THE NATURE AND ROLE OF LOCAL BENEFITS IN GEF PROGRAMME AREAS

CASE STUDY

Philippines:

Palawan New and Renewable Energy and Livelihood Support Project

GEF

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Authors

Dr. David M. Todd (Case Study Manager & Team Leader) GEF Office of Monitoring & Evaluation, Washington DC, USA **–** dtodd@thegef.org
Samuel Wedderburn World Bank – GEF Coordination Unit, Washington DC, USA – swedderburn@worldbank.org
Olav Lundstol, UNDP/GEF Bangkok Regional Office, Thailand – olav.lundstol@undp.org
Enrique Nunez - Consultant

INTRODUCTION

This Case Study is an input into the GEF Monitoring and Evaluation Unit Study of the Nature and Role of Local Benefits in GEF Program Areas. It is based on a field mission conducted in the Philippines from March 14th to March 30th 2004 by a joint GEF-UNDP-World Bank team, consisting of David Todd (Senior Monitoring and Evaluation Specialist, GEF M&E Unit), Olav Lundstol (Portfolio Manager, Climate Change, UNDP-GEF Regional Coordination Unit for Asia and the Pacific), Samuel Wedderburn (Senior Operations Officer, Environment Department, GEF Coordination Team, The World Bank) and Enrique Nunez (Consultant to GEF M&E Unit).

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The GEF Focal Point and Secretary of the Department of Environment and Natural Resources, Elisea Gozun, presided over a meeting with representatives of the Government of the Philippines.

In Palawan, the mission was assisted by the team in the Project Management Office of the Center for Renewable Resources and Energy Efficiency (CRREE), under the leadership of Antonio Miclat. The mission also held discussions with the CRREE Executive Director, Antonio de Castro.

During the course of the mission, the team met representatives of the Office of the Mayor of Puerto Princesa, Office of the Vice Governor, Palawan Cooperative Bank, Palawan State University, Shell Solar, the Affiliated Nonconventional Energy Center, CCC Lending, the Palawan Electricity Cooperative, the University of Philippines Solarlab and members of the communities and cooperatives in Caramay and Napsan.

The study team would like to extend its thanks to all who helped with its work. The findings of this report are those of the study team and do not necessarily reflect the views of any of those who assisted it.

ABBREVIATIONS

Co2	Carbon dioxide
IG	Income Generation
kW	Kilowatt
KWh	Kilowatt hour
MOA	Memorandum of Agreement
MTE	Mid Term Evaluation
MW	Megawatt
MWh	Megawatt hours
NRE	New and renewable energy
PCB	Palawan Cooperative Bank
PDF B	Project Development and Preparation Facility B
PIR	Project Implementation Review
PNRELSP	Palawan New and Renewable Energy and Livelihood Support Project
PV	Photo Voltaic
RE	Renewable Energy
SHS	Solar Home System
Wp	The amount of watts produced under optimal conditions

1: OVERVIEW OF THE INVESTMENT

1.1 Background to the project

Palawan Province of the Philippines contains more than 1,700 islands, with a total population of over 650,000 people. The main island of Palawan has an area of about 15,000 square kilometers. It is nearly 650 kilometers long and thin in shape, with nearly 2,000 kilometers of coastline. Most of the major settlements are along the east coast, which is separated from the west of the island by substantial mountain ranges. Road links are mainly along the coasts and link the capital Puerto Princesa, with other population centers. Many areas of the mainland, together with the outlying islands, can only be reached by boat.

Agriculture and fisheries are the main employment activities, with mining, manufacturing and logging as other important occupations. Average household income is stated in the Project Summary to be $200 per head per annum, or about $1,000 per household. This suggests a substantial level of poverty in the Province, although this dimension is not elaborated in project documents. Field study discussions indicated that land ownership is highly concentrated and that land redistributed to poor households under Department of Agrarian Reform programs is often sold back to the relatively rich to pay off debts or meet urgent needs. The poverty cycle is therefore likely to be highly resilient to change.

The Province contains the Philippines largest oil and gas fields. The Shell Malampaya Gas project is expected to generate over $ 2 billion in royalty payments for the Province over a 20 year period. However, it is not clear that all of these funds will actually be passed on to Palawan by the Central Government, or when, or for what purposes they will be used. In the first five years of receipt of funds, the Palawan Provincial Government is legally required to spend at least 80% of the royalty payment of $228 million (that is $183 million) to improve the supply of electricity.

The Palawan environment is the best preserved in the Philippines, in recognition of which the Palawan Council for Sustainable Development (PCSD) was established in 1992, to oversee processes to mediate between the pressures of economic development and environmental quality of the islands.

Palawan has 425 district units, called barangays, which normally contain between 50 and 200 households. Documents vary in their assessment of how many houses are electrified and it is not clear that they take account of the very low level of access, which meets the criterion of an “electrified” community. The original *Project Summary* states that about 35% of barangays are “electrified”; a national level definition, which means that 10 households in the community are connected to the grid. *The Feasibility Study for a Project to Provide Environmentally Friendly Services to Off-Grid Communities in the Province of Palawan*, prepared by Community Power Corporation on behalf of Shell Solar BV, states that 42% of communities are electrified. The report’s estimate of unelectrified households is over 50,000.

Power in Palawan is generated by two companies (one Government agency and a private enterprise), with a capacity of 20 MW from diesel generators. A private sector Rural Energy Cooperative (REC) distributes the power, mostly to the southern communities on the main island. Power generation and distribution are both subsidized by the national Government. The REC (named PALECO) is responsible for issuing permits for any stand alone systems, which may be set up by other providers. Such permits may be granted if the REC has no plan to extend the grid to the area within 5 to 10 years. Renewable energy offers substantial possibilities in Palawan. Potential wind energy has been estimated at 3,000 to 5,000 MW per annum, as against the Province's estimated energy demand by 2021 of 250 MW. There are also abundant hydro, biomass and solar resources, with an average solar insolation of 1000 Watt/m2.

Although renewable energy in general and solar energy in particular has a substantial history in Philippines, relatively little has been implemented in this field in Palawan. The distribution cooperative, PALECO has conducted a limited battery charging program, the Dutch Government has funded a solar-ecotourism project in El Nido on the west coast, whilst the Spanish Government funded a Philippine Rural Reconstruction Movement project to install solar systems in 200 households, also in El Nido. At the same time as the Palawan project was prepared, UNDP submitted a PDF B project proposal for capacity building to remove barriers to renewable energy in the Philippines.

The Provincial Government prepared an Energy Master Plan in 1999, stating the overall aim of providing "adequate, reliable and affordable energy supply for the province with due consideration of social and environmental acceptability". The Plan has six key strategies:

- "Enhance energy and self-sufficiency through continuous investigation, development and exploitation of indigenous energy resources
- Provide reliable and efficient supply of electricity
- Encourage greater private sector investment and participation in all energy activities
- Promote the adoption of environmental-friendly energy systems
- Integrate social and environmental concerns in the planning and implementation of energy programs and projects".

The Master Plan targets 24 communities out of the total of 269 for electrification through PV Solar Home Systems.

Funds for the Palawan Energy Master Plan are expected to be provided from the Province's royalty revenues from the Shell Malampaya gas project. These royalties are likely to amount to more than $2 billion over a 20 year period. However, in view of the huge scale of the royalties, their distribution between the national Government and Palawan Province is highly contentious and they are already the subject of high level legal proceedings.

1.2 Project Financing

This is a Medium Sized Project (MSP). The GEF budget for the project is $750,000. As co-financing, the Provincial Government committed $300,000, Shell $1,400,000 and UNDP TRAC input $100,000. According to the project summary, GEF funds were to be expended for the following purposes:

- Build capacity for Local Government Units and Rural Electric Cooperatives ($150,000 of which $100,000 from GEF)
- Public Awareness Campaign on Renewable Energy ($100,000 of which $50,000 from GEF)
- Establish a Renewable Energy Development Center ($350,000 of which $250,000 from GEF)
- Design a Risk Sharing Mechanism to support RESCO ($1,850,000 of which $250,000 from GEF).

As can be seen, the activities listed for GEF financing only add up to $650,000, leaving $100,000 unallocated. This has not been commented upon by any PIR or the Mid Term Evaluation (MTE).

The stated rationale for GEF financing was that, without it, the future expansion of electricity supply would primarily come from diesel generators, with renewable energy as an insignificant part of the energy sector.

1.3 Project Objectives

"The project is aimed to reduce the long-term growth of GHG emissions through removing barriers to commercial utilization of renewable energy systems to substitute for the use of diesel generators in Palawan" (Project Summary P1). To measure progress towards this objective, the project proposed three indicators:

- Increased installation and sustained demand for renewable energy systems in Palawan
- Decreased diesel consumption in Palawan
- Commercial operation of renewable energy systems by the Rural Energy Service Company (RESCO).

"The widespread adoption and operation of renewable power systems in Palawan is hindered by a large number of policy, institutional, information, financing, market and technical barriers. This project….will remove these barriers, thereby leading to wide-scale commercial operation of renewable energy systems to replace diesel generators and to provide electric power service to the unelectrified households" (Project Summary, P5).

The project was promoted on the basis of its substantial replication potential. “As a result of the replication made possible by this project after removing the key barriers, the RESCO would extend the renewable energy services beyond the 50,000 non-electrified households to the entire Palawan province. Thus, at least 4 million gallons, or 15 million litres, of diesel consumption would be reduced, US$4.5 million would be saved from oil imports, and 12,000 tons of carbon emission reduced. In addition, the commercial operation of renewable energy systems by the RESCO delivery mechanism would have a wider replication potential in other remote islands and areas of the world” (Project Summary, P5).

The proposed RESCO model would comprise “provision of a fee-for-service utility company, rather than through the sale of hardware…. The aim of the service fee would be the recovery of the utility’s operating costs plus a capital recovery charge…… The RESCO delivery mechanism considered under this project has its unique characteristics compared to those tested in other countries. First, this project will promote the economic activities of productive use from renewable energy services, so that the local communities can generate incomes to be able to pay for the electricity services received. Second, the RESCO under this project will be service-oriented, rather than technology oriented. That is, the RESCO will deliver a range of renewable energy services, depending on the resources availability, economics of the technology options, and communities’ needs, rather than only focus on solar home systems. The success of this model in Palawan and its replication in Philippines and other countries can accelerate the bulk purchases of renewable energy systems in the world market, lead to a reduction in the costs of renewable energy systems globally, thus mitigate more quantities of GHG emissions.” (Project Summary, P8).

