





NATIONAL OFF-GRID ELECTRIFICATION PROGRAMME BASED ON RENEWABLE ENERGY SOURCES

UNDP-GEF PROJECT (Project PIMS 34921) (COS/02/G31)

FINAL EXTERNAL EVALUATION

(END OF EXECUTION PERIOD)

FINAL REPORT (Final Version 2.1) (With text notes and observations incorporated)

KATHYA FAJARDO and HUMBERTO RODRIGUEZ Consultants

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Final Evaluation prepared by:

Kathya Fajardo and Humberto Rodríguez Consultants

kfajardot@hotmail.com

humberto.rodriguez.m@gmail.com

Humberto Rodríguez: Tel. (57-300)-215 8765

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ABBREVIATIONS

ARESEP	Autoridad Reguladora de los Servicios Públicos de Costa Rica / Public Services
	Regulatory Authority of Costa Rica
BUN-CA	Biomass Users Network – Central America
PSC	Program Steering Committee
CENPE	Centro Nacional de Planificación Eléctrica / National Electrical Planning Center
UNFCCC	United Nations Framework Convention on Climate Change
CNFL	Compañía Nacional de Fuerza y Luz / Electrical National Company
CO_2	Carbon Dioxide
CONACE	National Energy Conservation Commission / Comisión Nacional de Conservación de
	Energía
NPD	National Program Directorate
DSE	Energy Sector Directorate
GEF	Global Environmental Facility Trust Fund
PV	Photovoltaic
GHGs	Green House Gases
ICE	Instituto Costarricense de Electricidad
HDI	Human Development Index
kW	kilowatt
kWh	kilowatt hour
Min	Minimum
MINAE	Ministry of Environment and Energy
MINAET	Ministry of Environment, Energy and Telecommunications
MW	Megawatt
MWh	Megawatt hour
NGO	Non-Governmental Organization
PDF-B	Project Development Facility – Block B
OP	GEF Operating Programme
UNDP	United Nations Development Program
RECOPE	Costa Rican Petroleum Refinery
SEN	National Electricity System
SIEN SINAC	National Energy Information System of the National System of Conservation Areas
SNE	National Electricity Service
SNI	National Interconnected System (national network)
PVS	Photovoltaic Systems
TOR	Terms of Reference
UCRe	UNDP-GEF Regional Coordination Unit
UEN	SBU ICE Strategic Business Unit
Wp	Peak Watts

CURRENCY

UNITS

kilowatt hour
kilowatt
megawatt
metric ton (1000 kg)
terajoule

0. SUMMARIES

EXECUTIVE SUMMARY

BACKGROUND

The "National Off-Grid Electrification Programme based on Renewable Energy Sources" (COS/02/G31) has been executed jointly bythe ICE and the DSE, and implemented by UNDP Costa Rica with GEF funds. This project initiated in 1997 and subsequently produced a Project Brief and then the Project Document (PRODOC), which was signed by the last Party in December 2004.

The program was structured in two phases: a 2-year Phase 1 and a 5-year Phase 2. The first phase was mainly aimed at removing barriers, demonstrating and validating RE technologies as alternatives technically, economically and environmentally viable for the supply of energy in rural areas of Costa Rica. Phase I had 6 components, and Phase II, 3. The 6th component of Phase I consists of an evaluation of the project outcomes in order to move on to Phase II which would include mass scale deployment of renewable energy in Costa Rican rural areas where it is more convenient than to connect through the network, and help the country approach 100% electrification, making it a model in Latin America. *Phase II was canceled during the execution of Phase I at the request of the Ministry of Environment* (MINAE, today MINAET with tasks in Telecommunications).

The background of the project relates to the energy situation of the rural population in Costa Rica and the path that the country has chosen towards sustainable development. It indicates that *the project is relevant to Costa Rica, which it is in line with the objectives of the GEF* and those guiding principles driving the country towards the fulfillment of the Millennium Development Goals and a low carbon economy.

The Program objectives are:

- Reducing emissions of greenhouse gases (GHGs) and promoting the use of decentralized renewable energy (RE) in areas with no access to the National Interconnected System (SIN: Sistema Interconectado Nacional, National Grid System) of Costa Rica (overall objective)
- Validating RE technologies as viable options for rural electrification in remote areas with no access to the interconnected system within the next 10 years (development objective).
- Eliminating barriers that prevent the use of renewable energy sources in remote rural areas not accessible by conventional grid extensions (local objective)
- Creating within the energy sector in Costa Rica a systematic approach for rural electrification with RE (local objective).

In order to attain the program's objectives, it was necessary to remove the barriers identified during the preparation stages. These barriers were set out in the Project Brief and they were classified in four types: technical, financial, political-institutional and informational. These barriers were prioritized as follows:

• Financial: high initial cost of technology, lack of funding and insufficient ability to pay by the rural population.

- Institutional: lack of knowledge and motivation among staff which leads to delays in administrative procedures
- Education, communication and training: lack of awareness among public institutions that regularly visit remote sites and limited availability and access to information systems about these sites.
- Technical: limited knowledge about technologies using renewable energy systems.

The budget allocated to the project reached a total of US\$ 1,927,354, with US\$ 945.824 coming from Costa Rica and GEF providing US\$ 981.530. By December 2010, 92,2 % of GEF funds had been executed and 100% of co-financing funds coming from Costa Rica.

The objective of the Final Term Evaluation is to determine the relevance, performance and success of the project; look for signs of potential impact and sustainability of results, including the project's contribution to capacity building and the achievement of global environmental goals. Another objective is to identify and register lessons learned and make recommendations that could improve the design and implementation of other projects of UNDP / GEF.

The main results and findings¹ of the Final Term Evaluation are²:

Project Formulation

For the implementation of Phase I of the project, 6 components were designed under a coherent logical framework approach in order to remove barriers and to reach the objectives. This logical framework generated the products expected for each component, a set of indicators and of critical assumptions. These components were:

- Component 1. Establishing a regulatory framework that fosters the development of new and renewable sources of energy.
- Component 2. Institutional capacity building in the private sector and within the community to allow the efficient use of renewable energy resources.
- Component 3. Establishing appropriate financial mechanisms to support investments in renewable energy.
- Component 4. Demonstrating the feasibility of decentralized systems using renewable energy as a marketable option in remote areas.
- Component 5. Reassessment of the sites that show potential for electrification with renewable energy systems.
- Component 6. Assessment of the achievements of Phase I and release of funds for Phase II.

The evaluators consider that institutional relations for the project design were **SATISFACTORY**. The Prodoc / Project Brief documents are really effective guides for project replication. The project

¹ The methodology included the review of documents received from the parties, interviews to the parties, field visits and presentation of preliminary findings to the parties.

² Independent external evaluators Kathya Fajardo and Humberto Rodriguez were selected according to UNDP procedures.

conceptualization / design are also considered **SATISFACTORY**. However, success indicators for goals relating to legal and regulatory changes are too high because reaching them exceeds institutional and stakeholders capacity. In addition, the two years execution time allocated for Phase I is too short. The 6 years of project operation, without completion to date, are also too long.

Project Implementation

Project implementation had a series of setbacks which caused great delays. In 2005, there were legal difficulties forthe ICE as executor which delayed the project. Then, there were extensive procedures to hire consultants and companies providing goods and services, which on top of delays in executing the contracts and logistical difficulties, resulted in the *request of project termination by March 2010, although there are still some elements to conclude the project as it is now, six years after its start.*

This delay, compounded by a delay of almost 6 years since the PDF-B and PRODOC *made the project lose partially its technological innovative and demonstrative character*, in part because the ICE itself at the beginning of the project in 2004 had already set up numerous photovoltaic projects.

The evaluators consider that the approach to implementation is **MODERATELY UNSATISFACTORY**.

Monitoring and Evaluation

After reviewing the information received, the evaluators were able to infer compliance with the following monitoring mechanisms:

- Monitoring mechanisms established by UNDP were used.
- ICE-UE as project implementing agency has been involved in all particulars of daily work through the Annual Work Plan.
 - More specifically, and regarding monitoring mechanisms, this project developed five PIR, the first PIR on 2006 (July 1, 2005 to June 30, 2006) and the last PIR on 2010 (July 1, 2009 to June 30, 2010).
- <u>Goal Oriented</u> Progress assessments by the National Coordinator, the UNDP office-Costa Rica and the UNDP Regional Advisor, focusing on goals achievement varied from 2005 to 2010 between S (Satisfactory) and MS (Marginally Satisfactory). The UNDP Office in Costa Rica and the Regional Advisor of UNDP accorded in their <u>Project implementation</u> assessments during the 5 years of execution rated between S (Satisfactory) and MS (Marginally Satisfactory), while the Program Coordinator rated it HS (Highly Satisfactory), S (Satisfactory) and MS (Marginally Satisfactory).
- <u>Project progress reports.</u> Mainly registered in the PIR and there are also final reports or products from the sub-contracts made by the consulting firms.
- <u>Tripartite meetings</u>. *These meetings are not recorded in the Project Implementation Report* (*PIR*), specifically in the box "Date of last TPR Meeting ", or starting in 2008 in newer versions in the box "Date of Program Steering Committee". The dates of the meetings held were not registered as required. However, the evaluation team had access to minutes showing that seven different meetings took place. These meeting were tripartite review meetings and meetings of the Program Steering Committee (held in August 2006, March, June and October

2007, June and November 2008 and April and May 2010). During Project development, these kind of meetings were discontinued.

- <u>Project Closeout Report.</u> No report was made by the Executing Agency.
- <u>Meetings</u> of the Programme Steering Committee (PSC). The meetings of this committee organized by the National Commission on Energy Conservation were performed several times in the form of tripartite meetings. The last meeting for which the consultants found any register was held on September 1, 2009, convened by the Program Coordinator with representatives of the ICE, the DSE and UNDP, but other institutions that make CONACE are not included, suggesting that participation in the CONACE project diminished over time
- <u>External financial audits.</u> The results of three external audits came out clear and without reservations. But the 2009 audit did not include the inventory of solar systems purchased with *GEF funds*.

The evaluation team believes that there was not a systematic monitoring of work progress due to the absence of periodical meetings, the lack of additional project reports and failure to carry out the initial workshop, and therefore monitoring and follow-up of the project is considered **MODERATELY SATISFACTORY.**

Sustainability

Regarding <u>capacity building</u>, the project developed training courses and workshops (two workshops on RE with 50 people on project financing models), and trained users of PV systems and SHP. Project execution workshops trained 32 participants. A video was broadcasted in public buses to 130,000 people.the ICE personnel are trained to carry out the maintenance of PV systems.

Project results

Phase I global objectives

- Emissions avoided after installing the GEF systems in 2011 will reach 615.4 CO₂ t/yr, which *for 10 years means 6154 CO₂ t/yr avoided, exceeding the proposed 5700 CO₂ t/yr (by approx. 8%).* Hydroelectric generation will avoid 19% of emissions and PV systems 81%, whereas the initial proposed targets were 55% and 45% respectively. *The overall objective is hence fulfilled.*
- 16 projects were installed (10 in local communities, 4 in national parks, 2 demonstration projects that have also been considered as educational, totaling 18 projects altogether).
- Access of third-party stakeholders to the renewable energy market has been accomplished through several companies that supply goods and services within a limited market like Costa Rica.

<u>Objective 1</u>Supporting the implementation of policies and regulations to establish a regulatory framework that encourages the use of renewable energy in rural electrification projects

Results achieved:

• The project developed proposals for changes in the regulatory framework that were not implemented and remained only proposals.

- A draft Bill to Promote Rural Electricity Development from renewable resources (in Spanish LIDER: Ley para Incentivar el Desarrollo Eléctrico Rural con Recursos Renovables) was advanced containing only legal aspects (lacking technical aspects) but had no repercussion³.
- Water concessions regulation for small hydroelectric projects was proposed but not approved.
- ICE has regulations for the PV systems and SHP but the project did not contribute to the development of national regulation.
- Amendment to Law 7447 including again tax exemption for RE projects (drawn from Law 8229).

<u>Objective 2:</u> Strengthening the capacity of institutions, companies and communities to develop renewable energy projects

Results achieved:

- A comprehensive methodology was developed for assessing RE as an alternative to electric grid extension, called "ER tool". This methodology incorporates in a novel way not only technical but also economic and social variables. The Excel ER tool methodology is available forthe ICE and their officers have received training on the subject.
- Training to he ICE officials in RE (4 workshops were conducted with 225 participants).
- Website developed by the project and is fully operational (in Spanish SIFER: Sistema de Información sobre Fuentes de Energía Renovable, de carácter regional). Data from Nicaragua, Salvador, Honduras and Panama is not available. Data regarding Costa Rica is incomplete and outdated. *SIFER offers no services and there is no visitor's number record*.
- Informational page on the DSE website which provides *useful information* on reports produced by the project.
- Production of video on RE. Broadcasted on buses. Audience 134.400 people. Future presentation in schools bythe ICE.

<u>Objective 3:</u> Promotion of investment in RE projects through innovative financial mechanisms. Results achieved:

- During this phase of the project several mechanisms should have implemented to select those best suitable for Phase II. During the evaluation phase none of the mechanisms was implemented⁴.
- Number of participants in 2 workshops: 32

<u>Objective 4:</u> Demonstrating the feasibility of decentralized systems using renewable energy as a marketable option in remote areas.

Results achieved:

• 16 projects were installed (10 in local communities, 4 in national parks, 2 demonstrative projects – Marine Park Puntarenas (solar + wind power) and Park Chirripó (hydroelectric+solar) – also considered educational, for a total of 18).

