MICRO-CREDIT FOR ENERGY SERVICES: TRANSFORMING BASIC NEEDS OF POOR HOUSEHOLDS INTO EFFECTIVE MARKET DEMAND

Towards an ‘Energy Plus’ approach for the poor:
A review of good practices and lessons learned from Asia and the Pacific

Case Study 3

ENVIRONMENT AND ENERGY
We would like to take this opportunity to recognize the partners who have made financial and other contributions to the energy sector project described in this report. These include the Global Environment Facility (GEF), the Philippine Department of Energy and the Peace and Equity Foundation (PEF). In addition, the project would not have been possible without the co-operation and the contribution of the Government of the Republic of the Philippines.

“UNDP partners with people at all levels of society to help build nations that can withstand crisis, and drive and sustain the kind of growth that improves the quality of life for everyone. On the ground in 177 countries and territories, we offer global perspective and local insight to help empower lives and build resilient nations.”

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### Acronyms

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<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>BEST-OF-PREN</td>
<td>Building Economic, Social and Technological Opportunities and Foundations to Promote Renewable Energy Nationwide</td>
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<tr>
<td>CBRED</td>
<td>Capacity Building to Remove Barriers to Renewable Energy Development in the Philippines</td>
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<tr>
<td>CHHC</td>
<td>client household and community</td>
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<tr>
<td>DOE</td>
<td>Department of Energy</td>
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<tr>
<td>FARM</td>
<td>Federation of Agricultural Resource Managers</td>
</tr>
<tr>
<td>GEF</td>
<td>Global Environment Facility</td>
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<tr>
<td>kW</td>
<td>kilowatt</td>
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<tr>
<td>MF</td>
<td>microfinance</td>
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<tr>
<td>MFF</td>
<td>microfinance fund</td>
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<tr>
<td>MFI</td>
<td>microfinance intermediary</td>
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<tr>
<td>MSC</td>
<td>Market Service Center</td>
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<tr>
<td>MW</td>
<td>megawatt</td>
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<tr>
<td>NEA</td>
<td>National Electrification Administration</td>
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<tr>
<td>NGO</td>
<td>non-governmental organization</td>
</tr>
<tr>
<td>PHP</td>
<td>Philippine peso (currency)</td>
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<tr>
<td>PEF</td>
<td>Peace and Equity Foundation</td>
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<tr>
<td>RE</td>
<td>renewable energy</td>
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<td>RET</td>
<td>renewable energy technology</td>
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<tr>
<td>RPP</td>
<td>Rural Power Project</td>
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<tr>
<td>SPV</td>
<td>solar photovoltaic</td>
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<tr>
<td>SURE</td>
<td>Solutions Using Renewable Energy</td>
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<tr>
<td>UNDP</td>
<td>United Nations Development Programme</td>
</tr>
<tr>
<td>USD</td>
<td>United States dollar (currency)</td>
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<tr>
<td>W</td>
<td>watt</td>
</tr>
<tr>
<td>Wp</td>
<td>watt peak</td>
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</table>
Synopsis

Project title: Building Economic, Social and Technological Opportunities and Foundations to Promote Renewable Energy Nationwide (BEST-OF-PREN)

Country and region of implementation: The Republic of the Philippines (nationwide)

Focus area (technology/energy service): Projects on renewable energy to support basic services (potable water, health), livelihood and employment for the poor, and social capital building (technical capacity, advocacy, institutional development support)

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Duration: 2006-2011

Costs: USD 535,500

Project brief: BEST-OF-PREN uses a microfinancing scheme to make renewable energy technologies accessible to poor households in the Philippines. The project uses a microfinance fund of USD 535,500 from the Capacity Building to Remove Barriers to Renewable Energy Development in the Philippines (CBRED) project, funded by the Global Environmental Facility, with the Philippine Department of Energy as the executing agency. Through BEST-OF-PREN, the Peace and Equity Foundation (a non-governmental organization) has set up a financing and delivery mechanism for household-level renewable energy technologies. So far, the project has provided wholesale loans to 16 renewable energy microfinancing sub-projects in 14 provinces in the Philippines.

BEST-OF-PREN provides loans to non-government microfinance intermediaries (MFIs) working in poor provinces which lack access to electricity. Sustainability of these sub-projects depends mainly on the capability of the technology supplier and the MFI distributor in reaching client households and revolving the microfinance fund. Key success factors include selection of commercially mature technologies, capacity-building of MFI partners and technology suppliers, and the willingness of suppliers to market their products to poor communities and co-share product marketing costs.
Acknowledgments

Micro-credit for energy services: Transforming basic needs of poor households into effective market demand is one of 17 case studies which, together with a report titled 'Towards an 'Energy Plus' approach for the poor: A review of good practices and lessons learned from Asia and the Pacific' and an Action Agenda Note, comprise a review of good practices and lessons learned in energy service delivery to the poor. Commissioned and facilitated by the United Nations Development Programme Asia-Pacific Regional Centre (UNDP APRC), this case study identifies key characteristics that have helped poor households and communities gain access to modern energy services, and to derive valuable lessons for future energy access activities. This case study is the product of an intensive collaborative process and we wish to acknowledge the many contributors, without whose generous collaborative process and we wish to acknowledge the many contributors, without whose generous support this work would have been impossible.