It should be emphasized that the project aimed to explore a range of renewable energy sources and to link these with livelihood projects, to raise income to enable poor people to purchase household energy systems. A demonstration centre for different models of energy provision was one of the central components of the overall project concept.

1.4 Project Linkages

The development of small-scale renewable energy systems for rural development is one of the strategies of the UNDP Country Cooperation Framework to alleviate rural poverty. This links in with the Philippine Agenda 21 blueprint for sustainable development, which has as a priority strategy the development and utilization of renewable energy technologies. UNDP also supports a number of other energy-related projects and programs, including a technical assistance project to the Development Bank of the Philippines for the Financing Energy Services for Small-Scale Users (FINESSE) project, which promotes utilization of renewable energy sources by encouraging greater private sector investment and participation.

1.5 Intended Local Benefits

The intended local benefits are summarized in the project "social assessment" (Project Summary P15) as follows: "The project will have significant positive social implications. This project will utilize indigenous and environmentally friendly energy resources to provide electricity services to people currently without access to electricity in remote islands and areas, and promote livelihood support activities from the renewable energy services. In addition, renewable energy technologies can greatly reduce Palawan's oil import, and mitigate the health and environmental hazards posed by the consumption of petroleum products. Thus, this project can improve people's livelihoods and living conditions in Palawan".

Under its comment on "social and participation issues", the project is also intended to have an explicit poverty focus, in keeping with UNDP's mandate. "The project will be beneficial to the poor. In particular the widespread application of renewable energy resulting from the project should have a positive impact on vulnerable groups, through the following mechanisms:

- Babies and children will benefit from the convenient form of energy – electricity, and the reduced local air pollution from fossil fuels;
- Sick and elderly people will benefit from the convenient form of energy – electricity, and the reduced local air pollution from fossil fuels;
- Women will spend less time going to the market to buy kerosene and less time collecting wood". (Project Summary, P16 & 17).

1.6 Project Preparation and Design

The project implementers comprise a consortium of private sector, NGO and academic partners. Perhaps as a result of this factor, project preparation was thorough and researched both social and market factors. An overall Feasibility Study was conducted, including a detailed Participatory Market Research study.

The market research concluded that the target group was in the lowest identified "economic class", with fishing and farming as predominant occupations. Major energy sources are kerosene, generators, fuel wood, LPG and charcoal. Access to electricity from generators is rented on the basis of a set number of hours per month. Kerosene, charcoal, candles and batteries are purchased from local "sari-sari" (variety) stores, whilst LPG and vehicle batteries come from Puerto Princesa City, the Provincial capital. Fuel wood is gathered free of charge.

Since the project intended to make electricity available for livelihood activities, in order to generate income from which fees for solar PV could be paid, local residents' intended activities were investigated. The overall majority of respondents said that they would not engage in any additional livelihood activity, even if they had access to electricity. Of

those who were interested in additional livelihood activities, the great majority wanted to set up a "sari-sari" store. Less than ten per cent were interested in activities concerning marine or agricultural produce.

The Feasibility study identified 146 communities as "high potential candidates for electrification using a mix of renewable energy technologies due to their size and power requirements" (Feasibility Study, P15). The major factor in selecting these communicates was that they had more than 100 but less than 300 households and therefore had enough potential users to be attractive, but not so many that grid electrification was likely to be imminent. The relatively high dispersion of households also made solar PV or a battery charging system attractive. Many such communicates have already been supplied with local mini-grids, powered by diesel generators, which have typically failed within three years due to management and maintenance problems.

The Feasibility Study estimated that 60% of households in the target communities were wiling and able to pay from P300 to P500 per month (Philippine Pesos, then equivalent to $6.25 to $12.50) out of monthly incomes ranging from P2,500 ($60) to P8,000 ($200). If the price were lowered to 150 to 200 Pesos per month, most other households expressed the willingness and ability to pay (for a service providing 100 to 150 Wh. per day).

The most appropriate RE system was found to be Solar Home Systems (SHS), with additional opportunities for PV/LPG Hybrid systems. Five communities were identified as pilot sites for the introduction of off-grid electrification. These were Napsan, Caramay, New Ibajay, Nangalao (later replaced by Turda) and Bulalacao.

The Feasibility Study pointed to some potential difficulties in the path of RE technologies, as follows: "Sustainable operation of these power systems is difficult, especially for productive uses. Capital and operating costs of renewable energy power systems are typically significantly higher than that for a large central station utility plant or even some stand-alone engine generators. Operation and maintenance of systems in remote areas requires special training and management of local people. Variability in the renewable energy resource often requires energy storage, primarily batteries that are expensive and not well understood. End-use loads tend to be inefficient and not particularly well suited to application in a remote environment. Schemes for economic recovery of costs based on market-based pricing of energy are still in their infancy but often disallowed by well-meaning, but destructive, policies of uniform tariffs" (Feasibility Study, P22).

2. Project Progress

2a. Documentary Evidence

The project had its first disbursement in April 2000. Its first PIR in mid-2001reported satisfactory progress on all dimensions, with a high probability that the project's key assumptions would hold. The PIR of mid 2002 reported the displacement of 6,100

equivalent liters of diesel, based on the installation of 203 Solar Home Systems by Shell Solar Philippines Corporation. Other achievements were:

- the provision of advice by the Center for Renewable Resources and Energy Efficiency (CRREE),the main implementing NGO
- Commencement of "solar-powered, mangrove-friendly mud crab culturing ad fattening livelihood projects" in five community pilot sites and generation of some earnings from these activities.

Although the project was still rated satisfactory on most aspects in the 2002 PIR, it had already experienced a major change. Shell Solar, which had committed to operating a RESCO as a core project mechanism, decided to radically shift its approach to a direct sales system. This was done on the basis of an unfavorable experience with its RESCO experiment in the Aklan region of Philippines. The decision was taken unilaterally, without consulting other project partners and no evidence of the alleged failure of the RESCO approach was provided. Nevertheless, the Project Steering Committee decided to continue under the new direct sales mechanism and to seek to enlist a micro-finance institution (MFI), which could provide some mechanism through which prospective SHS users could raise capital to purchase their systems.

On the basis of this experience the 2002 PIR (Project Implementation Report) concludes: "The project learned that it is not proper to pre-identify a particular delivery mechanism to a given locality such as Palawan, without a supporting study, It is even risky to tie a project's delivery mechanism to that of the private sector partner who fully decides on its own and can change its approach anytime that may hold the project in hostage" (P14).

In September 2002, the project had its Mid-Term Evaluation (MTE). Key findings of this study included:

- The decision to change from a RESCO to a Direct Sale Scheme delayed the design and implementation of the Risk Sharing Mechanism
- By the time of the study, financial incentives for NREs should have been finalized
- A revised Palawan Energy Master Plan should have been submitted to the project. A JICA-assisted project to finalize this plan, with assistance of the University of Philippines had been agreed.
- Establishment of the Palawan Renewable Energy Development Center (PREDC) had not been formalized, although CRREE had partially adopted this role
- Production activities were limited; only mud crab culturing had been piloted in the six sites
- Market related studies were delayed
- Renewable energy resource assessment for pilot sites had not yet been completed
- Despite weaknesses exhibited in survey delivery, the Training Workshop on Socio-Economic Assessment was deleted by the Project Management Office, without the approval of the Project Steering Committee or UNDP
- UNDP-GEF had required the introduction of measurable indicators and timeframes for some outputs, which had been missing from the Project

Document. Since these were not available by the time of the evaluation, there was little basis for an assessment of progress

- The Memorandum of Agreement for the project did not include the main player, Shell Solar Philippines. Nevertheless, Shell had commenced its solar home system marketing campaign which, according to the MTE "could pave the way for other SHS suppliers and industry players to enter the market". **LBS Comment.** It should be noted in this respect that Shell itself is targeting the development of an effective "sole source" strategy for the supply of renewable energy in Palawan, according to commercial documents. It is not intending to facilitate market entry for other players. Furthermore, there have already been several commercial enterprises in the solar energy field in Palawan, but they have chosen not to focus on the area of household provision (See Section 2b)
- According to the MTE, the "project is very relevant to the development priorities at the local community levels being targeted especially at the capacity development for the targeted beneficiaries as well as the stakeholders of the project. The local participants in the project sites are trained by the CRREE staff in identifying needs towards livelihood development starting from their usual knowhow, data gathering, cooperative organization, and basic day-t-day operation and management of the business. The project site chosen were mostly coastal communities where mud-crab culturing was identified as a good potential for small business for the cooperatives formed by the PNRELSP. Using synergistic approach, the introduction of solar lighting systems in the mud crab farms were seen to enhance the productivity of the livelihood and as a good entry point for introducing this new technology and later on open new areas for productive uses of solar energy" (MTE, Page xix). **LBS Comment.** The LBS fieldwork produced substantially different conclusions on this aspect of the project. (See Section 2b).
- The project's capacity building achievements are not fully appreciated by intended beneficiaries, who still find themselves unable to purchase a SHS, despite the expectations, which have been raised by the project.
- The project had unrealistic scale and time span for outputs, in relation to its inputs. This was exacerbated by ineffective working relationships between various stakeholders in the consortium managed by CRREE.
- Beneficiary participation on the Project Steering Committee has been ineffective, owing to lack of consistency and continuity of representation.
- The intended Renewable Energy Development Center had not progressed and CRREE was filling this function on a temporary basis, with no clear direction for the future.
- The Risk-Sharing mechanism had not been designed, although the project was near its official closing date.
- Provincial Government had not yet created a special Energy Department as intended. **LBS Comment.** Completed by the time of the LBS mission.
- Although a Renewable Energy Policy had been adopted by the Provincial Government, no guidelines or action plans had been issued to show how this could be implemented.

