant in both the energy and petrochemical areas prior to joining the World Bank as a staff consultant on infrastructure policies in 2005. He later joined the Asian Development Bank and was assigned to the reconstruction and rehabilitation of Aceh and Nias.

Follow Rehan Kausar on



---

Last updated: April 2017