We express special gratitude to the main researcher and writer of the case study, Veronica Villavicencio, whose expertise and knowledge established the basis of this report. UNDP wishes to thank the Philippines rural communities that participated in the microfinance initiatives and the data collection. UNDP would like to express its gratitude to the staff of BEST-OF-PREN for their assistance in collecting and compiling necessary information for the analysis.

Special thanks to Thiyagarajan Velumail, supported by Soma Dutta, Lara Born and Butchaiah Gadde, for his technical leadership and guidance in the conduct of the 17 case studies.

Felicity Chard, David Galipeau (Chair), Daniela Gasparikova, Arun Kashyap, Faris Khader, Maya Nyagolova and Ashley Palmer of the UNDP-APRC Knowledge Products Review Committee (KRC) kindly provided a final review and endorsement of this publication.

The case study also benefited from the rich and fruitful interactions of the 9-12 November 2009 writeshop participants, including Praveen Arakkal, Expedito Belo, Lara Born, Ivo Besselink, Mamta Chander, Karma Chogyal, Beau Damen, Soma Dutta, Butchaiah Gadde, Geraldine Huet, Thomas Lynge Jensen, Xin Liu, William Mohns, Wattanee Niyomyath, Sunjita Pradhan, Kamal Rijal, Bhupendra Shakya, Bala Ram Shrestha, Kiran Man Singh, Dean Still, Yusuke Taishi, Pia Treichel, Kapila Subasinghe, Vernon Ray Vinluan, Veronica Villavicencio, Julien Wallet-Houget and Sirintharat Wannawong. Special thanks to the writeshop moderators Kamal Rijal and Thiyagarajan Velumail. In addition, the case study benefited greatly from an intensive peer review. Special thanks are due to Kayo Ikeda and Manuel Soriano of the Technical Advisory Committee for providing a detailed review that guided the finalization of the case study. We would also like to acknowledge Soma Dutta’s support to the case writer in preparing the final case study.

UNDP APRC in Bangkok was responsible for the facilitation and conceptualization of the 17 case studies and the associated report. We thank the core team, comprising Saana Ahonen, Aalok Awalikar, Lara Born, Soma Dutta, Butchaiah Gadde, Thomas Lynge Jensen, Pratima Mathews, Wattanee Niyomyath, Thiyagarajan Velumail and Julien Wallet-Houget. Thanks to Sirintharat Wannawong, who has been instrumental in supporting the entire process administratively.

Finally, UNDP would like to thank Nikolai Beresnev and Collin Piprell for their excellent editorial support, and KEEN Publishing Co. Ltd. (Thailand) for logistical support and graphic design.

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Preface

Asia-Pacific has achieved remarkable economic growth and socio-political progress in the past two decades, with almost every country in the region experiencing a concomitant decline in poverty.

Despite this progress, 800 million people in the region remain without access to electricity and almost 2 billion rely on the traditional use of biomass for cooking. While good progress has been made with expansion of electricity, many remote rural areas remain un-electrified, since connecting them to the national grid remains very expensive. Rural electrification is a particularly difficult challenge for archipelago countries such as the Philippines, which consists of more than 3,000 inhabited islands. By September 2011, 36,048 out of the 36,063 listed barangays in the country (99.43 percent) had been provided with electricity, but the share of electrified households stood at 75 percent.

The poor often live in subsistence economies that do not generate cash surpluses, limiting their purchasing power and opportunities to shift to modern energy services. As a result, they have to invest more of their income and time in obtaining energy, and tend to use traditional energy services and fuels. Women and children are particularly affected, spending many hours a day collecting fuelwood and preparing meals in the kitchen. Smoke from inefficient stoves in poorly ventilated homes kills 1.6 million people worldwide every year; the majority of victims are women and children younger than five years. Indoor air pollution is the fourth-biggest killer in the developing world.

Asia-Pacific countries have applied many cutting-edge practices in providing energy access to the poor, including innovative financing mechanisms. Apart from satisfying basic needs, energy services can act as an instrument to empower women and disadvantaged communities; as an entry point to mobilize communities to take charge of their own development; and, most importantly, as a means to livelihood enhancement and poverty reduction. However, the scale of expansion of energy access projects has been far from sufficient.

UNDP has been working with its country partners to address these energy poverty issues, aiming to meet user needs, broaden energy supply options and link these efforts in achieving the Millennium Development Goals. Between 2009 and 2011, the UNDP APRC reviewed 17 energy access programmes and projects implemented by various development agencies and the private sector in the region. These projects were documented as 17 case studies (including this report), a report titled ‘Towards an ‘Energy Plus’ approach for the poor: A review of good practices and lessons learned from Asia and the Pacific’ and an Action Agenda Note. Together, these documents provide practical guidance for policymakers and development practitioners in designing and implementing future programmes and projects that ensure the delivery of low emission, affordable and reliable energy services for poverty reduction.

This case study documents a microfinancing scheme in the Philippines which makes renewable energy technologies accessible to poor households. BEST-OF-PREN provides loans to microfinancing intermediaries that work in poor provinces where a low percentage of households have access to electricity. To date, the project has supported 16 renewable energy microfinancing sub-projects in 14 provinces.