- The implementing NGO, CRREE, has skills in environmental and community livelihoods aspects, but needs additional expertise on technical aspects, as well as on policy, planning, monitoring and evaluation.
- Provincial Government (PGP) had established many working linkages and had tangible plans to establish an energy management department
- The MTE noted some important lessons concerning intended and delivered local benefits. "Community ownership of the livelihood and energy projects is very important because it results to better commitment and involvement of people. This can only be possible if the level of awareness and acceptance has reached a point where local leaders are empowered…. It is easy to raise the expectations of the people in the rural community specially when there are no apparent options for their energy needs. However, their enthusiasm drastically drops if they fail to see tangible results of what were spoken of during information campaigns and training programs….Still the first-cost barrier for NRE systems is first and foremost consideration in designing sustainable small power systems for low income communities" (P xxxii).
- An important conclusion of the MTE relevant to private sector participation is that "all project partners and key project implementers should officially sign project agreements and related documents in order to formalize commitments on inputs, outputs and processes involved in the implementation of a project (Page xxxii).

By the time of the May 2003 PIR, three months after the project's original completion date, some of the project's original objectives had been revised. "This project is intended to demonstrate the viability of direct sales of SHS as a delivery mechanism towards achieving the target of energizing 1000 households in Palawan…..At the end of the Project, there will be …..a commercial and sustainable delivery mechanism and workable risk-sharing schemes to increase RE services in Palawan" (PIR 2003, P1).

According to the PIR, "As of end May 2003, there are 380 SHS currently installed and about 15,000 equivalent liters of diesel having been displaced over the last two years". **LBS Comment:** The LBS team concluded that few, if any, of these systems could be directly attributed to the project. However, the project contributed to the circumstances promoting the sale of SHS units in Palawan. The PIR acknowledges that these units have been sold at a rate heavily subsidized (by the Netherlands Government) as part of a national program of assistance. To date, the selling price had been P19,300 per SHS unit of 50-60 Wpk, as against the normal selling price of P 29,000-31,000.

In addition, "three Battery Charging Systems (BCS) have been installed in Napsan, Turda and Bulalacao respectively. About 20,800 equivalent liters of diesel have been displaced as of end May 2003". (P2).

According to its second Development Objective, the project aimed to have a "cumulative installed capacity of about 132 kW (approx. 2,220 solar home systems) operational by the end of 2004". The PIR claims that the "project was able to install 177 SHS (PV systems) at an average of 50 Wp per SHS. Specific to the 5 pilot sites, 10 (ten) SHSs have been installed in Caramay, Roxas, New Ibajay, El Nido and Coron as of May 15, 2003," (P3).

LBS Comment: The LBS team does not regard the attribution of 177 SHS units to the project as correct, although it has contributed to the build up of interest in and availability of such systems.

The third Development Objective stated in the 2003 PIR is that "Five cooperatives (with an average number of 25 members per cooperative) earn an additional income of P1 M at current production capacity of the on-going NRE-supported livelihood project by 2003". Against this, the PIR records a number of small business activities as follows:

- Napsan. Hatchery for ducks eggs, to produce an income of P 200 per day. Battery Charging Station and Satellite Phone projects, which had generated P 8,000 by end of May 2003.
- Caramay. Mud crab fattening project, which had grossed P 24,624 by May 2003. This cooperative also obtained 2 external loans, used for a "solar-powered" grouper fish rearing project.
- New Ibajay. Mud crab project, with income of P18,194 by May 2003.
- Turda. Mud crab project with income of P 22,500, some of which invested in a merchandizing project.
- Bulalacao. Mud crab project, trading in fuel, rice and grouper fish; with total monthly income of more than P 50,000.

Comment: Clearly, there have been some achievements, but the income attained is substantially less than the intended P 1 M. The LBS mission found major deficiencies in this project component. (See Section 2b).

The project's immediate objective to raise capacities for Provincial and Local Government and the Rural Electric Cooperative appeared to have been realized through a substantial training program and the establishment of a Renewable Energy Unit in the Provincial Government.

Its next objective, concerning raised public demand for renewable energy systems had been partially realized through successful inputs into preparation of the JICA-funded revised Palawan Energy Master Plan. Public events and community liaison are said to have resulted in 500 referrals of potential customers to Shell.

The intended Renewable Energy Development Center had been established, showing various types of RE system and offering training sessions on their use. However, its location in the backyard of accommodation rented by CRREE for its office does not provide the basis for a permanent centre and some of the exhibits are not readily movable. Ten NRE-supported livelihood projects had been started, including 5 biogas projects. In addition technical staff from the Project Management Office had been trained in installation and maintenance of various types of RE system and had installed units in project pilot sites.

Progress against the financial objectives of the project was far less clear. Achievements noted by the PSC include: Project Steering Committee approval of a Risk-Sharing

Mechanism for a direct sales model for SHSs; Provincial Government agreement to promote a Vendor Repurchase Commitment as a risk sharing mechanism to attract Financial Institutions into the market; Steering Committee resolution to endorse direct and indirect lending to households to finance SHS purchases.

With regard to the financing of systems to date, Shell Solar Philippines Corporation (SSPC) has provided its own guarantee funds to the Cooperative Bank of Palawan, which then extends 1 to 5 year loans to borrowers with 20% down payment to purchase SHSs. Out of 120 people who had applied for a loan under this scheme, 30 were able to conclude the agreement. The GEF's Risk–Sharing Mechanism would establish a Loss Reserve Fund (LRF) of $100,000 to cover losses from any default of payment. This LRF, together with the Vendor Repurchase Commitment are intended to enable achievement of the new target of 1000 household units.

The MTE cites a number of examples of good practice derived from the project, namely:

- "the strategy of combining the energy needs with environmental considerations of the province through the introduction of NRE systems in livelihood/income generation activities of the community…..As economic situation improves, disposable income of families for energy supply is enhanced.
- Shell Solar has agreed to the Project's Risk-Sharing Mechanism Design and the Cooperative Bank of Palawan and Landbank Leasing… agree in principle the project's concept of LRF (Loss Reserve Fund), Vendor Repurchase Commitment as the risk-sharing mechanism needed to induce the banks to lend…. The project's coordination work with Shell and the banks reflects the importance of the role of the private sector as the main vehicle for delivering NRE technology to rural communities….
- The high visibility of the Project's Renewable Energy Development Center/Renewable Resources Livelihood Center has significantly increased public demand for renewable energy systems and NRE-supported livelihood projects……" (MTE, P18).

As far as the **global environment benefits** obtained, the 2003 PIR calculates that the 416 Solar PV Units installed have a capacity of 20,000 Wp and deliver 45,552 MWh/year, avoiding a total of 39.1 tons of CO2 p.a.

2b. LBS Field Visit Findings (March 04)

The Implementation Consortium

The project has been implemented by a consortium of stakeholders. The LBS study team met the key players during its field visit to Palawan and Manila.

In the Philippines, GEF Climate Change programs are mainly tripartite activities between GEF, UNDP and the **Department of Environment and Natural Resources** (DENR). Many activities have NGO participation. Earlier, the Government was criticized for

working mainly with international NGOs. When it shifted its balance towards national NGOs, problems arose with newly-created bodies and NGO consortia, where there has been substantial rivalry between NGOs, with negative impacts on project quality. One advantage noted of working with locally-based NGOs is that they are likely to remain after the project closes, providing some support for sustainability.

GEF promotes national ownership and sustainability of its projects, but DENR feels that the Provincial or Local Government should adopt Renewable Energy projects and look for maintenance and replication opportunities, together with the private sector. RE projects need to produce enough energy for use in small-scale livelihood activities, such as rice mills. Just home lighting is not enough. Government has high level commitment for environmentally-friendly projects, but has limited absorptive capacity for funds in this area.

The Provincial Government of Palawan has established an Energy Division with 5 staff, one of whom is permanent. The revised Energy Master Plan (with JICA assistance) was expected by May 2004. The Provincial Government is capable of institutional development and capacity building in the energy sector, having received training under the CRREE implemented project. The PGP has earmarked P 20 million for IG activities, including rural energy projects.

The PGP is still in discussion with the National Government concerning its share of the Malampaya Revenue. P 600 million was released this year and will be distributed 80% to energy activities and 20% to infrastructure and livelihood. If the PG wins its case, it will receive $2 billion over a 20 year period, of which 80% would go to energy activities. In particular, the west coast and the internal areas would benefit, since the grid is unlikely to reach there. Solar is regarded as the most interesting prospect, with wind and water less so.

As far as the PGP is concerned, the current cost of P19,300 for a 75 wpk unit providing four lights is still very costly. Either a subsidy will be necessary or income generation will need to occur before units can be purchased.

For more investors to come into Renewable Energy there would need to be strong incentive policies. National legislation which is pending would allow Local Government to talk measures along these lines. However, the Provincial Government tends to think along traditional lines: they plan for an advance supply of fuel and maintenance requirements, which are costly but simple. In the most densely populated barangays, they will always implement programs in the quickest way. Generators are given free of charge for diesel-based mini grids and subscribers then pay around P200 per month, which is widely affordable. This compares very favorably with the current charge of P21, 000 for Solar Home System. Furthermore, the acceptability of Renewable Energy at community level is not yet established. Currently, the purchasers are from the more affluent sections of the community. Although they are dispersed, Shell has established barangay repair centers, with trained staff, covering much of the province.

The PGP intends to follow up the CRREE-implemented project through its Thematic Trust Fund. The Province has a Strategic Environment Plan for Sustainable Development, into which Renewable Energy would fit well. Palawan tends to take a strong lead in developing its own plans, since it is isolated from national level planning. The JICA Revised Palawan Energy Master Plan, which was inspired by the GEF RE project, will feed into implementation of the National Energy Master Plan, which has already been completed.

The PGP will shortly be entering a new building and the Renewable Energy Development Center could be moved there. However, the equipment, which CRREE assembled in its back yard, cannot be easily transferred. It would have been better if this were in Government premises from the start.