³ Pushing these changes through final approval by a Legislative Assembly or through executive decree is beyond the scope of action of project stakeholders.

⁴ In fact, users of RE rural projects are within the influence area of ICE and require high co-financing for viable projects which ultimately results in the ICE bearing the investment completely. Therefore, the penetration rate of RE is determined by performance of ICE in the rural sector.

- These projects have not been evaluated by the ICE.
- 8 feasibility studies were carried out by 2 private firms (3 by Chirripó Consultants and 5 by INCAE), as well as another10 conducted by the ICE.
- 2 proven execution schemes (turnkey contracts and the ICE)
- 74 PV modules acquired with UNDP-GEF funds (all not installed)
- A 20 kW SHP built by the ICE as matching contribution (Chirripó Park) instead of 3 smaller plants initially proposed.
- Users training in PV systems and SHP.
- There have not been seminars conducted for project evaluation or presentation of results of such assessments.
- The amount of the ICE matching funds in the 13 locations amounts to US\$950.622

<u>Objective 5:</u> Evaluating the rural electrification program in Costa Rica and confirming the sites that may benefit from using renewable energy.

Results achieved:

- the ICE *has obtained a Project Assessment Methodology* which includes not only technical and economic data (costs of alternatives: network extension, solar, wind, SHP) but also evaluation of social and developmental factors (ER tool). This tool allows for the prioritization of projects.
- Primary information has been gathered about electrification of sites nationwide that needs to be entered into the ER Tool.
- The Plan for RE Rural Electrification has not been released. It is yet to be developed.
- 8 feasibility studies were carried out by 2 private firms, as well as other studies conducted by the ICE⁵.

The evaluators consider that the achievement of the Objectives and the results are **MODERATELY UNSATISFACTORY** due to missing key products such as an analysis of the information to produce a plan for rural electrification with renewable energies, the evaluation of demonstrative systems and the installation of various GEF funded PV systems and equipment yet to be installed.

SITUATION REGARDING BARRIERS

Project evaluators consider that after the project, the current situation of the barriers is as follows:

- Lack of norms and standards for RE: *partly removed* because there exist the ICE standards but no national standards were developed
- Limited knowledge about RE. *Barrier removed*.
- Limited technical capacity to advance RE projects. *Barrier removed*.the ICE has the capacity to carry out such projects.
- Lack of a regulatory environment favorable to RE. *Not removed* but there was valuable information gathered and a proposals presented.
- Lack of long-term tax incentives. *Barrier removed*. Incentives in Law 744 were restored.
- Lack of specific RE budget. *Barrier not removed*. Resources are still limited.

⁵ It was considered that feasibility studies for the 313 sites were NOT viable as indicated in PRODOC.

- False expectations from the rural population on short term network expansion. Partially removed.
- Lack of information on RE projects. *Partially removed*.the ICE still has to assess the projects.

RECOMMENDATIONS

Forthe ICE – DSE (MINAET)

- Consider *continuation and strengthening* of the results achieved by the program because it is an effort that responds to real needs of rural and disadvantaged populations in the country.
- The use of RE in the rural sector is in line with the country's environmental policy, with the goal of a carbon neutral country by 2020, or at least a low carbon economy, according to a more recent discourse, with conforming to Millennium Development Goals and with the real possibility of achieving 100% rural electrification in the country, without resorting to foreign loans, making Costa Rica an icon and the first nation to have 100% electrification in Latin America.
- Dissemination of existing information such as the Video on RE.
- To close out the project, it is recommended for the ICE to:
 - o Install all PV systems stocked in its warehouses and finish the Marine Park
 - Conduct a technical, economic and environmental performance evaluation of installed systems to promote their use in the country.
 - Fully use the ER Tool as a planning instrument for rural electrification in the country and produce the Plan for RE Rural Electrification.
 - Establish a clear lifecycle for RE projects in the ICE.
 - Prepare the Project's Final Report so that it can be closed out.
- For closing out the Project, it is recommended for the DSE to:
 - Enter the Data for Costa Rica on SIFER and make it widely available for use.
- Given the nature of this project in relation to the use of renewable energy in rural communities for both residential and communal use (health and education), its direct relationship to the Millennium Development Goals is clear. Such projects ensure sustainability for the environment, since they use non-polluting sources of energy generation.
- On the other hand, the possibility of having electricity at home benefits all residents but especially women who in many cases remain more hours in their homes, allowing them the use of electrical systems such as lights, radios, cell phones, etc.
- The new conditions of access to electricity not only provide direct benefits such as the use of available communication technologies but it also minimizes the tasks required for ensuring the daily supply of candles, fossil fuels and other energy sources often in the hands of women.

For UNDP-GEF

• In the formulation of the Prodoc, it is necessary to adjust the scope of activities more to the reality of the countries, especially so that a project may induce legal and regulatory changes. The indicators for these activities usually require changes at the end of projects, something which is entirely independent of consultants and implementing institutions.

- Monitoring of all project activities should be more regular and strict, leaving a record of meetings and decisions taken and monitoring compliance and opportunity within the project. There should be a systematic approach for project information reporting and the development of a protocol for generating reports
- The value of the project as a demonstration project was lost, at least in terms of technology innovation, due to the long it took to formulate, start, and the delays during the project. However, the project did introduce new contracting practices for the installation of equipment (Turnkey contracts) and new community organization strategies took place in order to make the systems sustainable.
- Added value from the assessment of the demonstrative projects by ICE has not been achieved and this assessment is an onsite proof of advantages / disadvantages of renewable energy technologies, which would be a solid argument for widespread use of such systems in rural electrification.
- Requiring the External Auditor to include photovoltaic equipment purchased as part of the inventory of project assets within the audit report for the period 2009.
- Requiring the ICE and the DSE to develop the Project Final Report.
- Incorporate the issue of gender in the project. Gender mainstreaming within activities of this project would help to analyze the roles and responsibilities of women both as beneficiaries of electric power in their communities and as users of energy for domestic use, production or community use. Set up specific activities such as workshops or sessions aiming to develop awareness for gender issues, expanding the benefits of this technology through social changes. Determining the participation of women helps to assess their role in the maintenance and use of equipment and possibly generate more active participation in productive uses of electricity

LESSONS LEARNED

For UNDP and GEF:

- The time between the formulation, design, approval and implementation of a project cannot be extended for periods as long as in this case, causing the project not only to lose its demonstrative features but also making the priorities of the country and implementing institutions affect the pace and scope of the proposed activities.
- 24 months to execute a program that expects to remove barriers at the national level, as intended in the design, is a short time, especially considering that some of the results required the participation of different key stakeholders. For instance, the legislation proposal where both the DSE and ICE offered their input, required internal consultation in these institutions before carrying forward with internal operational aspects.
- In terms of in-kind matching contributions, it is important not only to clarify the responsibilities of officials in the project but also the availability of real time allocated as part of its commitment to ensure that it can meet the terms of the project and that the activities required do not overburden and impact negatively their performance with other duties assigned by the partner institution.
- Allocation of resources in the budget must go hand in hand with the scope of indicators and expected outputs. In the case of one information campaign, sufficient resources were not provisioned to cover the scope described.

- The indicators proposed in the project have to depend directly on the scope of action of implementing agencies and related stakeholders. Getting products such as changes in legislation and tax incentives is beyond the context of project development possible by the institutions in charge of implementation.
- Coordination and communication with State institutions that govern the electricity sector is often affected by changes in their hierarchical structures which shift existing policies and priorities when new high ranking officials enter office.
- The establishment of the projects Steering Committees among political stakeholders should make clear the associated risks of these tasks.

For <u>ICE – DSE (MINAET</u>)

- Primarily, it is important to take into account the intensity of coordination and monitoring requirements in a project of this nature like the preparation of reports, both in Spanish and English, minutes, agendas and presentations for project meetings. Many of these activities are entirely unrelated to the existing institutional mechanisms at the ICE and the DSE.
- Staff from partner institutions in charge of project duties must perform very technical work closely related with institutional activities in this field. However, it also requires coordination tasks different from their regular duties such as project reporting, meeting organization and detailed review of products delivered. Therefore, such projects must asses if a person can meet the time demands for all coordination duties or should more human resources be allocated.
- It is necessary to provide feedback not only on the progress of the consultancy and administrative and technical requirements, but also to analyze and share among key project staff the content of products and not leave this function only in the hands of the Coordinator or Project Director.
- Continuous or periodic monitoring should be considered for workshop participants such as in the case of the Financing Workshop attended by 5 bank representatives and it is not known whether the information provided in the workshop was practical for their professional work, if the institution considered financing RE projects and if it did not funded any projects, the reasons for it.
- Systematize and disseminate the information that can be made public in order to have a greater impact through the achievements of this project, for example, to develop case studies of communities who have benefited from solar energy would make this effort even more visible before UNDP, GEF, ICE and DSE

EXECUTIVE SUMMARY SPANISH

ANTECEDENTES

El "*Programa de Electrificación Nacional con Energía Renovable en Áreas no cubiertas por la Red*" (COS/02/G31) ha sido ejecutado conjuntamente por el ICE y la DSE, e implementado por el PNUD Costa Rica con fondos del GEF. Este proyecto tiene sus orígenes en 1997. Posteriormente se desarrolló un Project Brief y posteriormente el Project Document (PRODOC), el cual fue suscrito por la última de las partes en diciembre de 2004.

El programa fue estructurado en dos fases, la Fase 1 de 2 años de duración y la Fase 2 de 5 años. La primera fase era principalmente de remoción de barreras y de demostración y validación de tecnologías de ER como alternativas viables técnica, económica y ambientalmente para el suministro de energía en las áreas rurales de Costa Rica. La Fase I tenía 6 componentes, mientras que la Fase II 3. El componente 6 de la Fase I consistiría en una Evaluación de los resultados para pasar a la Fase II de implementación masiva de ER en las zonas rurales para electrificarlas con ER donde fuera más conveniente que con la extensión de red y buscar finalmente que Costa Rica se acercara al 100% de electrificación, convirtiéndola en un modelo a seguir en Latinoamérica. *La Fase II fue cancelada durante la ejecución de la Fase I por solicitud del Ministerio de Medio Ambiente* (MINAE, hoy en día MINAET con funciones en Telecomunicaciones).

Los antecedentes del proyecto derivados de la situación energética de la población rural de Costa Rica y la ruta que se ha trazado el país hacia el desarrollo sostenible indican que el *proyecto es pertinente a la situación de Costa Rica*, está *en línea con las propósitos del GEF* y los que orientan al país hacia el cumplimento de las Metas del Milenio y a una economía baja en emisiones.

Los objetivos del programa son:

- Reducir las emisiones de gases de efecto invernadero (GEI), fomentando el uso de sistemas descentralizados de Energía Renovable (ER) en áreas aisladas del Sistema Nacional Interconectado (NIS) de Costa Rica (Objetivo global).
- Validar las tecnologías de ER como opciones viables para la electrificación rural, en áreas aisladas que no tendrán acceso al sistema interconectado en los próximos 10 años (Objetivo de desarrollo).
- Eliminar las barreras existentes que imposibilitan el uso de fuentes de ER en áreas rurales remotas que no son accesibles por medio de extensiones convencionales de red (Objetivo local).
- Crear en lo interno del sector energético costarricense un enfoque sistemático para la electrificación rural con ER (Objetivo local).

El logro de los objetivos del programa requería la remoción de las barreras identificadas durante la preparación del proyecto en el Project Brief, las cuales fueron de cuatro clases: técnicas, financieras, políticas e institucionales, y de información. Estas barreras fueron priorizadas así:

• Financieras: alto costo inicial de las tecnologías, ausencia de financiamiento y poca capacidad de pago de la población rural.

- Institucionales: falta de conocimiento y motivación entre los funcionarios que conduce a demoras en los procedimientos administrativos
- Educación, comunicación y capacitación: falta de conciencia entre las instituciones públicas que regularmente visitan los sitios aislados, y la limitada disponibilidad y acceso a sistemas de información sobre lugares aislados.
- Técnica: conocimiento limitado sobre tecnologías de sistemas de energía renovable

El presupuesto asignado al proyecto alcanzó la suma total de US\$1,927,354, con una cofinanciación costarricense de US\$945,824 y una participación del GEF de US\$981,530, estos últimos recursos ejecutados en un 92.2% a Diciembre 2010, mientras que la ejecución del cofinanciamiento alcanzó el 100%.

El objetivo de la Evaluación de Término Final es determinar la importancia, el funcionamiento y el éxito del proyecto; buscar muestras del impacto potencial y la sostenibilidad de resultados, incluyendo la contribución del proyecto al desarrollo de capacidades y el logro de metas ambientales globales. También espera identificar y documentar las lecciones aprendidas y hará las recomendaciones que puedan mejorar el diseño y la puesta en práctica de otros proyectos de PNUD/GEF.