Nicholas Rosellini
Deputy Assistant Administrator & Deputy Regional Director
Regional Bureau for Asia and the Pacific

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1 Barangays are the smallest administrative divisions in the Philippines.
1. Background

1.1. Socio-economic status of the Philippines

The Republic of the Philippines is an archipelagic country in South-East Asia. Comprising 7,107 islands, it has the fifth longest coastline in the world. It is divided into three island groups (Luzon, Visayas and Mindanao) and 80 provinces. Its population is around 94 million.

The 2010 UNDP Human Development Report listed the Philippines as a ‘medium human development country’, ranked 97th out of 169 countries on the Human Development Index. The country’s per capita gross national income was around USD 4,000 in 2010. The economy is heavily reliant on remittances, which surpass foreign direct investment as a source of foreign currency.

Despite the country’s economic growth in recent years, a large number of people have slipped below the poverty line, making it almost impossible for the Philippines to meet the Millennium Development Goal of halving poverty by 2015. In 2006, almost 27 percent of households lived below the nationally defined poverty threshold of USD 343 (4.68 million households, or 27.6 million people); this proportion had increased to 35 percent by 2009 (32.3 million people).

Great disparities in the incidence and magnitude of household poverty exist among the country’s 80 provinces. Regional disparities in key dimensions of poverty, including access to energy services, were captured in the Peace and Equity Foundation’s (PEF) poverty mapping. For example, the percentage of households with access to electricity in metropolitan Manila was 99.4 percent, compared to only 6.9 percent in Maguindanao Province. Nationally, 75 percent of households have access to electricity.

1.2. Renewable energy in the Philippines

Power generation in the Philippines is dominated by fossil fuels (oil, coal and natural gas), which account for 66 percent of total power generated. Hydropower and geothermal-based energy account for 21 and 13 percent, respectively.

Renewable Energy Law 2008. The Government of the Philippines (GOP) has prioritized renewable energy (RE) as a means of both promoting energy independence and extending energy services to remote communities. This is reflected in the Renewable Energy Law, passed in December of 2008. This legislation provides fiscal and non-fiscal incentives for RE investors to encourage market development and generation of power from RE sources. It also establishes a ‘renewable portfolio standard’ system, which requires electricity suppliers to use a certain percentage of RE resources.
Current Department of Energy (DOE) projections suggest that RE will provide up to 40 percent of the country’s primary energy requirements over 2003-2012. The DOE aims to produce an additional 4,000 MW through RE by 2013, with 1,200 MW coming from geothermal energy, 3,000 MW from hydro-generated power, 400 MW from wind and 100 MW from combined solar, biomass and ocean energy.\(^\text{11}\)

**Biofuels Act 2006.** The Biofuels Act 2006 mandates the use of coco-methyl-ester in a minimum 1-2 percent blend with petroleum diesel fuels by 2008, and ethanol in minimum 5-10 percent gasoline blends by 2010. The use of biofuels for electricity generation and transportation power is expected to further reduce dependence on imported fuel sources.\(^\text{12}\)

Even though the development and use of RE resources have been promoted in the Philippines for many years, many barriers remain to widespread RE technology (RET) development and market penetration. RET uptake is particularly slow in rural areas, where RE resources are available but are not utilized due to the lack of household income.\(^\text{13}\) This situation is exacerbated by the risks of marketing and financing RETs in remote and poor communities. Isolated areas with widely dispersed households mean high transaction costs for suppliers and distributors, resulting in mark-ups on RE products, making them less affordable to client household and communities (CHHCs).

### 1.3. Policies and programmes for expanding energy access in the Philippines

Over the years, a number of laws, programmes and projects (described below) have been implemented to expand energy access in the Philippines. The DOE is the key agency, with a mandate to oversee and implement GOP policies and programmes on energy independence and energy access.

The **Electric Power Industry Reform Act of 2001** has expanded rural electrification by requiring distribution utilities to strive for universal service within their respective franchise service areas. This includes ‘missionary’\(^\text{14}\) rural areas, where financial returns may not be immediately realized.\(^\text{15}\)

The **National Barangay Electrification Program**, or the O’llaw (literally, ‘O, Light!), was launched in 1998, and aimed to electrify all barangays by 2010.

The **Rural Power Project (RPP)**, funded by the Global Environment Facility (GEF) through its sub-component **Project ACCESS** (Accelerating Community Electricity Services using Solar), targets off-grid communities to be electrified using Sustainable Solar Market Packages. Project ACCESS forges a strong public-private partnership by engaging private energy corporations to provide solar photovoltaic (SPV) systems in villages beyond the reach of the national grid.\(^\text{16}\)

The **Capacity Building to Remove Barriers to Renewable Energy Development (CBRED) project** (2002-2011) aims to promote and facilitate widespread use of RE in the Philippines. Project activities include strengthening the capacity of relevant GOP agencies to formulate, enact and implement RE policies; improving RE data banking and provisions of RE information to build markets; and improving coordination among organizations concerned with RE. Implemented by the DOE, the project has a total budget of USD 23.8 million, of which USD 5,143,048 is provided by GEF.\(^\text{17}\)

The main challenge to achieving nationwide energy access is the geographical remoteness of many rural areas, often located in mountainous or coastal regions and outer islands. This can make extending electric power lines prohibitively difficult and costly. As of 30 June 2006, the DOE estimated that 2,582 barangays remained un-electrified, representing a total of 411,299 households without electricity. Most of these barangays (55 percent) were in Mindanao region, or the main southern Philippine island region.\(^\text{18}\) By September 2011, 36,048 out of 36,063 listed barangays in the country had been provided with electricity (99.95 percent). Seventy-five percent of total potential households\(^\text{19}\) had been provided with electricity services.\(^\text{20}\)

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\(^{11}\) Marasigan, 2006.