The Center for Renewable Resources and Energy Efficiency (CRREE), played a leading role in developing and designing the project, together with different parts of the Shell Group in the Philippines. Shell Solar committed $1.4 million as counterpart funds for Palawan and as its investment into the process. The relationship with this important partner of CRREE has been made difficult by two changes of Director. Another Shell subsidiary, SPEX, put in $600,000 for livelihood generating funds. Subsidies were therefore available to all purchasers of SHS units, as well as for IG projects for cooperative groups. These subsidies from Shell compensated for the fact that the GEF funds could not be used for these purposes. GEF funds were mainly to be used for training and capacity building, as well as for a Loss Guarantee Fund. According to the head of CRREE, if there had been no SPEX funds, the project could not have worked, since it would have built expectations, which it could not meet. Furthermore, it would have been difficult to persuade the Provincial Government to participate, without these additional funds, since it was skeptical of a project, which did not provide any hardware for implementation. Similarly, the communities expected to see some tangible financial input from the project proponents. GEF money was an important incentive for Shell to enter the Province at that time.

Once Shell decided to adopt the straight sales model, the project began with the concept of a direct subsidy per SHS unit, reducing the cost from P 30,000 to P19,300, but sales were still flat. Then they tried to set up the Loss Guarantee Fund with the Cooperative Bank. These funds were used to assist with the sale of 160 units, with a buy back clause in the event of payment default and the remaining value being protected by the LGF. Since people are still repaying on the units, the Guarantee Fund is now locked up.

After UNDP-GEF formally approved the change from a RESCO to a sales model, the livelihood approach became very important, since it was clear that the market for SHS units would be very limited, unless income could be generated. CRREE introduced the idea of mud crab culture, on the grounds that crabs were indigenous to the mangroves in Palawan, so people would be able to catch crablets and raise them successfully. In the event, these projects all failed, partly because of the low availability of baby crabs for cultivating. CRREE felt that crab culturing was a new type of IG activity, which would

add value to the project. Sea cage culturing of grouper was already known locally and provided another activity, which groups could move on to later.

Fishing is currently a major activity in the pilot villages, with fish sold on to traders without freezing or processing. When CRREE researched the type of project ranked as of high potential by local communities, ice making proved to be in high demand. However, CRREE felt that ice making would require high cost, high technology inputs, which would be too much for the project resources. Other approaches might also have been tried, such as micro-hydro operated ice plants or using wind power, either of which might work in Palawan. Since the private sector involvement is Shell Solar, the project has concentrated on this form of energy. It has tried five experimental pig biogas projects, which have attracted considerable local interest. The use of biogas tanks has good potential, since people are very keen to rear pigs and this can provide a smokeless cooking fuel and reduce both pig waste and wood requirements. The project has trained many people in the installation and use of the biogas tanks, both within and outside project areas. Each tank costs about P12, 500 ($200) and there is a need for five piglets for start up, costing an additional P 4,000. The project would give income from the pigs, as well as time savings from firewood collection. Most of these benefits would accrue to women. The main limitation of biogas is that it is not attractive to external private sector players, since there is not much imported equipment involved.

The Renewable Energy Demonstration Centre established in the CRREE back yard attracts many visitors. Building on its profile from the GEF project, CRREE has also started projects in organic farming in the Province, which are raising the income of farmers. Sustainable farming using biomass in the soil is a sequestration process, when compared with modern farming practices used locally. CRREE markets the produce, generating income for itself and the farmers. This has enabled it to continue to pay some of its staff salaries, as external project funding has dried up. Palawan is the main operating area of CRREE, although it has a Manila office and some small activities elsewhere. It has cooperated with ANEC on this project and has trained several ANEC staff. ANEC is the field extension arm of the Department of Energy, which is intended to take new approaches to energy into remote rural areas. However, its capacity is limited by salary delays from the Department and chronic under-funding to undertake field activities. Many Government bodies suffer from this problem.

One of the problems CRREE has faced implementing the project is that the Provincial Government did not provide any office space for it and Government staff seconded to the project had to fit into the limited space in the Project Management Office. Few stayed long under these circumstances.

CRREE stated that the organization is aware that the main barrier to PV in Palawan is poverty and that marketing alone cannot overcome this. Only the top 20% or so of society can possibly participate through conventional sales mechanisms. So, in order to justify GEF funding, which requires global environmental benefits, they felt that they would have to try to reach the other 80% of society. CRREE believes that the project has already been successful, since Shell has entered the market and set up franchise

operations that reach many parts of the Province, assisted by local financing partnerships. In the north of the Province, Shell is looking at the possibility of micro-financing through a network of local cooperatives. A cooperative would become the main financing agency, using other specialist micro-financing institutions (MFIs), where no cooperative is active. However, Shell needs to sell this idea to the Development Bank of the Philippines, which is not enthusiastic about putting money through MFIs, which it does not know well.

Negotiations with the Cooperative Bank have also been successful. The concept of buy-back from Shell has offered the bank the security it thought it needed to enter this new market. The Malampaya Gas money will help establish the New and Renewable Energy Trust Fund, which should be substantial enough to enable Shell to scale up its sales. Palawan is the only major Shell Solar operation remaining in the Philippines.

The CRREE Project Management Office (PMO) in Palawan had many reflections on its project experience. A major problem experienced during project implementation concerned the long time it took the project to deliver anything to communities. After the feasibility work led to selection of six sites, people had very high expectations of the benefits they would receive. Even after three years, there were no home units and politically motivated members of communities used this failure to promote discontent. Furthermore, people expected the RESCO model, under which they would pay a monthly service fee, but would not have to pay a high deposit to obtain a unit. When the program changed to a sales model, requiring a down payment, many people were very unhappy. At the purchase price, only middle income and higher families could afford a system providing two light bulbs and a radio cassette player. Poorer people would have needed an even bigger subsidy than the 40% available from the Netherlands assistance. Even this may not have solved the cost recovery problem. The Electricity Cooperatives have often been unable to collect payments from poor people served by community level generators with mini grids, many of which have rapidly been abandoned. The PMO feels that the Shell Solar project in Aklan failed because of technical, organizational and financial constraints, so it would probable also have failed in Palawan. However, this cannot be taken as any confirmation that the replacement sales model will succeed. In Aklan, the cost of 80 Pesos per kWh of solar power was three or four times that of grid electricity.

Although not part of the project design, the units being sold are highly subsidized. This may undermine the long term marketing strategies of other companies, which have been trying to build up a Palawan market for solar power for several years, based on a realistic price structure.

With regard to income generating (IG) opportunities, there are prospects for the use of solar power for fish drying and for processing mangoes, which can only be exported from the Province in processed form. The crab rearing program was not the most appropriate, since the light is mainly used for harvesting in the early morning and is not integral to the rearing process.

At the time of the LBS fieldwork, the project was being wound down and the Project Management Office had an unclear future. At this stage the risk sharing mechanism, which was a core component supported by the GEF, was still being designed by local consultants.

The community-level IG projects were mainly organized through the Cooperative system. The Provincial Cooperative Development Office gives accreditation to local organizations. Six cooperatives, with a total of about 180 members, were formed to participate in the pilot project activities. These formed working committees, which received training on the use of RE for IG activities. Some of the members were already in other cooperatives, whilst others had previously formed a negative impression of this system and had dropped out of it. Many existing Cooperatives have no sustainable programs and are poorly-managed, so that there is a high rate of attrition. Most of the members were engaged in rice trading and fisheries/aquaculture and many were already members of active groups in these fields.

During the Market Research study, in which CRREE was involved, the pilot communities produced a long list of activities they would like to pursue under the project. CRREE negotiated with them to produce project, which it thought they could successfully undertake during the life of the project. It was CRREE itself which endorsed the concept of mud crab farming, which was pursued as the original IG activity for all participating cooperatives. The basis for this decision was said to be the strong interest expressed in communities for marine-based activities, together with support from the Provincial Bureau for Fisheries for the concept. In addition, the crabs could be locally sourced, either from participating communities or from elsewhere in Palawan. They grow from about 250 to 800 grams in about 3 months.

GEF funding for the IG activities was restricted to training Cooperative members and did not cover the supply of solar panels. Shell gave the project a small grant to purchase panels for the six sites (five original GEF project sites, plus one in Puerto Princesa, added to provide a “showcase” for the project) and the PMO provided security lighting, to be powered by the PV units. The mud crab pens cost about P20, 000 to 30,000 for 100 square meters, including the cost of all materials and nets. These funds were provided by Shell (SPEX). According to the PMO, the location of the crab pens in the mangrove areas helps to use these in a sustainable manner. This needed permits, since mangroves are protected by special laws in Palawan.

In Bulalacao and Turda, general stores managed by the cooperative have been established as part of the cooperative program.

According to the PMO, it is difficult to trace project “successes” as yet, since the Risk Sharing Mechanism, which would allow access to loans from the Palawan Cooperative Bank and the Loss Guarantee Fund are not yet in place, so few people can afford to buy a system. At the moment, people purchasing are those who have ready access to cash or who have some means of raising a loan. CRREE refers any potential buyers it discovers to Shell, who look into the specifics of how the person might be able to purchase a

system. Many potential borrowers have attended the Project Steering Committee and learned about the possible risk sharing mechanism, but they have not bee able to get any further.

The project has piloted some biogas units at field level, which are used to produce methane for cooking, as well as fertilizer. Main cooking fuels are LPG in urban areas and fuel wood and charcoal in rural areas.

The PMO stated that in Caramay, as a result of GEF-funded training, people became aware of renewable energy and received a Shell SPEX grant for solar crab rearing. Using part of the income from this source, the cooperative commenced a solar powered grouper fish raising project. They obtained additional support from a GEF Small Grant for this activity. Other support has been provided to cooperatives from a local NGO, Haribon and from Local Government sources. So there has been a substantial program of confidence building in participating communities, but the absence of a financial mechanism has prevented widespread adoption of home units.

The Risk Sharing Mechanism is about two-thirds of GEF funding. The Cooperative Bank of Palawan has no history of financing solar energy systems of cooperatives, so they are proceeding slowly towards an agreement, which it sees as presenting a high risk.

On the basis of its experience, the PMO would do some things differently in such a project. Firstly, it would allow more time for all the components to be completed. Then, it would have a specific budget for hardware for field projects, rather than having to rely on Shell support in this area. It would have had a broader range of technical staff in the PMO, rather than over-relying on external consultants to provide virtually all technical inputs. Financial agreements should have been concluded before the project even began implementation, to avoid delays and loss of confidence.