Los principales resultados y hallazgos⁶ de la Evaluación de Termino Final son los siguientes⁷:

Formulación del proyecto

Para la ejecución de la Fase I del proyecto se diseñaron 6 componentes, los cuales fueron diseñados siguiendo un marco lógico coherente para remover las barreras y para alcanzar el logro de los objetivos. Este marco lógico también desarrolló los productos esperados para cada componente, sus indicadores y suposiciones críticas. Estos componentes fueron:

- Componente 1. Establecimiento de un marco regulatorio que favorezca el desarrollo de las fuentes nuevas y renovables de energía.
- Componente 2. Creación de capacidad institucional, en el sector privado y en la comunidad para permitir el uso eficiente de los recursos de energía renovable.
- Componente 3. Establecimiento de mecanismos financieros apropiados para apoyar las inversiones en energía renovable.
- Componente 4. Demostración de la factibilidad de los sistemas descentralizados usando energía renovable como una opción comercializable en áreas aisladas.
- Componente 5. Reevaluación de los sitios que demuestran potencial para la electrificación con sistemas de energía renovable.
- Componente 6. Evaluación de los logros de la Etapa I y liberación de fondos para la Etapa II.

⁶ La metodología incluyó revisión de documentos recibidos de las partes, entrevistas a ellas, visitas de campo y presentación preliminar de resultados a las partes.

⁷ Los evaluadores externos e independientes Kathya Fajardo y Humberto Rodríguez fueron seleccionados siguiendo los procedimientos del PNUD.

Los evaluadores consideran que la *interrelación institucional para la formulación del proyecto fue* **SATISFACTORIA**. *El Prodoc y Project Brief son realmente buenos documentos para orientar la replicabilidad del proyecto*. También que la *conceptualización/diseño del proyecto* es **SATISFACTORIA**. Sin embargo, se considera que los indicadores de éxito en las metas relacionadas con cambios legales y marco regulatorio son muy altos porque exceden la capacidad institucional y de las personas participantes en alcanzarlas. Además, el tiempo de ejecución previsto para la Fase I es demasiado corto, como demasiado largo ha sido el tiempo de 6 años de ejecución sin que a la fecha se haya cerrado el proyecto.

Implementación del proyecto

El proyecto en su ejecución tuvo una serie de tropiezos que causaron enormes retrasos. Durante el año 2005 se presentaron dificultades de orden legal en el ejecutor (ICE) que retrasaron el proyecto, luego hubo extensas consultas para las contrataciones de los consultores y empresas proveedoras de servicios y bienes, que sumados a las demoras en la ejecución de los contratos y a las dificultades logísticas han causado que el proyecto haya solicitado su *terminación para Marzo de 2010, aunque en la práctica faltan elementos para dar por concluido en la actualidad el proyecto, 6 años después de su inicio.*

Este retraso y sumado a prácticamente otros 6 años de demora desde el PDF-B y el PRODOC tuvieron la consecuencia de que *el proyecto perdió parcialmente su carácter de innovador y demostrativo en su parte de tecnología* porque el mismo ICE al comienzo del proyecto en 2004 ya había instalado numerosos proyectos fotovoltaicos.

Los evaluadores consideran que el enfoque de la implementación es **MODERAMENTE INSATISFACTORIO**.

Monitoreo y evaluación

De la revisión de la información recibida, los evaluadores han podido inferir el cumplimiento de los siguientes mecanismos de monitoreo:

- Se han empleado los mecanismos de monitoreo establecidos por el PNUD.
- ICE-UE como entidad ejecutora del proyecto se ha ocupado de las labores cotidianas del mismo empleando el Plan Anual de Trabajo.
 - Más específicamente y relacionado con los mecanismos de monitoreo, en este proyecto se elaboraron cinco PIRs, siendo el primero el PIR 2006 (1 Julio 2005 a 30 Junio 2006) y el último el PIR 2010 (1 Julio 2009 a 30 Junio 2010),

Las evaluaciones del progreso hacia <u>el logro de los objetivos</u> variaron del 2005 al 2010 entre S (Satisfactorio) y MS (Marginalmente Satisfactorio) por parte del Coordinador Nacional, la oficina de PNUD-Costa Rica y el Asesor Regional del PNUD.

Las evaluaciones de la <u>Implementación del Proyecto</u> durante los 5 años de ejecución fueron de S (Satisfactorio) y MS (Marginalmente Satisfactorio) por parte de la oficina de PNUD-Costa Rica y el Asesor Regional del PNUD y HS (Altamente Satisfactorio), S (Satisfactorio) y MS (Marginalmente Satisfactorio) por parte del Coordinador del Proyecto.

• <u>Informes de avance del proyecto.</u> Consisten únicamente en los PIRs. También existen informes finales o productos de los sub-contratos realizados por las firmas consultoras e informes breves

o presentaciones que complementan la información

- <u>Reuniones Tripartitas</u>: No *se registran* en los *Project Implementation Report* (PIRs) que se hubieran realizado; en la sección de los PIRs específicamente en la casilla denominada "*Date of last TPR Meeting*", *o* en las versiones más recientes a partir del 2008 "*Date of Program Steering Committee*" no quedaron indicadas las fechas de las reuniones realizadas como se solicita en dicha plantilla. Sin embargo, el equipo evaluador ha tenido acceso a minutas que muestran la realización de 7 diferentes reuniones entre reuniones de evaluaciones tripartitas y reuniones del Comité Directivo del Proyecto (realizadas en agosto 2006, marzo, junio y octubre 2007, junio y noviembre 2008, y abril y mayo 2010). Durante la ejecución del proyecto estas reuniones fueron descontinuadas para los proyectos PNUD/GEF.
- <u>Informe de Cierre del Proyecto.</u> *No se ha realizado este informe* por parte de la Agencia de Ejecución.
- <u>Reuniones del Comité Directivo del Programa (CDP)</u>. Las reuniones de este comité en manos de la Comisión Nacional de Conservación de Energía se realizaron varias veces en forma de reuniones tripartitas. La última reunión de la cual los consultores tienen registro se realizó el lero de Septiembre del 2009, la cual fue convocada por parte del Coordinador del Proyecto a los representantes del ICE, la DSE y el PNUD, y no se incluye en la convocatoria al resto de instituciones que conforman CONACE), lo que parece indicar que la *participación del CONACE en el proyecto se fue diluyendo en el tiempo*.

<u>Auditorias Financieras Externas.</u> Se realizaron tres auditorías externas las cuales son limpias y sin salvedades. Pero la *de 2009 NO incluyó el inventario de los sistemas solares comprados con recursos del GEF*.

El equipo evaluador considera que hubo seguimiento pero no fue sistemático al avance de las actividades sin embargo dada la falta de periodicidad en las reuniones realizadas, la carencia de informes adicionales del proyecto y la no realización del taller de inicio, y considera por lo tanto que el monitoreo y seguimiento del proyecto es **MODERADAMENTE SATISFACTORIO**.

Sostenibilidad

En cuanto al <u>desarrollo de capacidad</u> se refiere, el proyecto desarrolló talleres y cursos de capacitación (en dos talleres sobre ER, 94 personas y cuatro talleres en el 2011) así como capacitación a los usuarios de los PVS y la MCH directamente en las comunidades. En talleres de modelos de ejecución de proyectos, 32 participantes fueron capacitados durante el 2007. También se difundió un video en autobuses exponiéndolo a 130.000 personas. El personal del ICE está capacitado para adelantar el mantenimiento de los PVS.

Resultados del proyecto

Objetivo global de la Fase I

- Las emisiones evitadas cuando se terminen de instalar los sistemas del GEF en el 2011, serán de 615.4 tCO₂/año⁸, lo que *durante 10 años arroja 6154 tCO₂ evitadas, excediendo las 5700 tCO₂ propuestas (ap. por un 8%)*. La generación hidroeléctrica evitará el 19% de las emisiones y los PVS el 81%, cuando se había inicialmente propuesto que fueran el 55% y el 45% respectivamente. El objetivo global entonces se da por cumplido.
- Se instalaron 16 proyectos (10 en comunidades, 4 parques nacionales, 2 proyectos demostrativos que también se han considerado como 2 educativos para un total de 18).
- El acceso de terceros actores al mercado de energía renovable se ha dado a través de varias empresas que suministran bienes y servicios en medio de un mercado limitado como es el costarricense.

<u>Objetivo 1.</u> Apoyar la implementación de políticas y regulaciones que establezcan un marco regulatorio que favorezca el uso de la energía renovable en proyectos de electrificación rural. Logros:

- El proyecto desarrolló propuestas para la modificación del marco normativo que no alcanzaron a trascender y se quedaron en propuestas.
- Se desarrolló una propuesta de Ley para Incentivar el Desarrollo Eléctrico Rural con Recursos Renovables (LIDER), propuesta que solo contiene elementos legales (faltan los técnicos) y que no trascendió⁹.
- Regulación para las concesiones de agua para pequeños aprovechamientos hidroeléctricos *está propuesta pero no aprobada.*
- El ICE dispone de normatividad para los PVS y las MCH pero el proyecto no desarrolló normatividad de carácter nacional.
- Modificación a la Ley 7447 retomando la exoneración de los impuestos para proyectos de ER (Ley 8229).

<u>Objetivo 2:</u> Fortalecer la capacidad de instituciones, compañías y comunidades para desarrollar proyectos de energía renovable.

Logros:

- Se desarrolló una metodología completa para la evaluación de la ER como alternativa a la extensión de red, denominada ER Tool. Esta metodología incorpora de manera novedosa no solamente variables técnicas sino también económicas y sociales. La metodología se encuentra montada en plataforma Excel en el ICE. Sus funcionarios han recibido capacitación sobre el particular.
- Capacitación a funcionarios ICE en ER (se realizaron 6 talleres con 225 participantes).

⁸ Para esta estimación se han hecho los siguientes supuestos: Metodología igual a la empleada para el Prodoc, se incluyen a MCH de Chirripó y todos los PVS del ICE instalados a partir de 2005 como promovidos por el programa, y todos los sistemas financiados por el GEF aún sin instalar.

⁹ Alcanzar que estas modificaciones tengan al final la aprobación por parte de la Asamblea Legislativa o reciban aprobación vía Decreto resulta fuera del alcance de los actores del proyecto

- Sitio web desarrollado por el proyecto y en operación (SIFER: Sistema de Información sobre Fuentes de Energía Renovable, de carácter regional). No tiene información de Nicaragua, Salvador, Honduras y Panamá. Información de Costa Rica incompleta y desactualizada. *SIFER no presta servicio alguno y tampoco hay registro de número de visitas*.
- Sitio información de la DSE. Da buena información sobre reportes producidos por el proyecto.
- Video elaborado sobre ER. Difusión vía publicidad en buses públicos. Número de personas expuestas al video: 134.400. Futura diseminación en escuelas por parte del ICE.

<u>Objetivo 3:</u> Es la promoción de inversiones en proyectos de energía renovable mediante el desarrollo de mecanismos financieros novedosos.

Logros:

- El proyecto evaluó diversos mecanismos financieros. Durante esta fase del proyecto se deberían haber implementado varios de ellos para seleccionar los mecanismos que se implementarían en la Etapa II. Durante la fase de esta evaluación no se implementó ninguno de los mecanismos evaluados¹⁰.
- Número de participantes a los dos talleres realizados: 32.

<u>Objetivo 4:</u> Demostrar la validez de los sistemas de energía renovable descentralizados como opción de mercado para generación eléctrica.

Logros:

- Se instalaron 16 proyectos (10 en comunidades, 4 parques nacionales, 2 proyectos demostrativos Parque Marino de Puntarenas (solar + eólico) y Parque Chirripó (hidro+solar) que también han considerado como 2 educativos para un total de 18).
- Estos proyectos no se han evaluado por parte del ICE.
- Se realizaron 8 estudios de factibilidad realizados por 2 firmas particulares (3 por parte de Chirripó Consultores y 5 por parte del INCAE), así como otros realizadas por el ICE
- 2 esquemas de ejecución probados (privado llave en mano e ICE)
- 74 módulos adquiridos con recursos PNUD-GEF (no se han instalado en su totalidad)
- 1 MCH de 20 kW construida como contrapartida del ICE (Parque Chirripó) en vez de 3 más pequeñas como inicialmente estaba propuesto.
- Capacitación a usuarios de PVS y MCH.
- No se han realizado seminarios de evaluación de los proyectos ni presentación de resultados de tales evaluaciones.
- El monto de las inversiones de contrapartida del ICE en 13 lugares ascendieron a US\$950.622

<u>Objetivo 5:</u> Evaluar el programa de electrificación rural de Costa Rica y confirmar los sitios que puedan beneficiarse del uso de energía renovable. Logros:

• Se ha dotado al ICE de una Metodología de Evaluación de Proyectos que incluye no solamente información técnica y económica (costos de alternativas: extensión de red, solar,

¹⁰ La realidad es que los usuarios de los proyectos con ER en el sector rural están en área de influencia del ICE y requieren de una elevada cofinanciación para viabilizar los proyectos lo que resulta en que finalmente es el ICE quien hace totalmente la inversión. *Por tanto, la rapidez de penetración de las ER está determinada por la ejecución del ICE en el sector rural.*

eólica, MCH) sino también una evaluación de factores sociales y de desarrollo (*ER Tool*). Esta herramienta permite la priorización de los proyectos

- Se ha levantado información primaria de sitios por electrificar a nivel nacional por subir al *ER Tool y se han realizado corridas del modelo en algunos sitios.*
- No se ha establecido un Programa de Energía Renovable dentro del Plan Nacional de Electrificación Rural.
- Se realizaron •8 factibilidades realizadas por 2 firmas particulares, más otras factibilidades desarrolladas por el ICE¹¹.

Los evaluadores consideran que el logro de los Objetivos y de los Resultados se considera MODERADAMENTE INSATISFACTORIO porque faltan productos fundamentales como el análisis de la Información para producir un plan de electrificación rural con renovables, la evaluación de los sistemas demostrativos y la instalación de sistemas y equipos financiados por el GEF aún por instalar.