\(^{12}\) Congress of the Philippines, 2007.

\(^{13}\) DOE, 2006.

\(^{14}\) ‘Missionary electrification’ refers to the provision of basic electric services in areas considered unviable by the National Electrification Administration.

\(^{15}\) Marasigan, 2006.

\(^{16}\) DOE, 2007.

\(^{17}\) Center for Environmental Studies and Management, 2011.

\(^{18}\) Marasigan, 2006.

\(^{19}\) Potential households refer to households where electrification is considered viable by the National Electrification Administration.

\(^{20}\) NEA, 2011.
2. Project overview

2.1. Project goal

Building Economic, Social and Technological Opportunities and Foundation to Promote Renewable Energy Nationwide (BEST–OF–PREN) is a microfinance project which promotes the take-up of RETs by households and community organizations in off-grid areas in the Philippines.

2.2. Project methodology

Through its microfinance fund (MFF), the project provides wholesale funds to microfinance intermediaries (MFIs). These funds are then re-lent to small- and micro-scale borrowers (including households and community organizations) in off-grid areas for purchase and installation of RETs from RET suppliers.

BEST-OF-PREN is managed by the PEF, a not-for-profit organization established in November 2001.

2.3. Project funding

BEST-OF-PREN is a component of the CBRED project. The original BEST-OF-PREN MFF (USD 535,500) has been deposited as a CBRED MFF Trust Account, and is managed by PEF. This amount is to be kept intact by the project completion term. After the first two years of project operation, MFF investment and interest incomes from the sub-project loans have been used to finance expected operating costs.

2.4. Project outcomes

Between 2006 and 2011, the BEST-OF-PREN aims to achieve the following outcomes:

- implement 70 RE sub-projects in targeted communities;
- install a collective total of 500 kW capacity of micro-level RET;
- enable targeted households to use the installed RET for basic energy needs;
- maintain the MFF as a source of accessible micro-credit past project expiration; and
- establish eight Philippine Renewable Energy Nodes to provide technical, financial and enterprise services needed for the RET installation in target poor households and communities.

21 Apart from its role in BEST-OF-PREN, PEF manages an endowment fund raised by Philippine NGOs to support their work in community empowerment and poverty reduction. From the interest earnings of the endowment fund, PEF has provided financial grants, loans and equity investments to NGOs for poverty reduction projects, basic services (e.g. potable water and RE), livelihood opportunities (e.g. microfinancing and enterprises) and social-capital development (organizational strengthening, governance and stakeholder participation).
3. Implementation strategy and results

3.1. Roles of implementing partners

PEF has the overall responsibility of managing the BEST-OF-PREN MFF and overseeing the implementation of the microfinance sub-projects. It has the following responsibilities:

- identify and engage suitable MFIs;
- provide loans to MFIs for microfinance sub-projects (maximum of USD 25,000, for up to three years, at an annual interest rate of 7 percent);
- provide grants to MFIs for sub-project feasibility studies, prior to full project proposal (maximum of USD 400);
- provide grants to MFIs for training in the use and maintenance of RET (maximum of USD 1,560);
- provide grants to MFIs for organizational and financial management; and
- conduct sub-project evaluations and impact assessments, using information collected by MFIs from households.

MFIs can take the form of a non-governmental organization (NGO), a cooperative or a cooperative bank with an operational microfinance programme. MFIs have the responsibility to design and manage the microfinance sub-projects, which includes:

- access BEST-OF-PREN loan and grant package;
- identify RETs (and their suppliers) that are available and suitable for the target clientele, i.e. poor households in off-grid communities;
- conduct marketing of RETs to potential CHHCs;
- investigate loan repayment capacity of CHHCs;
- conduct sub-project feasibility studies;
- provide microfinance loans to CHHCs for purchase of RET;
- oversee installation of RET and provision of after-sales support by suppliers;
- collect loan repayments from CHHCs; and
- collect feedback from CHHCs on RET use and impact.

RET suppliers have the following responsibilities:

- provide RET information to MFIs (for marketing to CHHCs);
- install the RETs in CHHCs; and
- provide households and community para-technicians with training on the use and maintenance of RET (funded by MFF, through MFIs).

CHHCs have the following responsibilities:

- acquire microfinance loans from MFIs for the purchase of RET (maximum of USD 3,125 per household);
- acquire the RET from RET suppliers;
- use and maintain the installed RET;
- repay microfinance loans to MFIs; and
- provide feedback to MFIs on RET use and impact.