The gap between community consultation and provision of an electricity supply should have been minimized. Beneficiaries expected to have electricity three years ago under the RESCO project with Shell. There was a plan for Shell minigrids under the project, which were again ruled out on the basis of the Aklan experience. Nothing was delivered in terms of homes units and people slowly lost all hope.

According to the PMO, in terms of the project preparation, the potential beneficiaries should have been more fully involved as part of the design process and there should have been more thorough feasibility and design work. The office sees no possibility of scaling up the use of SHS without more subsidies on purchase. The NRE Trust Fund will be essential and will need to draw on the Malampaya revenues, since Government funds are inadequate. Although the project has given impetus to NRE and many policy papers have promised its place in the power supply system, it can only succeed with financial incentives to all parties.

Since CRREE is in the process of winding down this project, the PMO feels that the project assets should be handed over to the Provincial Government.

The other major partner in the consortium is **the Shell Group, which is mainly represented by Shell Solar**, a company which started in Palawan in February 2002 and aims to cover the whole of the main island. The business is run on a franchise basis, with a small central office and a number of freelance agents working on a commission basis. The local agent received a two year marketing subsidy, which is now being phased out. The start up period was slow, because awareness of Solar systems was low and the product had to be actively promoted. The franchiser reported increased sales, but that the barrier of high initial costs has not been overcome. As well as the Cooperative Bank of the Philippines, the Philippine Appliance Corporation has also made some loans for purchase of systems. By February 2004, about 400 units were in use under the Shell franchise. Most of these units are outside of the pilot project sites, since these are poor areas, which will only be brought into the program when an adequate Risk Sharing Mechanism is in place. Shell has so far sold to people with higher incomes in and around Puerto Princesa, where units are mainly used as back up to the unreliable grid supply. The agent is confident that sales will rise, since many areas of the province will not be on the grid for at least ten years. He thinks there are at least 100,000 households without electricity and this number is rising by 10% per annum.

Much of the market to date has been in far-flung areas and sales agents work on a door-to-door basis. Agents report to one of the four area offices, located in Quezon, Brookes Point, Tay Tay and EL Nido. Each agent must do 35 calls per week, which is monitored by the Shell franchise manager. There are about 50 agents in the field, each of whom receives about P 1000 per unit sold. They are reporting big problems with the lack of an appropriate finance package. Many potential customers need a low down payment, lower interest rate and a long repayment period, which is a very difficult package to arrange. The franchise manager views a monthly payment of P 500 to 600 as affordable, replacing the equivalent expenditure on kerosene and batteries. But such a rate would give an 8 year repayment period, which no financer is offering. Actual monthly payments are in the range of P 800 to P 1,500 monthly.

In addition to home sales, the franchise has tried to interest local government units in the systems, for use in clinics and the like, but so far take up has been low.

The total number of units sold by Shell in Palawan in mid-March 2004 was 481. All had received the 40% Dutch subsidy and were covered by the Shell buy-back scheme in case of payment default. Another part of Shell, SPEX, had also provided a grant of $ 125,000 towards discounting the sales costs of Income Generating and household units. This was offered following the decision not to adopt a RESCO model and was intended to make units more affordable for purchase. With regard to the interest rates available to purchasers, the Palawan Cooperative Bank preferred to use a relatively high interest rate. It has found that purchasers often have several loan commitments and that they will prefer to keep paying their highest interest loan and to only pay off lower interest loans after those with a higher rate.

The Shell franchiser sees customer friendly financing as the key to increasing the market. Most people interested in purchasing a system are in remote off-grid areas and cannot actually afford such a purchase. They are scared of entering air conditioned offices of banks. However, many such people have seasonal incomes and are able to pay relatively high amounts in some months and nothing at all in others. They need optional payment schedules to meet their situation. At the moment, they have to pay on a monthly basis and have a three month grace period on defaults, before a system is repossessed. Shell try to obtain some form of background information on those wishing to buy, rather than any formal system of credit checking.

Solar systems cannot be sold without financing packages. Expanded sales are waiting conclusion of the Loan Guarantee Fund and establishment of the Escrow Account with the Development Bank of the Philippines (DBP). There have been procedural hold-ups; for example when the DBP took months to make changes to a document, only to find that these were unacceptable to UNDP.

Solar systems are limited in their benefits. They cannot enable IG projects in the same way that grid electricity does. It may only contribute to extending the hours for small home-based business such as matt making. Solar water pumping takes too much energy to be broadly used. It takes 18 panels for even a shallow well. This would cost P 800,000 as against only P 40,000 for a generator to do the same job. Since there is no real market for this type of equipment, the franchiser concentrates on domestic units, mainly of 80 wpk. Almost all of the equipment is imported. Only the batteries are locally manufactured. They are using ordinary car batteries, although costs might be reduced by making stationary batteries just for solar systems.

Chevron Texaco is planning 5 MW solar mini grid systems, which would provide 1 MW to the local community and 4 MW to the grid. This would be a major investment, but they are targeting the Malampaya revenues.

The University of the Philippines Solar Laboratory was an early partner of CRREE, in formulating the project concept. Together, they developed the concept of livelihoods assistance through the use of Renewable Energy. They then worked with UNDP to access GEF Funds, although Solarlab is not one of the signatories of the funding agreement. During the project, UP Solarlab has been involved in providing technical support and training on all aspects of RE. It also seconded a staff member to Palawan for more than a year to train people. This gave the opportunity to be involved at field level and provide training adapted to local circumstances. This assistance was invaluable to CRREE, which has little knowledge about RE.

UP Solarlab did not agree with Shell's approach. Under the early RESCO model, the project was being asked to pay Shell in advance for supplying its equipment to users. Once that model was abandoned, Shell wanted the project to directly subsidize households to buy their units, an approach which had already failed elsewhere in Philippines. An earlier German project on Palawan unsuccessfully tried to sell solar units at a 60% subsidy, but nothing remains of the project in the Province.

After these disagreements, Solarlab did not discuss the project with Shell again. Instead, it concentrated on building its relationship with the Provincial Government, which helped in the development on PGP's Energy Unit, which is the first in the Philippines and could serve as a model for the rest of the country. Similarly, the Provincial Energy Plan is a first in the country and has encouraged other isolated Provinces to think that they can play a major role in dealing with their own energy supply issues. The JICA support for this plan came as a result of Solarlab's involvement in the GEF project.

According to Solarlab, Philippines had its first solar energy project in 1983. Palawan was a major attraction to private companies and seven companies have been active in the field of solar power. However, their major area of concentration is the tourist industry, especially for small island resorts, where there is no possibility of conventional power supply. Wind turbines and solar are both widely used. Household units have not proved attractive to the private sector, because of the affordability problems. Many distribution models have been tried, but not the RESCO approach. It was already clear that a sales model could only reach a few relatively well-off people in Palawan. Solarlab was not informed about the decision to drop the RESCO model and was advising the Provincial Energy Planning unit to follow this model, at the same time as Shell was promoting the direct sales model to politicians. Although Solarlab was intended to be represented on the Steering Committee, it claims it was never invited. As disagreements within the project consortium clarified, it lost its coherence and Solarlab disengaged itself. However, it developed a continuing role as Adviser on energy planning and development to the Governor of Palawan.

The project also collaborates with the Palawan **Affiliated Non-Conventional Energy Center of the Department of Energy, (ANEC),** which is one of 21 ANECS throughout the Philippines, which serve as the extension arm of the Department of Energy. In Palawan, it is affiliated to the Western Philippines University and undertakes teaching, training and research. Members of ANEC staff have attended CRREE training programs and pass on this knowledge to their students.

ANEC has more experience on wind turbines and micro hydro than on PV or biogas. Nevertheless, in Palawan, it has implemented solar electrification programs through Barangay Power Associations in 14 barangays in Tay Tay and Dumaran areas. Municipal electricity systems throughout the Philippines charge a levy on their grid connected customers. This is put into the fund for the Missionary Electricity Development Plan, which started in 2002, under which the Government buys units for poor rural areas. In Palawan, this sponsors diesel and solar units, the latter of which fall under a program implemented by ANEC. Solar home systems are given to participants free of charge, after which they pay P100 per month towards maintenance costs, including replacement of batteries. Participants received the complete system from the project, which includes the panel, battery controller, lights and wires. Each Barangay Power Association included in the scheme has officers to collect the dues and deposit them in the bank. These barangays also have diesel generator sets and mini grids and the solar units go to people who are not connected to these systems. The SHS units give 80 wpk per household, enough for two

lights. It is also possible to buy a deep cycle battery, which is powerful enough to operate a karaoke set. This is more costly than a conventional battery. People interested in participating in the scheme were required to attend training seminars. Only 20 units were available per barangay and they drew lots, if there were more applicants. The project was not poverty focused and people had to be willing to pay the P100 maintenance fee. Apart from this, they were chosen by drawing lots, not on any needs basis.

Participating barangays also received three battery charging stations, each with 300 wpk capacity, consisting of 4 panels of 75 wpk.. Batteries need charging about every two weeks and it costs P20 per charge. Each barangay had one electrician trained in maintenance of the units. The units used Shell equipment and the total cost for 14 barangays was P 5.2million, with 280 households benefiting. People like the systems. The lighting systems are regarded as adequate, but when the battery voltage goes down, they miss out the battery control unit and connect directly to the battery, which wears it out quickly. Batteries are finished in one and a half years through this degree of misuse. It costs users more to participate in a battery charging scheme, in terms of charge up fees and transport costs, than to have a SHS, assuming the system is provided free in the first place.

The 50 wpk system is the most popular and costs P 19,160 with the Netherlands Government subsidy or P 32,000 without. The customer receives three light fittings, wires, panels, pipes, a battery, delivery, installation and one year of after-sales service, including four maintenance visits. After this period, they will be offered a maintenance contract, the cost of which has not yet been determined. A number of barangays technicians were trained by a previous solar project and will be used as maintenance technicians.