ESTADO DE LAS BARRERAS

Los evaluadores del proyecto consideran que después del proyecto, el estado actual de las barreras es el siguiente:

- Ausencia de normas y estándares de ER: *Se removió parcialmente* porque existen las del ICE pero no lo elevaron a norma técnica nacional
- Conocimiento limitado en ER. Barrera removida.
- Capacidad técnica limitada para adelantar proyectos de ER. *Barrera removida*. El ICE tiene capacidad para ello
- Falta de ambiente regulatorio favorable a las ER. *No se removió* pero si se produjo valiosa información y propuestas presentadas.
- Falta de incentivos fiscales a largo plazo. *Barrera removida. Se restablecieron incentivos de la ley 744*
- Falta de presupuesto específico para ER. Barrera no removida. Recursos son aun limitados.
- Falsas expectativas de la población rural sobre expansión de red a corto plazo. *Parcialmente removida*.
- Falta de información sobre proyectos de ER. *Parcialmente removida*. El ICE está por evaluar los proyectos realizados

RECOMENDACIONES

AL ICE – DSE (MINAET)

- Considerar la *continuidad y fortalecimiento* de los logros alcanzados por el programa porque es un esfuerzo que responde a necesidades reales de los habitantes rurales y las poblaciones menos favorecidas del país.
- La utilización de las ER en el sector rural está en línea con la política ambiental del país, con la meta de Carbono Neutro para el 2020 del país, o al menos de una economía baja en carbono

¹¹ Se consideró NO viable realizar estudios de factibilidad para 313 sitios como indicaba el PRODOC.

como más recientemente se dice, con las Metas del Milenio y la posibilidad real de alcanzar 100% de electrificación rural del país, sin recurrir a empréstitos extranjeros, convirtiéndose Costa Rica en un ícono en América Latina y siendo la primera nación 100% electrificada del subcontinente Latinoamericano.

- Diseminar la información existente como el Video Informativo sobre ER.
- Para cerrar el proyecto, se recomienda al ICE:
 - Instalar todos los PVS que se encuentran en sus bodegas y terminar el Parque Marino¹²
 - Realizar una evaluación técnica, económica y ambiental del desempeño de los sistemas instalados para promover su utilización en el país.
 - Emplear a fondo el ER Tool como una herramienta para la planificación de la electrificación rural en el país y producir el Plan de Electrificación Rural con ER.
 - Establecer claramente el Ciclo de Vida de los proyectos de ER en el ICE.
 - Elaborar el Informe Final de Proyecto para poderlo cerrar.
- Para cerrar el proyecto, se recomienda a la DSE:
 - Incluir la información de Costa Rica en el SIFER y difundir su existencia para su uso
- Dada la naturaleza de este proyecto en relación a la utilización de la energía renovable en comunidades rurales tanto para uso residencial como para uso comunal -salud y educación- su interrelación con los *objetivos del Milenio* está directamente vinculada, proyectos de este tipo garantizan la sostenibilidad del ambiente, ya que utilizan fuentes no contaminantes para la generación de energía.
- Por otro lado la posibilidad de contar con electricidad en sus viviendas *beneficia* a sus moradores pero especialmente *a las mujeres* que en muchos de los casos permanecen más horas en sus viviendas, teniendo la posibilidad de usar sistemas eléctricos como luminarias, radios, teléfonos celulares entre otros.
- Esta nueva condición de acceso a la electricidad no solo permite beneficios directos como aprovechar medios de comunicación sino que minimiza las gestiones diarias requeridas para garantizar el suministro de velas, combustibles fósiles y otros energéticos muchas veces en manos de las mujeres.

Al PNUD-GEF

- En la formulación de los Prodoc, considerar con mayor ajuste a la realidad de los países el alcance de las acciones sobre todo en términos de que un proyecto pueda generar cambios legales y reglamentarios. Los indicadores solicitan que al final del proyecto se hayan producido cambios en el marco legal y regulatorio del país, logros que están enteramente por fuera del alcance de los consultores y de las instituciones.
- El monitoreo de los proyectos, de todas las actividades, debe ser más periódico y estricto, dejando récord de las reuniones y las decisiones que se toman en la reuniones, y monitoreando el cumplimiento y oportunidad del proyecto. Se debe ser más sistemático en la información de los proyectos y desarrollar un protocolo para la generación de reportes.
- Debido al retraso entre la formulación y el comienzo de la ejecución del proyecto, así como los retrasos en la ejecución del mismo, el impacto del proyecto en cuanto a la demostración de

¹² Se instalaron dos aerogeneradores durante Mayo de 2011 en el parque marino, según información del ICE.

nuevas tecnologías se redujo. Lo que era alguna novedad en 1999 ya no era en 2005 porque el mismo ICE había montado ya más PVS hasta 2005 que los que se iban a implementar. Sin embargo, el proyecto introdujo nuevas formas de contratación para la instalación de los equipos (p.e. llave en mano) y se ensayaron nuevas formas de organización comunitaria para la sostenibilidad de los sistemas.

- El valor agregado de evaluación de los proyectos demostrativos por parte del ejecutor ICE no se ha dado y esta evaluación es una demostración in situ de las ventajas/desventajas de las tecnologías de ER que sería un argumento básico para la utilización masiva de tales sistemas en la electrificación rural.
- Solicitar al Auditor Externo que en el informe de auditoría del periodo 2009 incluya los equipos fotovoltaicos adquiridos como parte del inventario de activos del proyecto.
- Solicitar el ICE y a la DSE la elaboración del Informe Final de Proyecto que debería haberse realizado durante los últimos tres meses de operación del proyecto.
- Incorporar el tema de Género en la gestión del proyecto. Incorporar la perspectiva de género como parte de las actividades en este tipo de proyectos permitiría analizar los roles y responsabilidades de las mujeres tanto como beneficiarias del suministro eléctrico en sus comunidades como en su rol de usuarias del servicio energético sea ésta para usos domésticos, productivos o usos comunales. Programar actividades específicas como talleres o sesiones dirigidas permite que se desarrolle un proceso de sensibilización en la temática de género aprovechando la incursión tecnológica y ampliando sus beneficios con alcances sociales. Determinar la participación de la mujer permite valorar el papel de las mismas en el mantenimiento y uso de los equipos y posiblemente generar una participación activa en mayores usos productivos de la electricidad.

LECCIONES APRENDIDAS

Para el PNUD y el GEF:

- El tiempo transcurrido entre la formulación, el diseño, la aprobación y la implementación de un proyecto no puede alargarse por periodos extensos como en este caso, lo que provocó que no sólo el proyecto perdiera parcialmente (aspecto de innovación tecnológica) su carácter demostrativo sino que las prioridades país y de las instituciones ejecutoras afectaran el ritmo y el alcance de las actividades propuestas.
- 24 meses para ejecutar un programa que espera remover barreras a nivel nacional, como se tenía previsto en el diseño es un tiempo corto, sobre todo teniendo en cuenta que algunos de los resultados requerían la participación de distintos actores clave, como por ejemplo la propuesta de legislación donde participaban en la retroalimentación tanto la DSE como el ICE, instituciones que en sí mismas requieren consulta a lo interno antes de promulgarse en aspectos operativos
- En términos de cofinanciamiento en especie es importante no solo aclarar las responsabilidades de los funcionarios en el proyecto sino también su disponibilidad de tiempo real asignada como parte del compromiso para garantizar que podrá cumplir con lo estipulado en el proyecto y que la ejecución de las actividades no recarga de forma irreal su desempeño con otras funciones asignadas por la institución contraparte.
- La asignación de los recursos en el presupuesto tiene que ir de la mano con el alcance del indicador y el producto esperado, específicamente en el caso de una campaña divulgativa no se provisionaron los recursos requeridos para cubrir el alcance descrito.

- Los indicadores propuestos en el proyecto tienen que depender directamente de la gestión de las agencias de ejecución y los actores relacionados, esperar que se obtengan productos como cambios en la legislación, incentivos fiscales, están en el contexto de desarrollo de este fuera del alcance de las instituciones ejecutoras.
- El establecimiento de relaciones de coordinación e información con las instituciones gubernamentales que rigen el sector eléctrico, se ve en muchos casos afectada por las directrices de los cambios de jerarcas, los cuales una vez ingresan a las instituciones del gobierno modifican las políticas vigentes y las prioridades establecidas en las mismas.
- El establecimiento de los Comités Directivos de los proyectos, en instancias políticas debe tener descrito el riesgo asociado que esto conlleva.

<u>AL ICE – DSE (MINAET</u>)

- Es importante tomar en cuenta la intensidad de los requerimientos de coordinación y monitoreo principalmente de un proyecto de esta naturaleza, en lo relacionado a la preparación de informes, tanto en castellano como en inglés, minutas, agendas y presentaciones para las reuniones del proyecto. Muchas de estas actividades son ajenas en su totalidad a los mecanismos institucionales existentes en el ICE y en la DSE.
- La asignación de recurso humano de la institución para llevar a cabo las funciones requeridas del proyecto implica una labor técnica muy de la mano con el quehacer institucional en este caso, sin embargo las labores de coordinación requirieron gestiones ajenas a la cotidianidad del funcionario como la preparación de informes, convocatoria a reuniones, revisión minuciosa de los productos entregados, entre otros. Por esta razón debe de valorarse en este tipo de proyectos si una persona puede cumplir las demandas de tiempo requeridas por todas las funciones de coordinación o debe de asignarse más recurso humano.
- Es necesario retroalimentar no sólo el estado de avance de las consultorías y las gestiones administrativas y técnicas requeridas, sino también analizar y compartir entre el personal clave del proyecto el contenido de los productos y no dejar esta función sólo al Coordinador o Director del Proyecto.
- Se debe contemplar un proceso de seguimiento continuo o periódico a los participantes de talleres como por ejemplo en el caso del Taller de Financiamiento en donde asistieron representantes de 5 entidades financieras y no se conoce si la información brindada en el Taller fue de utilidad práctica para su quehacer profesional, si la institución consideró financiar proyectos de ER y si no financió proyectos, las razones para ello.
- Sistematizar los logros y diseminar la información obtenida que pueda ser de carácter público permitiría obtener un mayor impacto en los logros de este proyecto, por ejemplo, elaborar estudios de caso de las comunidades beneficiarias con energía solar fotovoltaica haría aún más visible este esfuerzo conjunto entre el PNUD, GEF, ICE y DSE

1. INTRODUCTION

The Instituto Costarricense de Electricidad (ICE), executor of the Project "*National Off-Grid Electrification Programme based on Renewable Energy Sources*" (COS/02/G31), hired in coordination with UNDP-GEF Regional Coordination Unit Costa Rica and UNDP-GEF Regional Coordination Unit Panama, independent evaluators Kathya Fajardo and Humberto Rodríguez to conduct the External Evaluation at the Project Final Implementation Period. This external evaluation is provided in the Prodoc (Project Document). Hereinafter, these two consultants will be referred to as the "Evaluators".

The following final evaluation is intended to determine Project relevance, quality performance and success. It seeks to identify outcomes impacts and sustainability, including the contribution to capacity building and global environmental goals scope. It also aims to identify and document lessons learned and make recommendations that could improve the design and implementation of other UNDP / GEF (Global Environmental) projects.

With this assessment, there is an opportunity to know the Project success or failure, outcomes sustainability and assess the lessons learned. It aims to achieve the following objectives:

- To assess the overall Project performance with respect to Project impact indicators included in the Project Document and the development activities implemented by the participating entities.
- To analyze Project performance with respect to indicators of activities included in the Prodoc, the co-financing, management and social participation, as well as proposing improvements in delivery mechanisms and operating funds, structuring and operation of the agencies involved overlooking the sustainability of products.
- To determine consistency with the environmental benefits of local, regional and global experiences that have taken place during Project implementation.
- To evaluate the outcomes and lessons learned during Project execution and in this context, evaluate Project design relevance.
- To determine if information mechanisms for implementation, emphasizing on monitoring and evaluation activities, have provided what is necessary to establish whether inputs, works, schedules, required actions and outcomes, were carried out according to the Project budget and work plan.

The **Evaluation Methodology** Consisted of:

- Documentation Review (prior to visiting San Jose). This documentation was received from UNDP Costa Rica and ICE.
- Interviews: At the beginning of the mission in the country, the evaluators met in San José with:
 - UNDP Resident Representative
 - UNDP Assistant Resident Representative
 - UNDP Environment Program and Risk Management Officer
 - UEN ICE National Director and Project Director
 - UEN ICE National former director and Project former director

- UEN Director of Special Projects and Project National Alternate Director
- ICE Program Coordinator and Officers
- Energy Sector Directorate (DSE) MINAET
- Visits to ICE. The evaluators visited ICE Executing Agency at its headquarters in San José, obtaining information about the Project.
- Visit to the Projects. Visits were made jointly with ICE personnel in different places of the country where PVS (photovoltaic systems) have been installed both for use by families, and schools and dining rooms, as well as EBAIS (Basic Comprehensive Health Equipment), turtle conservation centers and a Hybrid Aeolic-PVS- System (the aeolic section is still to be completed.¹³) at the Pacific Marine Park. These systems were funded both with UNDP-GEF and ICE resources.
- Interviews. In San Jose, the evaluators met with various institutions and consulting firms' officials and with equipment suppliers for details about their participation in the Project and the products supplied by them.
- Information Analysis.