Figure 1 provides a visual illustration of the roles of implementing partners.
Figure 1: BEST-OF-PREN implementing partners and roles

- **PEF**
  - **RE loan and grant package**
  - USD 25,000 max. loan
  - USD 5,000 max. grant

- **MFI**
  - **Microfinancing loan to CHHC to acquire RET**
  - (max. USD 3,125 per household)
  - Designs and implements a viable RE microfinancing programme.
  - Accesses BEST-OF-PREN RE loan and grant package.
  - Loan terms: 7 percent interest per annum payable in three years maximum.
  - Grant for feasibility study; capability building.

- **RET supplier**
  - Supplies the tested RE technology with appropriate pricing.
  - Provides RE technology information/specifications for marketing.
  - Provides para-technicians training for after-sales support.

- **CHHC**
  - Uses and maintains RET.
  - Repays RE microfinance loan.
  - Gives feedback to MFI on RET use and impact.
  - Acquires RE technology through a MF loan on agreed terms (usually 12 to 24 percent interest per annum, maximum 18 months payment).
  - Loans are on individual liability, but peer-group support and MFI loan account monitoring used for credit and repayment performance.
  - Builds capability for RET after-sales support for repairs and maintenance.
3.2. Identifying client households and communities

In order to identify priority provinces for BEST-OF-PREN, the 2006 DOE electrification data was matched with the 2006 Provincial Poverty Indicators Map. The results indicated that the poorest provinces also had the greatest number of households without access to energy services (see Annex 1 for more details). The poorest 21 provinces contained over 2,000 un-electrified barangays and over 325,000 un-electrified households, making them the obvious targets of the project.

3.3. Implementation to date

BEST-OF-PREN commenced in October 2006. As of June 2009, the SPV lantern (discussed below) has been the only RET disseminated under the project. Fourteen SPV lantern sub-projects have been implemented, including nine pilot phase projects, three combined pilot/local expansion phase projects and two local expansion projects (previously in pilot phase). To date, the SPV lanterns have proven to be the most appropriate RE technology for rapid dissemination to rural poor off-grid households.

3.4. Case study: Sunlite Solar SPV Lantern sub-projects

RE technology

The Sunlite Solar SPV lantern consists of a single 7 W compact fluorescent lamp with a 12 Wp SPV panel. This lantern is supplied exclusively by Solutions Using Renewable Energy (SURE), an accredited supplier under the DOE’s RPP. SURE, as the RET supplier under this BEST-OF-PREN sub-project, provides the lanterns and the after-sales support service (including training para-technicians and guaranteeing availability and replacement of spare parts).

Microfinance arrangements

Under BEST-OF-PREN, SPV lantern microfinancing sub-projects evolved in two phases to date:

1) **Start-up or pilot-phase projects** tested the market and built MFI capability. Each pilot-phase project targeted 50 client households. The MFI loan of USD 4,300 was combined with a USD 325 grant for social marketing activities.

2) **Roll-out or local expansion projects** targeted 100-300 households. MFIs that already had a good track record in managing similar projects (particularly micro-lending) moved readily into local expansion-phase projects.

The visual illustration of these phases is provided in Figure 2. Phase 3 is yet to be reached under BEST-OF-PREN.

The prices of SPV lanterns were set to induce CHHCs to switch away from alternative energy sources, including kerosene, car batteries and diesel-powered generators. For the five pilot-phase projects, the clients’ monthly expenditure on kerosene ranged between USD 5.0 and USD 30.0, with the cost of charging car batteries at USD 5.8 (including capital depreciation cost of the car battery), and a diesel-powered generator service at USD 5.6 to USD 10.0. The pricing structure and loan repayment terms were set in the light of these expenditures, with the monthly amortization payments ranging from USD 8.7 to USD 10.6, with a median of USD 9.3.

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22 The map is based on official poverty indicators and income/expenditure survey results released by the Philippines National Statistical Coordination Board.
23 RPP offers a subsidy for SPV lanterns sold in off-grid areas to make the dealership and marketing of lanterns more financially attractive.
The SPV lantern sub-projects are addressing the capacity needs of the following parties:

**Client households.** SURE provides household training in the use and maintenance of SPV lanterns, including familiarization with components and SPV panel set-up.

**Local para-technicians.** In each sub-project area, 8 to 10 para-technicians (roughly one technician to 10 client households) are trained in basic maintenance and troubleshooting to provide after-sales service to client households. This includes battery maintenance and changing, changing compact fluorescent light bulbs and connection wiring repair. This training is provided by SURE, which has also contributed PHP 10,000 for on-site training costs.

**MFIs.** While MFIs are experienced in microfinancing for enterprise development (usually in retail trading and home-based production of food and low-capital consumer goods), agricultural production and trading, they need to improve their skills in dealing and negotiating with RET suppliers, including demanding timely and adequate after-sales support (e.g. spare parts and replacement batteries delivery).

Consequently, MFIs have received training in the following areas:

- RET marketing;
- RE microfinancing, sub-project development and management, packaging and implementing a microfinancing scheme for specific technology;
- credit monitoring, collection and delinquency management; and
- training for distributors’ para-technicians in technology maintenance and repairs.

The capacity development activities were given relatively small grant funds, amounting to about 10 percent of sub-project funds.
4. Project costs and benefits

4.1 Project costs

In the first two years of operation, project expenditures on operating and overhead costs averaged USD 36,041. Fifty-eight percent of this expenditure went to project management, including salaries and supplies. The remaining expenditures were directed at social marketing, capacity development of staff and partners, project development and monitoring, and depreciation of 5 percent or less (see Table 1).