From an ANEC perspective, the CRREE project is more focused on livelihoods than on power. It is not maximizing the use of SHS units and there is no connection between SHS units and the livelihoods component. Power is not needed for the crab maturing projects. The idea that security is essential is incorrect and an unnecessary expenditure for poor people. With regard to SHSs, CRREE has not been very active. Napsan has one battery charging station, but no SHS units have been installed. ANEC attended two of the early Steering Committee meetings, but their role was not clarified. Its role seems to overlap with that of CRREE, namely training, capacity building and advocacy of Renewable Energy, all of which are part of ANECS' long term mandate. ANEC is part of the Government and receives Department of Energy funds, at the rate of P 1 million per annum for its operational costs, from which it has energized one barangay per annum since 1998 with renewable energy. It either uses SHS units or battery charging systems. Although mini hydro sites are available, they tend to be far from any communities, so they are not often viable. Wind power is mostly on the west coast of Palawan, which again is relatively sparsely populated. The University meets the ANEC salary costs and has itself donated two solar units for fish drying and has devised a solar powered fan for drying agricultural produce.

Another important stakeholder in the project is **the Palawan Cooperative Bank (PCB).** This Bank's main business is commercial and agricultural loans, and salary loans. It also has small loan programs, with P30,000 being the smallest secured loan. Its micro finance program gave collection problems and was suspended. A number of Government agencies and NGOs are able to offer such credit on more competitive terms, using a group based credit model derived from the Grameen Bank.. Although the PCB has not previously allowed householders to borrow funds to purchase a SHS, unless they had 100% collateral, it is now doing so under an agreement with Shell Solar, which is effectively providing the 100% collateral on behalf of the customers. The PCB has so far agreed to finance the purchase of 160 units under a Memorandum of Agreement (MoA) with Shell Solar, independently of the GEF-financed project. So far, two of its branches in the South of Palawan have released money. A new MoA will expand collaboration to the North, particularly the Roxas area. Under the original MoA, Shell deposited 30% of the funds needed with the Bank at 0% interest. The Bank used this money to start release of the funds and later provided the remaining 70%. Borrowers pay 16% p.a. interest and are allowed three months default on repayments before the unit is removed for resale. If the default goes beyond this period and the unit cannot be recovered, the Escrow Account will be charged. So far, repayment rate has been nearly 100%. The total of 160 units covered by the Agreement was passed and more have been sold. Under the new MoA, the interest rate has gone up to 24%, but they are looking to convert this to cover the diminishing balance, rather than on the total original loan, which will reduce the amount to be paid. Loans from local informal lenders charge about 20% per month and must be repaid daily. The risk to the Bank has proved very small, since it has released the funds under Chattel Mortgages, which give it the right of repossession in the event of default. About 25 potential borrowers have so far failed to produce the down payment required and have been unable to obtain units. The use of solar power for small scale income generating projects could be treated as part of PCB's agricultural loan portfolio.

The stated Shell target of 1000 units will be difficult to reach through the Palawan Cooperative Bank, since it will be unable to access sufficient funds for lending and its own funds are fully committed. Even a successful revenue-generating scheme would not easily allow the PCB to scale up its lending, since any profits generated in the Province are returned to Head Office in Manila and not retained locally.

A number of early adopters of SHS systems have borrowed funds from **CCC Lending, a private credit organization**, which mainly lends for real estate. This company made an agreement with Shell Solar and financed 75 units at an interest rate of 12% to 22% per annum on the diminishing balance, depending on the duration of the loan. Shell will buy back any units in default at cost less depreciation. These units are mostly in CRREE sites. The down payment is P 5,800 plus a processing fee of P 1,500. The balance for financing is P 13,552. There is no Loan Guarantee Fund. This program ran for one year, from March 2003, when the company decided to stop lending, because its Board felt that the interest rate was actually loss making. Collection was found to be costly and difficult. Although the repayment rate has been 100%, they cannot afford to keep sending people to villages to collect the money. They prefer to make P 500,000 loans on house, because

the processing on these is much more cost effective. Shell is in discussion with the Company President to see how the scheme could be started up again.

The Palawan Electricity Cooperative (Paleco) is the main transmission agency for power, which is generated by the National Power Corporation. Although not part of the project consortium, it is also an important stakeholder. It is currently collaborating with Korean and American power companies on more than 50 projects, which are distributing power to new communities, many of which are isolated. When these projects are complete, it will be supplying some degree of power to more than 50% of the barangays in Palawan. In addition, there are eight barangay operated (Provincial Government-owned) power plants and mini grids, for which Paleco is providing only technical assistance. These schemes are selected on the basis of a relatively densely populated area, requiring less than 2 km of power line and serving people who can afford to pay. The lines do not reach all households in the communities and usually only about 30% are connected. However, it is relatively easy to scale up from a one generator system to, say, a three generator system when demand is there. Paleco trains barangay level technicians, who will be able to add more generators, when funds become available. Residents are typically currently spending about P 300 per month on lighting, whereas 4 hours a night on the barangay scheme will cost only P 150 per month. The systems supply sufficient power for the use of appliances, as well as light and are metered at a rate of P 15 per Kwh. Power is normally only available for 4 to 6 hours per day, although the barangay administration can choose to vary this. These schemes offer the advantage that, if the grid reaches the area, they can simply be connected up to the main system. Grid-supplied power is much cheaper, at P5.50 per hour. A basic barangay system costs P 8 to P9 million for the generator plus distribution, with each household paying between P1,500 and P3,000 for its internal connections. The system would normally have a small group of staff, such as one plant operator, one meter reader/collector, a cashier, a manager and a line man, all of whom are paid from the income derived from charges.

Barangay Power Associations experience great problems in collecting dues from consumers, who are friends and relatives of the officials. Collection requires strong political will. As an outside stakeholder, Paleco has been able to collect 95% of the fees due to it.

In Paleco's view, areas which are too remote for the grid will eventually be reached by generators and mini grids or by renewable energy, since Paleco is mandated to supply power to all in the Province. Solar systems do not seem competitive to Paleco, since they supply only 50 wpk and cost P 20,000. This cost disadvantage does not seem susceptible to any major change. Paleco has temporarily waived its right to service those areas where renewable energy seems suitable, but once the grid does reach them, people will switch to grid power, since it is very cheap. Large national funds are available for keeping grid rates low and Paleco has been successful at getting national government subsidies to extend the grid and maintain low costs to consumers.

Paleco has an electrification plan for the Province, but lacks the resources to implement it in the foreseeable future. If the Malampaya money comes through as anticipated, P 15

million has so far been identified for grid extensions, which is only enough to reach 2 barangays.

The final set of key stakeholders are **the "pilot" communities involved in the project; namely Bulalacao, Caramay, Napsan, New Ibajay and Turda**. The LBS team made field visits to two of the sites, Caramay and Napsan and held discussions with members of the cooperatives associated with the project and with SHS users.

In **Caramay**, one of the pilot villages, a SHS owner told the team that she learned of the system from a neighbor, who had used one for several years. She purchased it through a local pastor, who is a Shell agent. He put her in touch with a credit company (Renewable Resource and Energy Systems Trading, a Shell franchise), from which she obtained an advance and paid Shell the full price of P 19,360. Her own input was a deposit of P5808 plus P 396 insurance. She took a one year loan, to avoid the higher interest costs of a 3 year loan. She prefers a high down payment and short payback period. She did not offer any collateral, since she was referred to the company by the Pastor. She knows of 7 or 8 other owners in the barangays. She also owns a diesel generator, and finds the SHS easier to use and cleaner. It is also better for children's health. The 5 kw generator cost P40,000 second hand in 1998. The whole family clubbed together to buy the unit on a cash basis. Her household is relatively wealthy, since her husband is a migrant worker overseas, her mother has a teacher's pension and she processes copra.

The user has experienced no problems operating the system, but would like to be able to use it for other appliances. This would require an AC inverter and an additional panel, costing a total of P 19,000. Shell explained very clearly that she can use 3 light bulbs for 8 hours a day, or use fewer bulbs for longer. It is also possible to run a karaoke unit or TV/satellite system for 3 hours per night with the system. Even during the rainy season, the battery remains charged, because they only use two bulbs. She would recommend the system to others, particularly people such as teachers, who have a regular salary.

With regard to the way the systems have been marketed, she noted that the seminars about the systems were restricted to members of the cooperative and were not open to the general public. It would have been better for the project team to have asked the barangay leaders to organize information sessions for any people interested in purchasing a unit.

Caramay is a settlement of about 500 households. The Caramay Income Generation program is implemented through a cooperative, which was established 2 years ago. Membership is approved by the Board and costs P 50. Three barangay officials are members of the cooperative. Many members of the cooperative are also part of a community based organization, which implements a Community Based Resource Management project. This group was previously organized by another local NGO, the Haribon Foundation of Palawan, but was re-oriented by CRREE to become active in the field of mud crab rearing. The cooperative has 17 primary members, who have inputted P300-1000 into the Coop, or used their own labor. There are also 21 secondary members, who are not fully paid up.

CRREE entered the village with the promise of a livelihood project, in the field of crab culture. Members worked with the Government Bureau of Fisheries to select sites. They were told to begin crab culturing in September, with an intended harvest time of February. But by the time of harvesting, all the crabs had disappeared. They tried again and the second time the harvest failed. At this stage they decide to abandon this venture and try something new – they have moved to crab fattening and fish farming. The fish farming enterprise has been successful, with 4 harvests of groupers already achieved and first year sales of P 50,000.

The rationale for the use of solar PV in the fish farming project was not entirely clear. Cooperative members stated that the use of lights at night prevents theft and scares away monitor lizards and also acts as a light beacon for fishermen near the shore. In fact, the fish pens are permanently occupied, which provides security and no-one could remember any examples of major thefts from other fish farming activities in the area. Many cooperative members, including women, are involved in the fish farming program, in installing the cages, harvesting or in marketing. Other members of the cooperative stated that, using the knowledge they have gained from the project, they have also set up their own independent businesses in the same field.

The cooperative brings several advantages to its members. It can access Local Government loans, can operate free of taxes and sell in volume to get good prices. However, as a new cooperative they only qualify for a P20,000 loan, as against the maximum which such authorities can lend. This sum was too little to enable them to scale up as quickly as they would have liked, particularly since they initially lost P 14,000 on the crab culture venture. As well as the Local Government loan, they also received a start-up loan of P 20,000 from CRREE and Shell SPEX. Their early losses from this loan were written off as “force majeure” and they did not repay the advance.