Project Information: The information (reports and documents) was directly obtained from UNDP-Costa Rica, ICE and the Energy Sector Directorate (DSE). UNDP PIR (Project Implementation Report) is of particular importance. The external audits reports (2007-2008 and 2009) as well as the tripartite meetings results were also considered.

Section 6.6 provides a list of all the information received and organized by date and all the electronic files received are attached in the electronic version of this report. It is important to note that only two Project Progress Reports (2006 and 2007) were received and, *the Project Final Report, which should have been delivered three months before Project completion, as set forth in Prodoc page 21, was not received.*

Once visits in Costa Rica were completed, Evaluators proceeded to analyze the information received. The evaluators requested additional information to both ICE and UNDP, *receiving the last information by electronic means on March 18, 2011 for the draft version and, until April 29 for the final version.*

Reviews to the Report: The Evaluators have provided the following versions:

- March 18, 2011, Draft Version 1.0, for ICE, UNDP and other stakeholders review.
- March 28, 2011, Draft Version 1.1, for ICE, UNDP and other stakeholders review. Grades awarded to the Project with the current grading table were updated.

¹³ Two wind turbines were installed during May 2011 in the Marine Park, according to ICE information.

2. THE PROJECT AND ITS CONTEXT

PROBLEM DESCRIPTION

This section intends to describe the problems faced by Costa Rica in rural electrification by 2000, year when the Project "National Off-Grid Electrification Programme based on Renewable Energy Sources" was formulated.

Costa Rica has an area of $51,800 \text{ km}^2$ and a population approaching 4 million inhabitants, growing at a 2.1% annual rate. About 59% of the population lived mainly in urban areas, while the remaining 41% were in rural areas¹⁴. The country's energy needs were growing rapidly and by 2000, consumption grew at an average annual rate of 5% with important consequences for the payment balances, as 7.8% of their export earnings in that year were allocated to meet the transportation demand for diesel and gasoline.

Costa Rica has provided particular importance to environment and its conservation, and is recognized internationally for its conservation efforts and natural resources sustainable management The energy sector recognizes that the country's vast natural resources offer a real opportunity for cost-effective and environmentally sustainable energy from these resources. During the 90's, the country diversified its energy sources basket for electricity generation to include more renewable energy, in addition to hydroelectric, such as geothermal, biomass, solar and aeolic.

In terms of national policy, 1998 National Development Plan was launched aimed "to cope challenges and take advantage of current available opportunities in Costa Rica, vitalizing the economy with stability, equity and sustainability." Realizing that providing access to modern energy sources is essential to rural sector economic development, one of the Plan main objectives *is to provide access to energy to 100% of Costa Rican population in 2010*. This objective is considered in the IV National Energy Plan 2000-2015, prepared by the Energy and Environment Ministry (MINAE) and the National Off-Grid Electrification Programme is responsible to fulfill isolated rural areas energy needs, which at date are not connected to the National Interconnected System (SNI).

During the preparatory phase, it was estimated that by 2010 a level of 99%, ¹⁵ rural electrification would be reached and it was considered that there would then be about 12,000 rural homes without electricity. 4727 of these could be electrified through grid extension. The grid extension for the remaining 7273 was not feasible due to high costs and it was therefore considered *that these could be electrified with cost-effective systems such as RE photovoltaic systems* and Micro Hydroelectric Plant (MHP) (wind and biomass systems were discarded by resource unavailability in such places).

On the other hand, it provided the opportunity to reduce greenhouse gases emissions (GHGs) as these homes could choose to use generators instead petroleum fuels, Global Environment Facility (GEF)

¹⁴ Information related to the 2001 Census.

¹⁵ It is currently (February 2011) mentioned that it reached 99.3%.

interest reduction and in line with the country's environmental oriented policy, despite Costa Rica was a modest GHG emitter in year 2000. According to the First National Communication to UN Framework Convention on Climate Change (UNFCCC) greenhouse gases emissions for 1996 reached a net value equivalent to 4 912 million tons (1.25 tons / inhabitant / year).

Costa Rica was also an eligible nation for GEF projects. In line with its environmental policy, Costa Rica ratified the UN Framework Convention on Climate Change on August 27, 1996. Furthermore, important decrees, agreements and laws were approved, as a significant contribution to international environmental commitments. Examples include Environmental Organic Law, Rational Use of Energy Law and its Regulations and the new Forestry Law. Likewise, the Advisory Commission on Climate Change was established in 1998 aiming to organize and maintain an ongoing dialogue with all society sectors on policies and measures for mitigation and adaptation to climate change

The search for the Millennium Development Goals (MDGs) fulfillment was an additional factor to contribute to rural electrification program development, several of them promoted by rural sector energy supply and target number 7 in particular, which is to integrate sustainable development principles into country policies and programs and reverse environmental resources loss.

Therefore, *at the time factors coalescence led to the program formulation*. However, the use of RE faced a series of barriers that impeded their development in the country. The formulated program seeks to remove barriers (financial, institutional, educational, technical, communication, and training) that prevented RE systems implementation and without it, users resort to the installation of liquid fuel plants that not only have high operational costs but also use petroleum-based fuels and thus are GHG emissions sources.

Facing the possibility of reducing GHG emissions, GEF would then provide funding for certain barriers removal. The benefit to global environmental mitigation consisted in an estimated 210,000 tons of CO2 emissions for an impact analysis period of 10 years for the two phases in which the Project was designed. Phase I of this program would result in *CO2 5700 tons estimated reduction for a 10 years period of impact analysis*.

The Project would be executed by the Instituto Costarricense de Electricidad (ICE) with other institutions participation, as the Energy Sector Directorate (DSE) of the Environment and Energy Ministry (MINAE) and the National Energy Conservation Commission (CONACE), assuming the role of Programme Steering Committee in conjunction with UNDP. It was also intended to involve companies and private sector consultants to carry out the sub-contracts required. UNDP is GEF's Implementing Agency. The program was designed to be implemented in two phases with a 2 years period for the first and 3 years for the second. At MINAE request and in agreement with ICE, the second phase was canceled and *the program executed only the first phase*.

PROJECT BACKGROUND

This Project background dates back to 1997 when institutional approaches between Costa Rica government and UNDP were initiated, but it was back in 1998 when discussions between ICE, UNDP and MINAE begun to seek alliances to develop the Project entitled Photovoltaic Electrification National Network. This Project was not successful because it was limited to photovoltaic electrification. However, CONACE Sub-Commission on New and Renewable Energy Sources had instructions to

implement the necessary mechanisms to develop a document to be submitted to UNDP thereby requesting Preparatory Assistance for a Project Document that would develop a rural electrification program with renewable sources including the entire country. On June 22, 1999, the Project Document B/COS/98/G41 PDF Block was signed by the Environment and Energy Ministry, and UNDP Office in Costa Rica, starting the research work. For this purpose, a contest was carried out to hire consulting firms to assess renewable energy sources status and prospects as an option for worldwide electricity services and barriers to its development.

The main conclusions of this Preparatory Assistance were:

• It is estimated that by 2010 there would be 12,067 non-electrified homes. Of these 7273 would be electrifiable both with MCHS as PVS, houses that would be in about 329 communities, 66 protected areas and 329 health centers, production units and schools (see Table 2 1).

ED	Hous	ses	Commu	nities
	Houses	%	Number	%
MCHs	5159	71%	178	54%
SFV	2114	29%	151	46%
Total	7273	100%	329	100%

Table 2 1. Houses to Electrify According to Technology

Source: Project Brief

- The user's potential market for renewable energy systems (RE) are in ICE areas and therefore, the potential market depends on Ice's plans for rural electrification by 2010.
- For the introduction of the mentioned RE, **political, institutional, economic, technological and social** barriers were identified as well as an activities plan to reduce and / or eliminate barriers (local, national or regional).

2.1.1 PROJECT IDENTIFIED BARRIERS

The PDF-B identified a number of barriers to RE development to produce electricity. These were identified based on work done by the consultants, the workshops conclusions carried out within Project framework, interviews with various stakeholders in financial and electrical systems in the country, and in internal discussions with UNDP staff Costa Rica, CONACE, and UNDP Program on Energy and Climate Change for Latin America.

The main barriers identified were:

Technical Barriers

- Lack of technical norms and standards for construction, operation and isolated systems maintenance. As a result, performances are variable and their sustainability is prevented.
- Limited technical knowledge among providers of energy systems in both the country and the region.
- Limited technical capacity to identify, design, installs, operate and maintain small scale renewable energy systems.
- Lack of knowledge and experience to take advantage of available renewable resources for rural electrification.

Political and Institutional Barriers

- Lack of a favorable regulatory environment for the promotion of small renewable energy projects. These incentives may be needed to reduce investment risks, taking into account consumer's remote and scattered nature and associated administration costs.
- Lack of long-term tax incentives within Law 7447 framework, which relates to renewable energy promotion in Costa Rica. This law is reviewed every year and during the latest revisions incentives were eliminated to remove import duties on equipments using new and renewable sources.
- Lack of specific budget in sector institutions to implement programs to promote renewable energy in areas not connected to SNI.
- Delays in Project implementation due to trained technical personnel limited number at all levels in government entities. Electricity projects, regardless of size, are subject to the same bidding process. This process is long (at least one year) and tedious. This limits the performance of small projects and prevents new bidders entering the hiring process.
- Lack of a regulatory legal framework adapted to small-scale hydroelectric projects regarding water concessions. Other actors who want to build plants based on hydroelectricity have to go through the process.

Information Barriers (Communication, Education and Training).

- The scattered rural population has false expectations about the expansion of the conventional network (at lower prices) in the short term.
- No information available locally on the use of renewable energy on a small scale.
- Lack of or little knowledge about renewable energy technologies among public employees (for example: teachers, doctors) who continuously visit rural areas and rely on electricity to provide public services like education and health.
- Lack of information on business opportunities related to these forms of alternative energy:

The *barriers were prioritized* through a survey among stakeholders as follows:

- Financial: high initial cost of technology, lack of funding and insufficient ability to pay by the rural population.
- Institutional: lack of knowledge and motivation among staff which leads to delays in administrative procedures
- Education, communication and training: lack of awareness among public institutions that regularly visit remote sites and limited availability and access to information systems about these sites.
- Technical: limited knowledge about technologies using renewable energy systems.

2.1.2 Prodoc Formulation

Subsequently, based on PDF-B results, Project Brief was developed and its final version (March 8, 2002) provides a Full Size Project with 9 components and to develop in two phases, the first lasting two years and with the implementation of 6 components, and the second of three years with the implementation of 3 components. The value of the first phase is U.S. \$ 2,053,933 with a GEF contribution of U.S. \$ 1,147,154 and a Costa Rican co-financing of U.S. \$ 906,779, while the second phase had a GEF contribution of U.S. \$ 3,260,836 and a national co-financing of U.S. \$ 16,901,307, for a grand total of the entire Project of U.S. \$ 20,162,143.

However, UNDP and GEF suggested dividing the Project into two phases considering *that ICE's co-financing covered equipment investment, while GEF funds were intended for the removal of barriers. The implementation of the first phase did not involve a commitment to implement the second, which is executed after both parties agreed to the desirability of conducting an evaluation after the first phase.*

From there, the Prodoc (Project Document) was developed which focused on the so-called Phase 1, with the execution of six components of the initial Project, and in an amount equal to the initially determined for phase 1 for GEF however, the co-financing part was slightly increased.

PROJECT APPROVAL BY GEF

Following the procedures of UNDP-GEF, PDF B proposal was developed and signed on June 22, 1999 by MINAE and UNDP-GEF. Subsequently, the Project Brief was signed on June 28, 2002. And the Prodoc (Project Document) was signed by the parties (Ministry of Environment and Energy in November 2004, Chief Executive Officer of ICE on December 3, 2004 and UNDP Resident Representative on December 6, 2004). It should be noted that the program *complies with the* United Nations *Millennium Development Goals* ... *Target 7.A:* Ensure Environmental Sustainability and consequently, with the Strategy for Poverty Reduction, and was in line with the country's environmental policy.

PROJECT STARTING DATE AND DURATION

The first phase of the Project, designed to be executed in two years, actually began operations in July 2005. Subsequently, the ICE responded on September 6, 2006 to MINAE, GEF focal point, no objection to the termination of the Project to complete the first phase and requesting cancellation of the second.

There were delays due to legal nature clarifications arising from ICE's legal mechanisms and project implementation mechanisms during the start of the project. These explanations took a great amount of time mainly during 2005, as well as those due to some contracting processes during the year 2006, that claimed an extensive work to develop terms of reference, as well in the delivery of products by the consulting firms hired during 2008 and 2009. The implementation period was extended until December 31, 2009 and subsequently again until May 31, 2010 at the request of ICE (January 22, 2010). This Project therefore was executed *three times the original execution time*. The Project to February 2011 is in the Final Evaluation, thus fulfilling component 6 of the Project. Table 2-2 shows the major milestones of the program.

Date	Activity
22-Jun-99	PDF-B Signature
2000 a 2001	Consultants work
Aug-01	Project Brief First Version
2001 a 2002	Adjustments to Project Brief
8-Mar-02	Project Brief Final Version
15-Apr-02	Observations of the GEF to the PRODOC
22-Jul-02	PRODOC version with changes suggested by the GEF
6-Oct-04	Project ratified by the GEF
6-Dec-04	PRODOC Last Signature
Jan. to Sept. 2005	Clarification legal dispute with the Comptroller General of the Republic
Jul-05	Project begins operations
6.0.06	ICE responds to the Minister of Environment and Focal Point no objection
6-Sep-06	Permination of the project with Phase 1 requests cancellation of Phase 2
22-Jan-10	ICE requests May 31, 2010 as the date of completion of the project
Feb-11	Final Evaluation

Table 2 2. Key Program Events.