Table 1: BEST-OF-PREN expenditure

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<tr>
<td></td>
<td>USD</td>
<td>%</td>
<td>USD</td>
</tr>
<tr>
<td>Project management (salaries, administration and supplies)</td>
<td>20,161</td>
<td>53</td>
<td>21,483</td>
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<tr>
<td>Social marketing</td>
<td>8,905</td>
<td>24</td>
<td>2,796</td>
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<td>Capacity development</td>
<td>4,175</td>
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<td>3,190</td>
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<tr>
<td>Project development and monitoring</td>
<td>2,944</td>
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<td>5,033</td>
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<tr>
<td>Depreciation</td>
<td>1,697</td>
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<tr>
<td>TOTAL</td>
<td>37,882</td>
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</table>

In Year 1, loan and grant disbursements remained low because the RET and microfinancing packages were still being marketed, while the sub-projects were still being appraised. Only one pilot-phase sub-project commenced in Year 1. Consequently, the ratio of project expenditures to total loans and grants for the first year was 3:1, which was reversed to 1:3 by Year 3 (with sub-projects increasingly utilizing loans and grants). More detail is provided in Table 2.

Table 2: Sub-project disbursements vs. project expenditures (Oct 2006 to June 2009)

<table>
<thead>
<tr>
<th></th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3 (1st half)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loan funds released (USD)</td>
<td>13,047</td>
<td>69,001</td>
<td>65,103</td>
<td>147,151</td>
</tr>
<tr>
<td>Grants paid (USD)</td>
<td>0</td>
<td>9,688</td>
<td>4,413</td>
<td>14,101</td>
</tr>
<tr>
<td>Total – loans &amp; grants (USD)</td>
<td>13,047</td>
<td>78,689</td>
<td>69,516</td>
<td>161,252</td>
</tr>
<tr>
<td>Project expenditure (USD)</td>
<td>37,882</td>
<td>34,199</td>
<td>19,576</td>
<td>91,657</td>
</tr>
<tr>
<td>Expenditure as percent of loans and grants for sub-projects</td>
<td>290%</td>
<td>43%</td>
<td>28%</td>
<td>57%</td>
</tr>
</tbody>
</table>
4.2. Project benefits

Appraisal of impacts

The BEST-OF-PREN is yet to fully realize its potential. Despite intensive social marketing, the uptake of microfinance loans has been slow, and SPV lanterns have been the only RET disseminated.\(^{24}\) Nonetheless, financial reports submitted by the MFIs involved in the SPV lantern sub-projects, together with field monitoring reports prepared by BEST-OF-PREN staff, provide an insight into the potential impacts of RE sub-projects. These are discussed in detail below.

Impacts of the SPV lantern sub-projects

By 2009, the SPV lantern sub-projects covered 1,411 households in 14 provinces and two adjoining cities. These households represent various livelihood bases, including lowland farming, fishing and upland farming. A quarter of these households are from indigenous communities in Mindanao (the southern Philippine island-region) who engage in upland farming.

Three types of application for the SPV lantern were reported by MFIs and client households: home lighting, household-based livelihood activities and community activities. These are described in Table 3.

Table 3: Uses of SPV lanterns in BEST-OF-PREN sub-projects

<table>
<thead>
<tr>
<th>Activity type</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic use/home-based activities</td>
<td>Home lighting&lt;br&gt;In on-grid areas, SPV lanterns are sometimes used because of unstable electrical power supply.</td>
</tr>
<tr>
<td>Livelihood activities (household-based)</td>
<td>Evening lighting for:&lt;br&gt;• cooking/baking enterprises&lt;br&gt;• market-stall lighting&lt;br&gt;• producing brooms&lt;br&gt;• herding animals and lighting animal stalls</td>
</tr>
<tr>
<td>Community activities</td>
<td>Patrol boats for community fisheries and pens</td>
</tr>
</tbody>
</table>

The benefits of the SPV lantern were also illustrated in a pilot-project case study in Oriental Mindoro Province, which identified the following advantages of SPV lanterns.\(^{25}\)

**High-quality and safety.** Illumination from SPV lanterns is much better than that from kerosene lamps. It is also safer than kerosene, which can cause accidental fires.\(^{26}\) Furthermore, users of SPV lanterns reported none of the soot build-up in their houses commonly associated with kerosene lamps, meaning that the lanterns give better protection from respiratory illnesses.\(^{27}\)

**Cost-effectiveness.** For households in Pola, Oriental Mindoro Province, the cost of kerosene ranges from PHP 40 (for ordinary wick lamps) to PHP 200 (for pressure-pumped kerosene lamps) per month, with two to three hours of lighting per day. The household use cost of SPV lanterns is therefore roughly equivalent to that of kerosene lamps, which are of inferior quality and damaging to the health. For night-fishing operations, using SPV lanterns rather than kerosene lamps means saving about PHP 25 per day.\(^{28}\)

**Ease of maintenance.** CHHCs enjoy a sense of pride in owning a lighting appliance that is not dependent on automotive battery power or kerosene and is easy to maintain.\(^{29}\)

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\(^{24}\) By the mid-term of 2.5 years, only 14 percent of total available loans had been disbursed.