The cooperative manages the fish farm and owns the equipment. The crab fattening activity is continuing on a seasonal basis and Caramay has become known for the quality of its crabs, which sell for P200 per kilo. The either market the crabs in Puerto Princesa themselves for that price, or sell to agents who visit Caramay and pay P150 per kilo.

The cooperative members are mainly poorer members of the barangay and none of them can afford a SHS, although they have learned the value of the systems through their IG units. They had a presentation from an American consultant, who explained the possibility of financing the purchase of a system through a three year loan of P 20,000. However, according to their own perception, they live a “hand to mouth” existence and cannot much a commitment on such a scale. The maximum level which some members felt might be affordable was a down payment of P2,500 to 3,000 and monthly repayment of P500. Others felt that the down payment would rule out purchase of a system and that a flat repayment of P 500 er month, with no cash “up front” could make the system more attainable. They currently pay generator operators P90 per month to run a 20 watt light bulb for 3 hours per night. They are aware of the advantages of a solar system over purchasing generated power, but also feel that a SHS should be sufficient to power, for example, a fridge-freezer, so that they could make some money from selling iced water.

Other fuels used in Caramay are kerosene lamps, which cost about P100 per month to run and wood for cooking, which is collected from tress and the mangrove areas. Dry sell batteries cost about P35 per month, while charging of a car battery, widely used for karaoke machines, costs P40 per time. Alternatively diesel power can be used to run karaoke for about P200 per month. Looking at Caramay, the 500 households contain about 50 generators, 300 Karaoke machines, 20 TV sets and 20 fridges. So the economic balance of residents is very unequal.

As a cooperative, they would like to be able to have sufficient solar power to run businesses like an ice plant and battery charging station. They have learned some skill in raising grants and recently gained an award from the GEF Small Grants Program for a Community Based Marine Sanctuary Management and Livelihood Support Project, which features:

- Expansion of fish culture, mud crab fattening, seaweed culture, sea cucumber culture
- Eco tourism, livelihood support, research and demonstration sites, mangrove management and reforestation.

The former CRREE project officer covering their cooperative helped them draw up the proposal, after he left CRREE, which was not itself involved in this initiative. Leaders of the cooperative expressed strong reservations about the possibility of any future contact with CRREE, despite the various forms of assistance they have received through the organization.

Napsan is another pilot community, which collaborates with the project through the Napsan Multipurpose Cooperative. The community, which has 1,700 voters, is scattered, with a central cluster of about 80 households. There are six SHS units in the barangay, while the Cooperative has 36 members, of whom 20 are paid up and active. The official membership contribution is P800 per annum and about 20 people have paid some amount towards their dues. When the Cooperative was organized and registered, CRREE incurred costs, which the Cooperative reimbursed, leaving it with only about P 2,000 as start up capital. They received some training from the Department of Agriculture and all of the members were already involved with some other organization in the barangay, such as a farmers' group.

CRREE suggested crab culture and battery charging as viable activities. When the area was flooded, the water lost its salinity and the crabs died inside of their cages. The next time they tried, the site selected was too low and cages were again flooded, killing the crabs. With assistance from CRREE, the cooperative obtained some funds with which to buy crabs, nets and to prepare the site. CRREE also assigned a community organizer to the cooperative, who helped on a day to day basis and arranged training activities concerning solar energy. The members were mainly farmers, who had no knowledge of crab rearing, although they received some training under the project, as well as inputs from the Bureau of Fisheries, which helped choose the site. Under the first Memorandum of Agreement between the cooperative and CRREE, CRREE was to market the crabs in

Manila. In the second MOA, the target was the hotel industry in Puerto Princesa. When their crab harvest failed for the second time, they expected CRREE funding to continue, but were told that no more funds were available for the project. So people lost interest in crab rearing, even though the local government in Puerto Princesa offered them a loan to continue. The problem with the crab rearing was, according to cooperative members that it was too far from their experience. They did not choose it as a project and could not make it work. They regard it as a big mistake and draw that lesson not to become involved in activities, which they have not played a part in designing. They told CRREE that they wanted an ice plant and the project seminar came back with the idea of crabs. Ice would have made money, because they live far from the city and the ice which reaches them is expensive and ready to melt by the time it gets to the village. Most of the people engage in fishing, for which ice is essential. A small ice plant would enable them to store fish and sell to other barangays. Solar lighting was added to the crab pens for security reasons, on the advice of CRREE. Kerosene lamps could have been used for the same purpose. The solar panel is now intended to be used as part of a duck incubation project, but they sent the incubator back to CRREE to modify it to use lower power bulbs and they have not got it back yet. The two solar panels are both currently in use for battery charging units. The cooperative charges P30 per battery charged. It takes up to two days to charge a battery and each unit is charging about 5 batteries per month. There is not a very high demand, because people who live far from the charging station would rather give the battery to a Jeepney bus driver to take it to Puerto Princesa and return it directly to their door the next day. The cost is not much more than charging it locally and the convenience is higher. The cooperative has also bought a satellite phone, for villagers to make calls on a payment basis, but they haven't yet bought the necessary pre-paid card, so the venture is not operational.

Other possible income generating uses, which members cited might be to provide heat and light for a piggery or animal rearing facility. However, if they had to purchase the equipment, they not do so, since they would rather spend the money on a bigger piggery. Women mainly help their husbands on the farm and would like the opportunity to farm poultry, possibly with the assistance of solar lighting.

The Cooperative members are poor farmers and any increase in income would be a big contribution. They will not be able to afford any form of power, unless they are able to raise their incomes. When the project was announced, they expected it to make SHS units available to them and that they would earn enough income from the IG projects to pay the monthly charges, but this did not happen. Currently, people use kerosene for lighting if they have the money. If not, they do not use any power. Others pay P150 per month for a 50 watt bulb for four hours per day. There are four people who sell power from their generators, as well as a number who do not. The barangay has a generator donated by the city mayor, but it no longer works. It started operating a year earlier, only worked intermittently for four months and then broke down completely. It is a second hand Chinese set, for which parts are unavailable in Puerto Princesa, typical of the sort of units which local government bodies buy cheaply from China for rural barangays. It used to cost P450 per month for sufficient power to run a TV, karaoke and lights. However, there was also a collection problem and the person who used to gather money and go to Puerto

Princesa to buy diesel got tired of struggling to raise the money and gave up. If solar were affordable, it would be a great asset, since people would not have to rely on the barangays and would own their own power source. Some people might be able to afford a down payment of P 3,000 and charges of P500 per month, but for most people, even this would be too much. Only teachers, business people and the like could afford a system. Local credit sources are extremely expensive (20% per month) under the "Mumbai" system run by Indian immigrants. It would not be possible to purchase a SHS on this system. Another drawback would be the limited power supply, which could only provide light. The inverter required to power appliances would raise the cost of the system still further.

There was already a multi-purpose cooperative in the village, which has about 15 to 20 fully paid-up members and about 50 associates. This has already functioned for seven years. Its membership dues are about P1000 and few people in the village can afford that. Many members are actually resident in Puerto Princesa. CRREE looked at this organization and decided that it had powerful internal divisions and that its financial position was precarious, so CRREE decided that it would be better to establish a completely new organization and it provided technical training to set it up. The advantage of a cooperative is that it gives access to a range of loans, which farmers and fishermen's groups could not obtain. There have been several previous cooperatives in the village, which have become dormant. Many members of the new cooperative had been members of previous groups in the village, which have already failed. They are aware of the difficulties of keeping such groups running.

3. Overview of Global Environmental Achievements

It is clear that the project has contributed to heightened awareness of the possibilities of solar energy in Palawan and more broadly in the Philippines, The GEF funds also encouraged Shell Solar Philippines to establish a PV franchise in Palawan, although the 40% Dutch Government subsidy on every PV unit sold in Palawan and several other Provinces has been another key factor. Furthermore, Shell's unilateral decision to operate on a sales basis, working through a franchise agent, rather than through the original RESCO model, has already substantially reduced the company's risk.

Since the UNDP-GEF Loss Guarantee Fund has still not been established, sales of SHS units to date cannot be directly attributed to the project, as has been the practice in PIRs. The project has certainly contributed to the sale of 400 home units, through its initial influence on the Shell decision to enter the Palawan market and through "leveraging" of additional SPEX funds. The direct environmental contribution has been through the provision of 10 solar units in the 5 pilot sites, for Income Generating activities. Again, PIR's incorrectly attribute all reductions in CO2 emissions from Solar Home Systems to the project.

The project approach to scaling up benefits relies upon the generation of additional income at the community level, bringing increased household surplus income, which can

be used for the purchase of a SHS. However, the IG projects have not been successful and they have certainly not led to any widespread economic empowerment of community members, which might enable a growth in willingness and ability to pay for a SHS. Of the surviving IG projects, the crab fattening and grouper rearing might claim marginal impact on environmentally sustainable use of mangrove swamps. Battery charging units have displaced a minimal amount of diesel use. Environmental benefits to date are therefore slight, even when over-stated in PIRs, owing to their general tendency to attribute all adoption of SHSs to the project.

4. Local Benefits

The project has contributed towards a total of more than 400 SHS units, which are giving users a modest supply of light, independent of the need to purchase power from local diesel generators or to use kerosene lamps. The users are from the village elites, with regular salaries, such as Government employees or pensioners, and/or with expatriate family members, able to remit income to the households. Even at a price, which is greatly subsidized by the Netherlands Government and with the availability of relatively low interest loans, the systems are currently unaffordable to the great majority of the population. Local benefits are therefore slight and are not targeting poor people, which could enable a scaling up of both local and environmental benefits. This contradicts statements made in the initial Project Summary, which claim a poverty focus and specify certain vulnerable groups expected to benefit.

The formation of local IG cooperatives has led to some empowerment of members, capacity building connected with founding and running organizations and technical aspects of IG projects. Some cooperatives have accessed additional financing from Local Government and other sources (including GEF SGP) to scale up existing ventures or start new ones. Sales opportunities have been provided by CRREE. Cooperative members are from poorer sectors of the community, with a minority of female members, some of whom are in management positions.