Source: Author
PROJECT OBJECTIVES

Project objectives are of different kind because they must be in line with both the country and GEF objectives of the country and GEF.

The Project's Overall Objective is:

• Reducing emissions of greenhouse gases (GHGs) and promoting the use of decentralized renewable energy (RE) in areas with no access to the Costa Rica National Grid System (SIN: Sistema Interconectado Nacional,) Costa Rica.

The Project's Development Objective is:

• Validating RE technologies as viable options for rural electrification in remote areas, with no access to the interconnected system within the next 10 years and for the development of these communities also.

The Local National Objectives are:

- Eliminating barriers that prevent the use of renewable energy sources in remote rural areas not accessible by conventional grid extensions.
- Creating within the energy sector in Costa Rica a systematic approach for rural electrification with RE.

This program is also expected to set an example for neighboring countries in Central America, which are simultaneously trying to reform its energy sector and provide basic services to its poorest people, as a precondition for national development objectives.

As indicators of results are:

- Reduction of 5.700 tons of CO2 emissions after 10 years (calculated value)
- 16 communities electrified with Renewable Energy at the end of Phase 1
- Third party actors access to a small scale Renewable Energy Market that works well.

PROJECT EXPECTED OUTCOMES

The expected outcomes of the Project after two years of implementing its application (5 years in practices) would be the following¹⁶:

- Laws and regulations governing the energy sector are modified to include provisions that permit the development of renewable energy on a small scale.
- A standardized procedure was established to analyze the potential of RE in rural electrification projects.
- Public and private resources are combined in rural electrification projects developed by public service companies and third parties (within the limits of the national legislation).
- Construction of demonstration projects is successful and completed with the budget.

¹⁶ Prodoc, page 25

• A Rural Electrification Plan that specifies the number of sites to be electrified with renewable energy is released at the end of Phase I.

Components were formulated to achieve these objectives and each includes an immediate objective, specific products and a number of activities designed to achieve the results established. **PROJECT COMPONENTS**

The Project was divided into two phases and the phases structured by components.

Phase I

This phase will focus on creating an institutional, regulatory and market environment that supports the use of renewable energy systems in Costa Rica. The total cost of this component will be \$1 927 354, for which GEF will co-finance \$981,530.

For its implementation, the following 6 *components* will be developed:

- Component 1. Establishing a regulatory framework that fosters the development of new and renewable sources of energy.
- Component 2. Institutional capacity building in the private sector and within the community to allow the efficient use of renewable energy resources.
- Component 3. Establishing appropriate financial mechanisms to support investments in renewable energy.
- Component 4. Demonstrating the feasibility of decentralized systems using renewable energy as a marketable option in remote areas.
- Component 5. Reassessment of the sites that show potential for electrification with renewable energy systems.
- Component 6. Assessment of the achievements of Phase I and release of funds for Phase II.

Each component comprises an immediate objective, specific products, and a number of activities designed to achieve the results established. Through these six components, the program will set the scenario for a successful national campaign for rural electrification with renewable energy.

Following is the objective of each component, its justification and its cost:

• Component 1: Policy and Legislation¹⁷

¹⁷ Project Document, page 25 and following

The objective of this component is to support the implementation of policies and regulations that establish a regulatory framework conducive to the use of renewable energy in rural electrification projects.

Due to lack of experience with decentralized renewable energy systems, Costa Rican law provides little incentives for investment in renewable technologies. This component will work to reformulate national energy policies to incorporate decentralized renewable energy systems in the long-term strategies for energy development in the country. This regulatory framework will redefine the role of renewable energy systems in the country, promoting their use in future electrification projects upon GEF's financial support completion.

Total cost of this component: US\$ 142,000 (GEF financing: US\$ 61,000).

• Component 2: Capacity Building

The objective of this component is to strengthen capacities of institutions, businesses and communities to develop renewable energy projects.

Decentralized systems of renewable energy in Costa Rica are relatively unknown. Therefore, substantial ability must be generated to ensure the proper use of the equipment, including best practices for energy efficiency. Training programs are goint to be designed and structured to raise awareness among stakeholders and create a solid foundation for renewable energy development and efficient use of energy. This training program main beneficiaries will be representatives of ICE, CNFLS, municipal electricity companies (ESPH and JASEC), rural electrification cooperatives (CoopeGuanacaste, Coopelesca, Coopesantos, Coope Alfaro Ruiz), the different EBAIS (Basic Integral Health Equipments) Public Health Ministry, Ministry of Public Education teachers, and officials from the Social Security Fund (Caja Costarricense de Seguro Social CCSS), DSE and MINAEs Conservation Areas. The Project also actively promotes and disseminates information on renewable energy to potential users of this technology in order to generate awareness among the population.

Total cost of this component: US\$ 238.500 (co-financing GEF: US\$ 194.500).

Component 3. Establishing Appropriate Financial Mechanisms

The objective of this component is to promote investment in renewable energy projects through the development of innovative financial mechanisms.

The introduction and use of renewable energy require considerable investment by government institutions, the private sector and beneficiary communities. Financial barriers have been identified by national stakeholders as the major barriers for rural electrification with renewable energy. The long-term success of this initiative must include new financial mechanisms that make the investments required attractive for all the parties involved.

Total cost of this component: US\$ 26.000 (co-financing GEF: US\$ 26.000).

Component 4. Demonstrating the feasibility of decentralized systems using renewable energy as a marketable option in remote areas.

The objective of this component is to demonstrate the validity of decentralized systems using renewable energy as a market option for generating electricity.

To achieve this, goal 16 pilot projects and 2 training facilities will be implemented to demonstrate the benefits of renewable energy in remote communities not connected to the national grid. The completion of these pilot projects will help eliminate doubts about new and renewable sources of energy that those interested still have because of the lack of experience with these systems. These will also serve to validate the results of the PDF-B as to comparing the current performance and costs with those predicted by the PDF-B activities. Finally, this component will determine the most effective methods of community participation, both in contributing to the financing of the system and in the operation and maintenance of power systems.

The demonstration sites were selected to have a balanced representation on the type of energy source. However, feasibility studies indicated that only two sites had micro-hydro potential, therefore, three micro-hydroelectric projects will be built during this phase, including a demonstration and training facility.

Total cost of this component: US\$ 810.624 (co-financing GEF: US\$ 2.160.000).

Component 5. Reassessment of the sites that show potential for electrification with renewable energy systems.

The objective of this component is to evaluate the Rural Electrification Program in Costa Rica and confirm the sites that can benefit from using renewable energy.

During the PDF-B, considerable efforts were addressed to identify FENR Project development sites and it is prudent to reassess the results of the PDF-B in light of the experiences and results of Phase I. There will be a new portfolio of projects incorporating lessons learned during Phase I. Consultants did not receive any documents from ICE which include the lessons learned from Phase 1.

Total cost of this component: US\$ 340.000 (co-financing GEF: US\$\$ 340.000).

Component 6. Assessment of the achievements of Phase I and release of funds for Phase II

The immediate objective is to evaluate the achievements of Phase I and determine the feasibility of conducting a National Rural Electrification Program based on renewable energy in light of these results.

Dividing the Project into two phases allows an evaluation of the results before beginning a national program of rural electrification with renewable energy. Total cost of this component: U.S. \$ 61,000 (GEF financing: U.S. \$ 61,000). Guide activities for obtaining the products intended and its indicators and targets are given in detail in the Prodoc¹⁸.

PROGRAM ORGANIZATION

To implement the program three instances were established with the following names, composition, functions and responsibilities.

- Program Steering Committee
 - **Integrated by**: CONACE¹⁹ and PNUD
 - **Function:** Provide guidance to the NPD, National Program Directorate, the National Coordinator and the Executing Agency on the direction of project development and implementation.
 - All decisions involving GEF-funds will be taken in consultation with UNDP, who has to approve utilization of GEF-funds.
 - Responsibilities: a) Promote strategic partnerships, b) Give broad strategic guidance, c) Reviewing reports on the project's progress, d) Designate one PSC Representative to participate in the Project's tripartite reviews.

• National Program Directorate

- **Integrated by:** DSE and ICE with two Strategic Business Units (SBU); SBU Customer Service and SBU Project Management.
- **Function:** Supervise all the project-related activities, and to ensure that the expected outputs are completed on time and they comply with GEF and UNDP criteria, requirements and procedures.
- **Responsibilities:** 1. The centralized financial supervision of the Project, managing directly the resources provided by ICE. Implement GEF resources through the UNDP administrative procedure; 3. Appoint a full-time Program Coordinator from ICE core staff (in-kind contribution); 4. The National Director will be the link of communication between the NPD and the Program Coordinator; 5. Supervise the formulation of the equipment specification in coordination with the Program Coordinator for the purchase of equipment; 6. In coordination with UNDP adjust the different activities as progress is made in the different project development phases; 7. Submit semi-annual progress reports to the Steering Committee and the Tripartite Review Meetings, as well as additional reports; 8. Signature the Combined Delivery Report (CDR) four times a year, and Budget Reviews (initial, substantive, mandatory and final); 9. Make sure that the respective final documents are signed by the person designated (CDR and compulsory final revision).

¹⁸ Prodoc, page 25

¹⁹CONACE, by its nature, involves different actors in the government sector and the electricity sector, including the cooperative sector. CONACE will ensure a participatory process at the highest level in the program.

• Program Coordinator

- Integrated by: ICE's Staff Officer
 Function: Is responsible for day-to-day management, coordination and supervision of project activities implementation.
- **Responsibilities**: 1. To prepare a detailed work plan at implementation outset; 2. Responsible for all contracting (personnel and subcontracts) funded by GEF funds following UNDP procedures; 3. Supervise coordinate and facilitate the work of all personnel (including subcontracts) hired by the project; 4. Keep the NPD, PSC and UNDP fully informed of Project implementation progress; 5. Prepare reports required by the NPD, UNDP and GEF such as the yearly Project Implementation Report (PIR), APRs and QORs among others; 6. Prepare and send the duly signed payment requests to the UNDP country office; 7. Implement activities related to technical and financial barriers; 8. Coordinate activities related to removal of political, institutional and information barriers; 9. Maintain a detailed record of all equipment purchased by GEF funds, and submit annually an updated inventory list to UNDP.

Since its inception the program established the TOR related contracts required for its implementation.

Figure 2-1shows the chart that links instances to implement the program.

The implementing and executing agencies are the agencies directly involved with the program. Following are their roles and responsibilities.

Executing Agency: UNDP Costa Rica

UNDP-Costa Rica will act as the implementing agency for the Project. The project will be administered in accordance with UNDP established regulations and administrative procedures.

UNDP:

- Will administer and allocate the Project funds on behalf of GEF Secretariat,
- It will provide assistance in the purchasing process for any acquired equipment, if required, and will assure that the selection process for national and/or international consultants as well and subcontracts will follow competitive and transparent processes,
- Will provide assistance on the GEF formal procedures that apply to reporting, and
- Will be the formal channel of correspondence between the Project and UNDP/GEF, and
- It will be responsible for the continuous monitoring of Project progress.

Figure 2-1. Program Organization Chart



Also:

- It will convene tripartite reviews at least every 12 months, during the execution of the Program,
- It will appoint a Program Officer as the focal point for this Project,
- It will give Project execution all administrative support and financial and budgetary follow up,
- It will provide NDP with accounting, financial and budgetary documentation
- It will conduct the annual Project audit following GEF procedures,
- It may charge a fee for providing services in accordance with the Corporate Guidelines on UNDP Cost Recovery (Medium-High Level Cost in the Universal Price List).

Executing Agency: ICE

ICE will be the executing agency for the Program and will be responsible for carrying out and completing the program in accordance with the activities described in Prodoc. Additionally, it will:

- Provide as an in-kind contribution the Program Coordinator, Field Projects Officer and the administrative support staff,
- Appoint one of the ICE NPD Members as the National Project Director,
- Provide office space for the Program Coordinator, who will be physically located at ICE, and assure that he/she will get the necessary technical and administrative support,
- Have the flexibility to conduct a voluntary audit of the Project following national legislation in case deemed necessary.

PROJECT SCHEDULE

The following schedule reflects the programming of Phase I Project activities for two years.

ACTIVITY / MONTH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Pre-project Phase																								
Signing of Project Document	х																							
Setting up of National Programm Directorate and the Programme Steering	v																							
Committee	^																							
Start of Project	x																							
Request for proposals – Subcontracts		х																						
Evaluation of proposals			х																					
Selection, contracting of consultants			х																					
Project Implementation Phase-1																								
Design of detailed weekly work plan		х																						
Inception workshop			х																					
Revision of legislative/regulatory framework	х	х	х	х	х	х	х	х	х	х	х	х	х	х	х	х	х	х	х	х	х	х	х	х
Site visits and electrification design			х	х	х																			
Development of rural financing mechanisms				х	х	х	х	х																
Development of alternative bidding schemes					х	х	х	х	х	х	х	х	х	х	х	х	Х							
Selection and purchase of equipment						х	х	х	х	х														
Installation of equipment (or construction)									х	х	х	х	х	х										
Start measuring performance indicators														х										
Development of renewable energy info systems														х	х	х	х	х	х					
Institutional strengthening (DSE)														х	х	х	Х	х	х					
Formulation of a national renewable energy strategy													х	х										
Capacity building																								
For Public Service Company employees																			х	х	х			
Promotional workshops at national level																			х	х	х			
For financial sector officers																х	х	х						
For community members (beneficiaries))								х	х	х	х	х	х	х	х									
Launching of a nation-wide dissemination campaign																			х	х	х	х	х	х
Reassessment and feasibility studies for 313 sites										х	х	х	х	х	х	х	Х	х	х	х	х	х	х	
Revision of project document for Phase II																							х	
Formulation of an investment plan for Phase II																							х	
Monitoring and Evaluation	х	х	х	х	Х	Х	х	х	х	х	х	х	х	х	х	х	Х	х	х	х	х	х	х	х
End of this project phase																								х

Table 2-1. Monthly schedule of Project activities according to Prodoc.