\(^{25}\) PEF, 2008b.

\(^{26}\) PEF, 2009.

\(^{27}\) PEF, 2008a.

\(^{28}\) PEF, 2008b.

\(^{29}\) PEF, 2008b.
5. Measures for project sustainability

The sustainability of BEST-OF-PREN sub-projects depends on their ability to transform basic energy needs of poor households (such as reliable lighting and fuel for cooking) into an effective market demand for RET. This requires, among other things, appropriate RETs and associated services, supported by appropriate pricing and delivery mechanisms.

Experience in the Sunlite sub-project points to the importance of the following factors in ensuring project sustainability.

**Appropriate RE product.** The SPV lanterns disseminated by this project are a sturdy, safe, portable, high-quality light source. In addition, the product is supported with after-sales service by trained para-technicians.

**Appropriate finance mechanism.** The SPV lantern is provided through a monthly instalment-based payment arrangement for households, a financing package that the MFI can continue to provide as long as there is market demand. The MFI’s earnings help it to sustain its loan processing and collection staff. Associated monthly payments – roughly equivalent to household expenditure on kerosene for lamps – are affordable for households.

In pilot-phase projects, MFI operations are partially subsidized from BEST-OF-PREN. In these projects, gross income per lantern is about USD 35-44. The MFI thus earns an average total gross income for 50 lanterns of USD 110 per month for an 18-month loan repayment cycle – just enough to cover a loan officer rendering part-time work and claiming transportation expenses within the town centre.

**Appropriate distribution mechanism.** In a given target area, the main distributor is the MFI. In areas where the market is large and dispersed, the MFI may set up a network marketing system with sub-distributors who also act as collecting agents for client households. Sub-distributors are their member organizations or cooperatives, who in turn have as members client households or individuals who are known, responsible residents of the sub-distribution areas.

**Reliable RET supplier.** The RET supplier has to be capable and committed to bringing the RE product to poor off-grid households. RET suppliers have recently grown in number and capability, bringing with them more affordable and reliable RETs, particularly SPV lighting and improved cookstoves. Outside funding (such as provided by CBRED and RPP) provides an incentive for RET suppliers to bring their products to the mass market.

**Social marketing and networking with industry players.** BEST-OF-PREN applies numerous social marketing techniques to attract various players to the project. These include:

- RET orientation programmes with potential MFI partners in target off-grid and electricity-poor provinces;
- participation in RET and microfinancing exhibitions, conferences, product demonstrations (e.g. the National Cooperative Summit in 2008) and development trade fairs in key cities. The purpose is to network with suppliers and distributors; and
- brochures, stimulating presentations and RET demonstrations (including the SPV lantern, fuel-efficient charcoal-fired cookstoves and hydraulic ram pumps).
6. Lessons learned and good practices in expanding energy services for the poor

To date, the SPV lantern sub-projects have been the only projects under BEST-OF-PREN, meaning that the expansion of energy access has been limited to 1,400 rural households using the lantern. However, the project has tested and refined the microfinancing system, and built MFI capacities to operate the RET supply and delivery mechanism effectively. The following factors have proven important for expanding energy access through microfinancing for household and community-level RET.

6.1 Enabling policy environment

The GOP (particularly the DOE) has created an enabling environment for expanding energy access to rural poor households using RE. Specifically, CBRED interventions in capacity development and a market service centre stimulated private-sector involvement and expansion into the rural household market. The strategy of partnering with civil society organizations and MFIs created a wider distribution mechanism, one that could reach more rural poor households, particularly because these households are the MFIs’ target clientele.

In addition, the Renewable Energy Act of 2008 provides the necessary policy backing and allocates budget to further extend RETs. As the Act is implemented, appropriate market-based approaches to RETs for the poor may be given greater focus. A social and economic cost-benefit analysis of RETs aimed at poor households will be important for CBRED and the DOE, particularly if the poor communities are eventually connected to the electric power grid.

6.2 Market-based approach in development and delivery of energy products

The project relies on a commercially mature RET that could be bought into the market (the SPV lantern). Much like other modern appliances such as televisions and mobile phones, household RETs should fulfill a need and be available through an accessible loan amortization scheme. SPV lanterns for household lighting have proved to be the most commercially viable RET under the project.

When BEST-OF-PREN began operations in 2006, there were few RET suppliers. However, the past few years has seen many industry players and commercial suppliers entering the Philippines. The crux of RE expansion to remote rural communities lies in the willingness of RET suppliers to move into these communities and co-share in product marketing and capacity-building among MFI partners.

The SPV lantern is MFI-distributed and financed. Price calculations, including interest on RET financing, were based on ‘replacement expenditure’, i.e. the amount that a family would have otherwise spent on kerosene for lighting. Loan amortization collection is then based on MFI activities with CHHCs. For instance, if the client household is also a member of the cooperative, the loan is collected according to the cooperative’s usual practices, and the member receives a patronage refund at the end of the year.