The IG projects themselves have had very limited success. Although socio-economic research was undertaken in order to select participating communities and residents were asked their preferences for IG activities, the project introduced as its main project type an activity, which was not supported by the public, which was unknown to them and which rapidly failed in all project areas. The initial CRREE-inspired activity of crab propagation was swiftly abandoned after failed harvests and was replaced by less demanding projects, such as crab fattening, fish rearing, battery charging, mobile phone operations, seaweed and duck rearing. Even with this second generation of project activities, no IG operations have produced income at anywhere near the level required to enable members to purchase individual SHS, nor is this likely. This draws attention to the completely unrealistic claims made in the original Project Summary, that the project would eventually lead to the adoption of SHS by more than 50,000 households in Palawan.

The anticipated demonstration effects of the IG projects outside of the immediate project areas have not been attained, since the projects have not been successful. With regard to income generation, after the withdrawal of project personnel and resources:

- Some individuals in cooperatives have gone on to set up their own related businesses (in Caramay)
- After failure of crab propagation, some members took the initiative to try other activities, such as crab fattening, grouper rearing, marine protection and seaweed farming (Caramay) and battery charging and mobile phone operation (Napsan)
- Community members feel that the initial choice of projects was wrong, because they knew nothing about crab rearing
- Cooperatives have received insufficient support in terms of gaining access to other necessary inputs, such as micro-finance and technical assistance for other potential livelihood opportunities.

The substantial failure of the IG elements highlights several important deficiencies in the project. It is notable that, even though substantial social assessment was undertaken, it was not constructively used in designing the project's village level IG interventions, which completely ignored the communities' stated needs. Furthermore, neither the projects which were chosen, nor those preferred by the communities, specifically required solar power, which does not produce sufficient energy for most of the desired economic activities, unless an excessive number of solar panels are used and still less at an affordable cost. In the absence of any linkage between solar power and the IG program, this must be regarded as a poorly-designed development project, rather than an environmentally-focused intervention.

5. Negative Impacts of the Project

The project has had some negative impacts, notably the following:

- A high level of frustrated expectations among the IG cooperatives – they were asked what types of activities they would like supported, but were given something completely different and unknown, which failed in all cases. The income lost from this failure was only partially offset by replacement ventures
- The negative distributional impact of SHS. The systems are only affordable by a few households per community. The rest have no access, although their expectations had been raised by project awareness activities.

6. Relationship of Local Benefits to Livelihoods

Although the project documents claim that the project presents a coherent package of inter-related components, this has not proved the case. The SHS are not related to livelihoods and provide only limited social and (minor) health benefits to a few people. The provision of power is at such a low level that it can only be used to illuminate small-scale activities, such as sewing or weaving. However, since the system owners are

relatively affluent, many of them will not need to engage in such IG activities. As the great majority of people in participating communities are poor, their exclusion from owning a SHS minimizes the opportunities for livelihood benefits.

The IG projects have produced low levels of income for a small number of people, none of whom have received anywhere near enough benefits to consider purchasing a SHS, even if this was a priority for them.

The relationship of local benefits to livelihoods in the project was totally misconceived. Statements made in the project summary were not based on any evidence and display a total lack of understanding of development realities in poor communities. For example, the statement that "the widespread application of renewable energy resulting from the project should have a positive impact on vulnerable groups", totally ignores the well-known and extensively-documented problem of affordability of Solar Home Systems. Even more misleading is the livelihood-related outcome that "women will spend less time … collecting wood" (Project Summary, P17). It is, in fact, inconceivable that poor people would ever be able to substitute the limited energy provided by a PV system for fuel wood.

7. Relationship to Wider Social, Economic and Environmental Processes

The contribution of the project to wider environmental processes has been its major area of achievement, whilst it has had only minor social or economic impact. Specific successes, to which the project has made a substantial contribution include:

- Raised awareness of RE at policy level in Palawan and nationally
- Palawan Provincial Government is the first to develop an Energy Master Plan and to have an Energy Unit; which is likely to be replicated by some other Provinces
- A number of Department of Energy Regional Plans have copied the Palawan approach of local level planning.

It should be noted that none of these achievements relate to the field-level activities of the project, which might, if examined critically, serve to discourage adoption of Solar PV systems in pursuit of global environmental gains.

The project objective specifically inter-relates social, economic and environmental processes through its emphasis on "removing barriers to commercial utilization of renewable energy systems to substitute for the use of diesel generators in Palawan" (Project Summary Page 1). However, by the time the Project Management Office was being closed, the GEF-funded Risk Sharing Mechanism was still not operational. Despite this setback, progress had been made in enhancing the role of the private sector in the distribution of one renewable energy technology. This progress was the result of several factors, including:

- The availability of GEF support as an incentive to Shell to put in its own, much larger, resources

- The presence of a substantial Government of Netherlands subsidy for all solar units sold by Shell Solar (a Dutch-registered Company)
- The intention of Shell to gain a competitive advantage over potential rivals in a market which might expand dramatically, if the far more substantial funds from Malampaya Gas revenues actually become available for renewable energy systems
- The positive stance of the Provincial Government towards renewable energy, which is partly attributable to the lobbying efforts of the Project consortium.

However, the scale of barrier removal was strictly limited by the low affordability of Solar Home Systems, even with a 40% subsidy and various financing schemes. It seems that any financing package, which might be accessible to the poor, would require such a long repayment period, that the end of the useful life of the system is almost reached. This situation is not seen as a good risk by any lender, since repossession of an aging unit is not likely to defray the remaining costs. In order for the hugely ambitious long-term objectives of the project (50,000+ households) to be even partially reached, the issue of affordability for the poor majority would need to be addressed. This has not been attempted.

8. Nature of Links between Local and Global Environmental Benefits

- If the risk sharing mechanism works and leads to a wider take up of solar energy, the environmental benefit could be scaled up to a modest level. Currently, the number of units in use will have virtually no impact on GHG emissions
- Small scale diesel generators with local grids will clearly remain the preferred delivery mode for barangays and power suppliers, even though they are often ineffective and of short duration
- There is increased environmental awareness at Provincial and National level.
- The Palawan Draft Energy Master Plan allows for the increased of SHS and it is claimed that CRREE advocacy influenced the JICA-financed study to adopt this approach
- As the project nears completion, its links to the national level and the environmental arena remain at the level of advocacy rather than of demonstrable results.

9. Missed Opportunities

Other types of renewable energy, which appear promising, were not fully explored because of the Shell Solar link. The sustainability of field and Province level benefits has not been assured by the choice of a new NGO with no prior operational experience in Palawan:

- The Renewable Energy Demonstration Centre remains in rented accommodation, rather than in a permanent institutional location or in village location and, indeed many of its exhibits will be difficult to move

- Community mobilization staff from the Project Management Office have found other work or left Palawan and the pilot communities have been left unsupported
- The pilot communities are not positive concerning future links with CRREE, even if it is able to acquire new funding
- The project has produced no sustainability plan, although the Provincial Government, ANEC and PSU present options to continue the work
- There is no clear exit strategy of CRREE, although the Mid Term Evaluation raised this issue in good time. All of the key stakeholders are waiting for others to act.

More productive and sustainable IG activities could have been developed, but few resources were committed to this by any party to the project and no linkages were made to micro-credit providers and/or other livelihood-focused NGOs. Funds (up to Pesos 20M) are available for IG activities by cooperatives, through the Land Bank; but an established track record is needed to qualify. CRREE organized new cooperatives, which were not eligible, although some existing cooperatives (e.g. Napsan) could have qualified, if they had received capacity building.

The IG activities pursued by the project are basically unrelated to renewable energy. The assertion made by the project managers, that solar lights are needed for security is unconvincing and there is no other linkage.

Most importantly, in terms of the possibility of scaling up the sustainable benefits of the intervention, the project did not effectively consider ways of financing poor people to obtain SHS units. A specific mechanism for no or low down-payment, using micro-finance options, could have been explored. Even now, no-one is considering how the poor can be accessed, so that the market will remain very limited, as will the potential environmental gain.

10. Lessons Learned

- Poverty is the key “barrier” to widespread access to solar systems. Since poverty has not been addressed by the project, market penetration is and will remain limited. In this respect, the sales model as implemented has not proved more effective than the RESCO model
- GEF should not be drawn into “take it or leave it” agreements with the private sector. Shell’s unilateral rejection of the RESCO model substantially delayed the project, and meant that the poor were automatically excluded from access to RNE systems. There should be some form of commitment letter outlining the minimum deliverables from private sector partners, together with an agreement on information sharing between partners. Shell presented no evidence that the RESCO model is unworkable, before moving on to the sales model.
- The sales model removes the possibility of exploring the full range of locally appropriate energy systems. The private sector is more likely to set up a sales and marketing system offering a limited range of products than solutions tailored to community needs

- SHS units do not fully meet people's expressed energy needs
- Less credence should be given to the argument that, once barriers are broken down, "economies of scale" will bring down the costs of SHS to widely affordable levels. Such an assertion can only be made on the basis of substantiated examples, which are not cited in proposals based on this scenario
- Do not rely on initial subsidies, which distort the market and keep out other players (all units sold to date have benefited from a high Dutch Government subsidy)
- Have very clear objectives and design the project to meet them. (For example: if the project claims a poverty focus, seek ways to supply solar PV to the poor, to test whether this is achievable. If the aim is simply to distribute PV units for environmental reasons, do not spend time developing elaborate financial mechanisms, when the relatively affluent can already find ways to purchase).
- Much greater urgency needs to be given to producing workable financing mechanisms. The Risk Sharing Mechanism was at the core of the GEF support, but was not operational by the time of official project closure.
- Implementation by NGOs needs to be just as carefully planned and regularly monitored at field level as any other mechanism. An ad-hoc consortium needs very strong management to function effectively. Implementing NGOs need a broad range of expertise, covering technical and social aspects of project implementation, as well as a demonstrable long-term presence and commitment to the project areas.
- Medium Scale Projects should have modest and realistic objectives and should not be based on disproportionate claims of potential Global Environment benefits. They should aim to test out new approaches on a limited scale and to draw key lessons, which can be expanded by subsequent programs.