Source: Made from Prodoc, page 30

BUDGET FOR PHASE I OF THE PROJECT

The following tables show the Budget for Phase I of the Project and its breakdown by components according to the Prodoc. The schedule of quarterly disbursements from GEF and by component is also shown in Table 2-3.

As shown in this budget, GEF provides for 51% of the phase while ICE 49%, being both sides almost equal.

Table 2-2. Budget for Phase I of the Project (US\$)

Component	FMMA	Cofinancing	Total
Administración del Proyecto	\$55,030	\$170,200	\$225,230
Component 1:To support the implementation of policies and			
regulations that establish a regulatory framework conductive to	\$66,000	\$81,000	\$147,000
the use of renewable energy in electrification projects			
Component 2: To strengthen the capacity of institutions,			
companies and communities to develop RE projects	\$249,500	\$44,000	\$293,500
Component 3: To promote investment in RE projects by	\$20.000	\$0	\$20,000
developing innovative financial mechanisms	\$50,000	\$U	\$30,000
Component 4: To demonstrate the validity of decentralized			
Systems using RE as marketable options for electricity	\$180,000	\$650,624	\$830,624
generation			
Component 5: To assess Costa Rica's Rural Electrification			
Programme and identify the sites that may benefit from the	\$340,00	\$0	\$340,000
use of RE			
Component 6: Evaluation of Phase I and release of funds for	1 000	\$0	\$61.000
Phase II	1,000	φU	φ01,000
Total \$98	1,530	\$945,824	\$1,927,354

Source: CR PNUD-GEF – Prodoc, page 33

Note: Co-financing is US\$39.045 higher than anticipated in the Project Brief. This is due to the existence of higher than expected costs, and ICE will cover the additional cost.



Figure 2-2. Budget by components and funding sources

Source: Prodoc

	Year 1 Year 2 Di					Ye	Disbursement Year 1	Disbursement Year 1		
Component	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 5	Qtr 6	Qtr 7	Qtr 8	Qrt 1 to 4	Qtr 1 to 4
Project Administration	х	х	х	х	х	х	х	х	\$28,900	\$22,130
To support the implementation of policies and regulation that establish a regulatory framework conductive to the	s v	v	v	v	v	v			\$30,000	\$31,000
Use of RE in the electrification projects	^	^	^	л	л	^			\$50,000	\$51,000
Component 2: To strengthen the capacity of institutions, Companies and communities to develop RE projects	x	x	x	x			x	x	\$165,000	\$29,500
Component 3: To promote investments in RE projects By developing innovative financial mechanisms		x	x	x					\$26,000	\$0
Component 4: To demonstrate the validity of Decentralized systems using RE as marketable options for electricity generation.		x	x	x	x	x	x	x	\$90,000	\$70,000
Component 5: To assess Costa Rica's Rural Electrifi- cation Program and confirm sites that may benefit from using Renewable Energy.				x	x	x	x	x	\$50,000	\$290,000
Component 6: Evaluation of Phase I and Release of funds for Phase II							x	x		\$61,000
Training	х	х	х	х	х	х	х	х	\$44,000	\$44,000
Total									\$433,900	\$547,630

Table 2-3. Financing of Phase I. Project Budget for Phase I and its Breakdown by Components (US\$)

Source: CR Prodoc, page. 45

3. FINDINGS AND CONCLUSIONS

PROJECT FORMULATION

This section's objective is to describe and evaluate ²⁰ how effectively the Project Concept and Design could address the Project's problem, emphasizing on consistency, logic of the strategy and logical framework.

3.1.1 Project Conceptualization / Design

The *Project is consistent* with GEF Operational Program No. 6 Promotion of the Use of Renewable Energy by Removing Barriers and Reducing Implementation Costs²¹. The Project is also in line with the country's environment policy.

Energy supply problem in remote areas of the grid; the possibility of using renewable energy as an alternative technique, economically and environmentally viable against networks extensions, or the use of generators based on petroleum fuels, which are GHGs emitters; as well as national policies and commitments towards a sustainable development path, are *conceptually well intertlocked* in the Project's characterization. The strategy used for working in the Project *is considered successful* as participation of an energy sector company such as ICE and the Energy Sector Directorate (DSE), committed to sustainable development, allow an approach, and the *Project objectives and outcomes are also in line with its own objectives*. In the aspect of improving the legal and regulatory framework for Renewable Energy in Costa Rica, the possibility of introducing changes whose implementation is beyond the scope of the Project and the institutions involved was over estimated. Even tough these were formulated within the Project they remain at a proposal level.

The Project formulated is directed towards removing the identified barriers. Both the development *objectives* and the immediate objectives and their results formulated in the logical framework are *consistent with the barriers to be removed*.

The *risks* considered in the Project are related to those presented for the implementation of the measures. The risks considered in the Project were essentially four: limited technical capacity, limited ability to pay by users of the rural sector, limited market development and lack of sustainability. The opportunity to interact with experts from ICE during a visit to several PVS installed showed they have enough technical capacity to provide maintenances services and various PVS visited, users understand well enough their operation. ICE has trained its staff in the different regions. In the case of PVS, this risk does not exist today. Also, the technical the capacity of the equipment suppliers interviewed was noted.

Concerning *limited ability to pay*, the risk persists as such due to the low income of users. It is well established

http://207.190.239.143/OP_6_Spanish.pdf

²⁰ All Findings and Conclusions sections marked with (E) in the TOR should be evaluated in AS: Highly Satisfactory, S: Satisfactory; MS: Marginally Ssatisfactory, U: Unsatisfactory)

²¹ The objectives of this Operational Programme are: a) remove barriers to the commercial or near commercial use of Renewable Energy technologies and b) reduce any additional implementation costs of the above technologies resulting from the lack of practical experience, initial market low-volume or dispersed nature of applications, so that "win-win" economically viable transactions and activities increase Renewable Energy technologies deployment.

in the Project that the installation of new PVS is only possible with a strong initial subsidy between 70 and 80% (according to the consultants in Objective 3). What happens in practice is that ICE installs the systems at all costs and users agree to a monthly fee. On the other hand, users interviewed are very satisfied with the current monthly rate of C1000 (approx. 2 US\$/month) and know very well that if they bought candles, etc. they would have expenses of approximately US\$ 8/month as determined in the PDF-B.

The *limited market development* remains a current risk because the PVC mass use y ICE has not happened, being ICE a determining factor for market growth.

With regards to the use of RE in the country, it is necessary to distinguish between the large scale RE projects and the small scale projects directed towards the isolated communities of the national grid. It is clear that the government of Costa Rica is in the path of RE but regarding the Project, a decrease in the RE systems installation rate occurred during its execution, compared to the rate during the period 1999 - 2005 prior to the Project, as indicated in Table 3.22. Therefore, regarding the sustainability of this Project, it is considered that it continues to be at risk because government plans continue to be shy in front of potential users, such as reflected in the National Development Plan which aims to use renewable energies in rural areas by installing 1500 photovoltaic solutions in a 4 year period²², when within a very short period of four to five years the country could achieve the goal of a one hundred percent electrified country.

The Project components and the activities proposed to achieve the objectives are considered appropriate and responsive to the institutional, legal and regulatory conditions of the Project. Schedules resulting from the activities and the interrelationship of the same can in time, hardly anticipate the delays that may be incurred, but it is there where the Project must adapt to these situations in favor of the execution of the Project. This Project faced delays caused by external actors with which the ICE was required to interact especially with regard to ICE's execution procedures subject to the legal framework and, it is a justification for extending the Project's deadlines in its beginning, therefore the delay of approximately 1 year, especially at the beginning, can be understood; then there were delays in recruiting consultants, goods and service supplier companies, as well as delays in implementing the projects which have influenced the fact that the Project has been in execution for 6 years, and that the Project is yet to be closed.

In this context it is necessary to note that the initial schedule of activities for two years is very tight for the execution of the Project and it is considered that the execution time should have been higher (three years). However, regardless of the time the sequence of the Project activities respond to the logic of its execution.

Indicators were defined in the Project for the Logical Framework of the Project and the Objectives, and for the Outcomes of the Project. These indicators are considered appropriate to guide the implementation of the Project and measure the progress achieved. However, several indicators that deserve discussion are 23 :

- Development Objective: 7273 houses in 329 communities electrified with Renewable Energy (RE)
- Development Objective: Estimated reduction of 210.000 tons of CO₂ emissions in 10years.

²²MIDEPLAN (2010) Plan Nacional de Desarrollo 2011-2014.Pág. 82

²³ Project Brief, English Version page. 53

This indicator pointed out to electrify the houses across the country with RE but it should have included the second phase that did not take place - The same occurred with the estimated reduction in CO_2 emissions.

The following indicators include legal actions against the industry of the country whose results have no certainty and are not foreseeable at the time, and the fact of having executive decrees or laws approved by the Legislature goes beyond the ability of the Project implementers. This observation applies primarily to Objective 1 indicators such as:

- Objetive 1. Normative and Legal Framework governing the Energy Sector includes provisions that allow the development of small scale RE systems at the end of Phase I.
- Product 1.2. Executive Decree on technical specifications for small hydro and PV systems produced and adopted by the end of Year 1.
- Product 1.3. Revisions of Law 7447 and associated regulations approved by Congress by the first quarter of Year 2.

It is also difficult to comply with indicators such as the following:

• The Government of Costa Rica confirms the availability of co-´financing for the Project at the end of Year 2.

because the Project can only propose, discuss and promote changes in the Legal and Regulatory Frameworks however, its implementation does not depend of the Project but of government institutions. And indeed, it was MINAE who requested the cancellation of phase 2.

It is then considered that the formulation of the Project is **SATISFACTORY in spite of not considering the** risks of delays and postponements in the implementation of the Project due to the legal nature of the executor.

3.1.2 Project Relevance for the country / Country Ownership

The background of the Project derived from the energy situation in Costa Rica and the path set by the country towards sustainable development indicate that *the Project was relevant* to the situation in Costa Rica and its rural sector, at the time of its formulation.

3.1.3 Stakeholders Participation in Project conceptualization/Design.

The following table shows the various institutional actors and their role in the off-grid electrification Project based on renewable energy sources.

Institution Role/Responsibilities								
Instituto Costarricense de Electricidad (ICE)	 Executing Agency. Responsible for carrying out and completing the Project in accordance with the activities as they are laid down in the PRO-DOC. Responsible for the day-to-day implementation of the Project. Provide as in-kind contribution the Program Coordinator, the Field Projects Officer and the administrative support staff. Appoint one of the ICE-members of the NPD as the National Director of the Program. Provide office space for the Program Coordinator, who will be physically located at ICE, and assure that he/she, will get the necessary technical and administrative support. 							
Energy Sector Directorate (DSE)	 It forms part of the National Program Directorate (NPD) with the ICE. It provides a Task Manager as a counterpart to execute activities of political bargaining and lobbying. 							
United Nations Development Program (UNDP)	 Implementing Agency UNDP will convene tripartite reviews at least every 12 months during program implementation. Designate a Program Officer as the focal point of this program. Give administrative support and financial and budgetary follow up to the execution of the program. Provide accounting, financial and budgetary documentation to the NPD. Conduct the annual audit of the Project following GEF procedures. 							

Table 3-1. Institutional Actors

Source: Prepared with information from PRODOC

The three institutions (ICE, DSE and UNDP) worked together in the design phase, as they had since before the signing of the preparatory phase (PDF-B) in June 1999. Various meetings between 1998 and 1999 show since

the beginning how the dissemination of information, interactive consultation and participation were a constant in the process.

The inter-institutional commitment is also reflected at each institution. For example, the ICE Board of Directors at its meeting 5306, Article 2 of June, 2001, confirms support for the program in order to promote social and economic development of rural and remote areas of the country.

It is considered that the institutional interplay in the conceptualization and design of the Project was **SATISFACTORY**.

3.1.4 **Project Replicability**

The Project design considered broadly the replicability of the Project taking into account different aspects and conditions that would be of benefit. Among the different dimensions considered there are the financial component, RE policy issues and regulation, capacity building, awareness and dissemination of information, development of the Baseline and Monitoring of GHG emissions.

Prodoc and Project Brief are actually very good documents to guide Project replicability. (It did not have a second phase).

The new energy model of the energy plan and mandate of the Chair proposes the installation of 1500 PV systems in 4 years, which is little compared to the needs identified in this program and a little less than 1787 installed by ICE in 10 years up to 2010.**Error! Bookmark not defined.**

3.1.5 Other aspects

For the implementation of projects, UNDP has the advantage over other institutions, of its enormous ability to summon people, compared to the government sector and the unions, and the society in general. On the other hand, it operates lines of social and governmental interest related to those of the Government of Costa Rica. Also, their recognized impartiality is favorable for action among multiple actors.