6.3 Adequate, accessible and appropriate RE financing windows

Reducing costs. Financing windows and packages available from development financing institutions (e.g. the Development Bank of the Philippines) typically require project feasibility studies, loan collaterals and equity from project proponents – all of which add up to a high cost of capital. BEST-OF-PREN reduced the cost of financing RETs by fixing the MFI interest rate for wholesale financing to 7 percent per annum, which provides the MFI a comfortable 17 percent per annum margin to cover its own lending and transaction costs.

Linkage with the World Bank’s RPP, particularly for subsidy provision for household-level RET, has enabled MFIs to lower the SPV lantern purchase cost (and, consequently, the final price to the CHHC).

Continuing challenges. Despite the concessional financing, however, the high transaction costs of operation in remote and dispersed communities continue to present a challenge. These lead to higher mark-ups by distributors (making the product less affordable for clients) and make it more difficult for distributors to provide after-sales support and maintenance.
Innovative marketing and microfinancing models. The project is currently experimenting with various marketing and microfinancing models in loan collection. For instance, the Federation of Agricultural Resource Managers (FARM), one of the more successful MFIs, deducts repayments when farmers sell their products through FARM.

6.4 Adequate and accessible knowledge support

Links with the other CBRED components and DOE RE projects can provide PEF and partner MFIs with relevant information and knowledge support.

For example, information regarding commercially available RETs and accredited suppliers was available through the DOE’s Market Service Center (MSC). Unfortunately, the MSC ceased operation in 2007, making such information poorly organized and difficult to access. A new MSC that could serve as an information clearing-house regarding technologies, suppliers and markets would create a more supportive environment for various market players, including the RE Industry Association.

6.5 Capacity development for MFIs in technology, financing, marketing and risk management

From the start, CBRED provided capacity development support, helping private-sector organizations (including civil society and not-for-profit organizations) to become effective RET financing agencies.

CBRED training programmes. Market delivery was accomplished through a series of CBRED training courses attended by BEST-OF-PREN staff and MFI partners. Conducted by a credible training organization, courses included project development, monitoring, evaluation, financial analysis and market analysis for RE projects.

RET supplier training programmes. As the MFI sub-projects were being rolled out, RET suppliers provided training and orientation sessions on product information and marketing strategies to the MFI. A Solar Lantern conference was held after the first year of the pilot projects to assess progress, share lessons and recommend adjustments to delivery mechanisms.

More capacity building needed. Marketing and financing in remote and poor communities pose multiple risks. These include theft and even kidnapping of MFI staff who deliver products, provide after-sales support and collect loans. More capacity building is needed to develop adequate market and risk analysis, as well as MFI creativity and flexibility in addressing these risks.

7. Conclusions

The BEST-OF-PREN has been in operation since 2006, providing loans to MFIs operating in poor provinces for on-lending to poor households for the acquisition of RETs. While the project is yet to demonstrate large-scale impacts on the ground, the MFI model shows promise for large-scale adoption. Experience shows that sustainability of the model depends predominantly on the capability of the RET supplier and the MFI distributor to reach large numbers of client households and revolve the microfinance fund. Key success factors include selection of commercially mature technologies, capacity-building of MFI partners and technology suppliers, willingness of RET suppliers to market their products to poor communities, and co-share product marketing costs.

BEST-OF-PREN can provide lessons and best practices to the government and the private sector. In the Philippines, these are particularly applicable to the missionary areas – small offshore island communities or remote highland communities that will remain off-grid for the foreseeable future.
References


Annex 1: Number of un-electrified barangays in PEF priority provinces (30 June 2006)

<table>
<thead>
<tr>
<th>(Region) Province</th>
<th>Rank PEF 2007 dev. index</th>
<th>Un-electrified barangays (no.)</th>
<th>Un-electrified households (no.)</th>
<th>Percent of total un-electrified barangays for region</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Luzon)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Masbate</td>
<td>3</td>
<td>430</td>
<td>92,330</td>
<td>71</td>
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<tr>
<td>Palawan</td>
<td>41</td>
<td>227</td>
<td>50,120</td>
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<tr>
<td>Quezon</td>
<td>46</td>
<td>109</td>
<td>29,620</td>
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<tr>
<td>Cagayan</td>
<td>59</td>
<td>46</td>
<td>5,086</td>
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<tr>
<td>Oriental Mindoro</td>
<td>44</td>
<td>5</td>
<td>1,393</td>
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<tr>
<td>Albay</td>
<td>50</td>
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<td>811</td>
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<tr>
<td>(Visayas)</td>
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<td>Northern Samar</td>
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<td>454</td>
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<td>Eastern Samar</td>
<td>40</td>
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<td>Western Samar</td>
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<td>10,598</td>
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<td>Negros Oriental</td>
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<td>Negros Occidental</td>
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<td>13,925</td>
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<tr>
<td>(Mindanao)</td>
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<td>Lanao del Sur</td>
<td>55</td>
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<td>28,264</td>
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<td>Sulu</td>
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<td>Maguindanao</td>
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<td>Zamboanga Norte</td>
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<td>Sarangani</td>
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<td>7,448</td>
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</tr>
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<td>Basilan</td>
<td>4</td>
<td>7</td>
<td>1,550</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>2,021</strong></td>
<td><strong>325,464</strong></td>
<td><strong>78</strong></td>
</tr>
</tbody>
</table>