3.2 IMPLEMENTATION OF THE PROJECT

3.2.1 Implementation Approach

To implement the Project, ICE as an Executing Agency was responsible for appointing staff within a National Director of the Program, an Alternate Director, a Coordinator and a Field Project Officer. As a complement a representative of the Energy Sector Directorate (DSE) of the Ministry of Environment and Energy-MINAE-(MINAET today) served as Task Manager. Both organizations share the responsibility for coordinating the Project components.

The 6 components of the Project were sub-contracted to individual consultants and consulting firms, national and international maintaining the proportion established in the PRO-DOC of an international participation up to 25 or 30% depending on the component.

The DSE coordinated the implementation of the following components:

- Component 1: To support the implementation of policies and regulations that establish a regulatory framework conducive to the use of renewable energy in electrification projects, and
- Component 2: To strengthen the capacity of institutions, companies and communities to develop Renewable Energy projects (Sub-contract 2: (information Standardization, regional network and web site information development).

ICE coordinated the implementation of the following components:

- Component 3: Promote investment in Renewable Energy projects by developing innovative financial mechanisms.
- Component 4: To demonstrate the validity of decentralized Renewable Energy systems as a marketable option for electricity generation.
- Component 5: To assess Costa Rica's rural electrification programme and confirm sites that may benefit from using Renewable Energy.

The logical framework presented as an integral part of the *Project Brief* remained as a guiding theme during the implementation of the initiative, there were no variations of the same and the 15 products offered from the start were those maintained during the Project life.

The Work Plan to guide the implementation was presented in the PRO-DOC. This plan was developed for 24 months and the activities were to be carried out during 2005 and 2006, as the PRO-DOC was signed in December, 2004. However, the actual implementation began in 2007 through 2010, as virtually, during 2005 and 2006 there was no budget execution and, during 2011 the activities pending are the completion of the installation of the photovoltaic systems, the installation of the wind turbines in one of the demonstration sites (Marine Park²⁴)) and the final evaluation of the Project.

The activities implemented where those proposed in the PRO-DOC. Tabl3 3-2 shows the activities proposed for each of the components:

The work plans prepared for the implementation were those requested by UNDP or GEF according to the administrative procedures of both organizations for the approval of the resources to be executed each year. The evaluators found no evidence that operational plans were discussed periodically between the implementing agencies (ICE-DSE) and that these actions originated any substantial changes in the execution of the activities planned; however, at ICE's internal level communication between the technical part, the coordination and the Project directorate did allow periodic feedback of the actions implemented, as shown in some of the minutes of meetings held.²⁵.

²⁴ Two wind generators were installed during May 2011 in the Marine Park according to ICE information

²⁵ Two minutes are in the document list reviewed by the evaluators

	Table 3-2. Pro	ject activities p	proposed according	to the Prodoc
--	----------------	-------------------	--------------------	---------------

National Off-Grid Electrification Program based on Renewable Energy Sources										
Objective 1. To support the implementation of policies and regulations that establishes a regula Renewable Energy in rural electrification projects	tory framework conducive to the use of									
Result 1.1. An established normative and legal framework that allows development of small-scale r implemented	enewable energy systems is approved and									
ACTIVITIES PROPOSED	Observations									
Evaluate current energy legislation	Performed. There is a report									
Gather support from decision makers in the Legislative Assembly and the Executive Power to formulate the required legislation	Outside the Project's scope									
Provide elements for improving the hydroelectric concession process	Performed. See report of this consultancy									
Result 1.2 National technical norms and standards for renewable energy are developed, implemented and	lisseminated.									
Preparation of norms and standards for Renewable Energy Technology	Reactivate Law 7447									
Dissemination of official norms and standards	Outside the Project's scope									
Result 1.3 Fiscal incentives for the development of renewable energy projects are in place										
Review and enhancement of legal exemptions and incentives	Reactivate Law 747									
Result 1.4 A National Rural Electrification program that incorporated renewable energy systems into national energy planning is established										
Design of Renewable Energy Program	1693 systems have been installed									
Objective 2. Strengthen the capacity of institutions, companies and communities to develop renewable energy projects.										
Result 2.1: Professionals and technicians are trained in renewable energy technology										
Evaluation of human resources needed for the National Rural Electrification Program with Renewable Energy	ICE Field Operation team hired									
Organization of seven training workshops for employees of power utilities	Training workshops performed									
Strengthening of DSE personnel on Renewable Energy										
Result 2.2 National Energy Information System (SIEN) is strengthened incorporating variables related to a	new and renewable sources of energy-									
Standardization and classification of available and new data on small-scale Renewable Energy	Website designed									
Development of a regional information network on renewable energy	Operational Information System but no information									
Create a website to access information available	Information Module at									
Result 2.3: National population is informed and aware of the benefits of decentralized renewable energy s	ystems									
Launching of a nation-wide dissemination campaign to promote Renewable Energy	An information video was produced and									
Conduct seven promotional workshops for employees of government agencies	Workshops carried out with other entities									
	representatives.									
Objective 3: Promote investment in renewable energy products by developing innovative financial n	nechanisms.									
Result 3.1: National energy bidding processes are adapted to facilitate small scale renewable energy										
Evaluation of bidding schemes	Mechanisms proposed									
Validation of proposed schemes	Workshops performed (financial mechanisms)									
Result 3.2: A set of possible financial mechanisms is developed and validated										
Design of financial mechanisms for rural users.	Mechanisms designed									
Implementation of different mechanisms during Phase I demonstration projects	Final Consultancy Report									
Result 3.3: Raised awareness and involvement of financial sector in promoting new and renewable sources	s of energy									
Training workshops to financial sector officers	Workshop performed									

(Continuation)

Objective 4:Demonstrate the validity of the systems using decentralized Renewable Energy market as an option of generating electricity.								
Result 4.1 16 Pilot projects in rural communities using micro-hydro plants or photovoltaic systems and two facilities								
Design a detailed electrification plan for each of the 18 installations	Installations in operation							
Buy appropriate equipment and services through an open contracting system	Equipments installed							
Installation of Photovoltaic Systemas and construction of micro-hydroelectric plants	Only one hydroelectric plant was installed							
Training of community members in daily magament, operation and maintence	ICE's technicias trained							
Result 4.2 Evaluation and dissemination of pilot project results								
Human Resources and Systema performance evaluation	Pending performance							
Dissemination of pilot project results								
Objective 5 Evaluate the rural electrification program in Costa Rica and confirm the sites that can benefit from using ren	ewable energy.							
Result 5.1: a current portfolio of sites that confirm the potential use of decentralized renewable energy systems in Costa	Rica.							
Re-evaluation of PDF B portfolio	Not applicable due to the lack of Phase II.							
Feasibility Study for the 329 sites	Not applicable due to the lack of Phase II.							

Source: Author with information from Pro-Doc

In Project implementation the use of information technologies such as email enabled better communication between representatives of the implementing organizations and UNDP. The results section shows how the development of an informational video of renewable sources allows a greater participation and dissemination; however in the Project existing information technologies had little involvement.

Relations between the institutions involved had different levels that are described below:

- First, the ICE as the main responsible for the execution, carried out an internal coordination and communication process, not only interdepartmental in the Area of the UEN instance that hosts the Project, but also with other existing technical units that were related to the issue of rural electrification, also at the level of executives and managers of the institution.
- Another relevant interaction was coordinated by the ICE as the central institution with regional offices in the area of installation and maintenance of rural electrification equipment.
- Communication between ICE and DSE through the coordinator of the Project and the task manager, reflected especially in the implementation of Components 1 and 2 in the first years of implementation of the initiative.
- Another effective channel of communication was the frequent and fluid communication between the Project Coordinator and the National Alternate Director, allowing a constant feedback from the Project implementation.
- The relationship of the Project Coordinator with the Environmental Programme Officer and the Administrative Officer, the Operations Manager, of UNDP, has also been fundamental for the progress of the Project activities.
- The relationship with the contractors was led by the Project Coordinator, however for Components 1 and one of the two subcontracts of Component 2 this relationship was led by the Task Manager designated by DSE.

The following table shows the main actions taken by the institutions involved during the Project implementation.

Component 1. To support	Subcontract 1. Legislation revision and introduction of changes (under the
nolicies and regulations	responsibility of DSE)
implementation to	Activities implemented
establish a regulatory	• March 26, 2006 the hiring process begins
framework conducive to	 May 30, 2006 the contract is signed
renewable energy use in	 October 24, 2006 Delivery of the first two products from the
electrification projects	• October 24, 2000 Derivery of the first two products from the
ciccumcation projects.	• November 2, 2007 Concultant expects the inputs derived from
	• November 2, 2007 Consultant expects the inputs derived from
	Lauren 2008 Devicing of the final and dust delivered by the
	• January 2008, Revision of the final product derivered by the
	Results:
	Final Report on Analysis of Energy Legislation related to renewable energy
	and introduction of changes and a Draft Law including provisions that permit
	the development of renewable energy on a small scale.
Component 2: Strengthen	Subcontract 2: Modules of renewable energy information on the website en
the capacity of institutions,	in SIEN (under the responsibility of DSE)
companies and	Activities implemented
communities to develop	 March 26, 2006 hiring process begins
Renewable Energy-	• April 2, publication in the newspaper
projects.	 October 12, 2006 TORs are forwarded again
	• September 2007 Contract is signed
	• November 2007 Visits initiated at CA level
	Result:
	SIFER Operating Platform
	Subcontract 3: Launching of a nation-wide dissemination campaign and
	conduction of promotional workshops (under the responsibility of ICE)
	Activities implemented
	October 2007 UNDP – ICE Coordination meetings
	 November 2007, reprinting of renewable energy manuals
	Posults
	<u>Kesuis</u> Video on Donowahlo Energy
	Panawahla Energy Manuala raprintad
Composite 2: December	Subcontro et A. Evoluction of Einspiel Schemes and Encurtion of Designst
Component 3: Promote	Subcontract 4: Evaluation of Financial Schemes and Execution of Projects
Investment in Renewable	(under the responsibility of ICE))
developing innovative	Activities implemented
financial machanisms	• September 2006 Consultancy hired
mancial mechanisms.	• February 2007 Workshop carried out
	April 2007 Review of final report
	Results:
	Document on organization schemes for the implementation of projects and
	document on financing schemes and risk analysis
Component 4: To	Subcontract 5: Design, procurement, installation and training for the off-Grid
demonstrate the validity of	Systems in 18 sites (Pilot Projects) (under the responsibility of ICE).
decentralized Renewable	Implemented Activities
Energy systems as a	• November 2007, approval of TORs
marketable option for	• Dec 2007- Feb 2008, installation of the first pilot projects

Table 3-3. Activities implemented by the institutions involved

electricity generation.	Results
	16 pilot projects installed (10 in communities, 4 in National Parks, 2
	demonstration projects, one solar and wind
Component 5: To assess/ensure Costa Rica's rural electrification program and confirm sites that may benefit from using Renewable Energy.	Subcontract 6.1: Methodology for the evaluation of options for rural electrification with renewable energy sources (Project portfolio) <u>Activities implemented</u> • Dec 2006-Sep 2007, tour to communities, gathering of information- • February 200, submission of tenders by consultants • August 2007, Contract signed with INCAE <u>Results</u> Tool for evaluation and prioritizing Project (RE Tool): network, appropriate renewable energy and renewable energy technology
	Portfolio of projects prioritized by technology to initiate prefeasibility
	Subcontract 6.2: Feasibility Studies
	November 2007. review of service offers
	• June 2008, awarded to two companies
	• January 2009 Beginning of preparation the feasibility studies
	February 2010. Delivery of feasibility studies
	<u>Results</u> 8 Feasibility studies performed (Los Andes-Santa Cecilia, La Peña-Punta Burica, Finca Nicoya Lourdes Parrita, Sepecue, Cureña, Yaovin, Olan and San Fernando-La Libertad)

Source: Author

Overall bilateral communication channels between the two partners were successful, however a lack in terms of integrating all partners was evident during the implementation, coordination among the consultants was not appropriate in some cases. For example, the contract to support policies and regulations that establish a favorable regulatory framework was discontinued because they required the information on the type of systems already installed since the sites of greater potential were not identified at that time.

In relation to the work of the consulting firms contracted, the evaluators find that the persons or companies contracted met the deliverables and deadlines successfully, except the Marine Park in Puntarenas where the installation of a wind generator²⁶, computer and screen by the company Consenergy is still pending.

The Prodoc Document/Project Brief contains a consistent and logical framework consistent with the general and the specific objectives of the Project.

The evaluation team believes that the implementation approach is MARGINALLY UNSATISFACTORY.

²⁶ Two wind generators were installed during May 2011 in the marine park according to ICE information

3.2.2 Monitoring and Evaluation

3.2.2.1 Monitoring

The PRO-DOC established a program inception workshop aimed at assisting the program staff so that they understand and take ownership of the activities. *This inception workshop was not performed*.

The Project Brief established the following monitoring mechanisms for the implementation of the Project²⁷:

- a) The program shall be monitored according to UNDP control, monitoring and evaluation procedures and following the internal evaluation and control regulations of the Executing Agency (ICE. ICE and UNDP will be jointly responsible for continuous monitoring Project progress.
- b) UNDP in Costa Rica will monitor performance during execution.
- c) The Project Coordinator will internally review and make comments on performance to provide feedback and aim efforts in the desired direction, including the submission of Quarterly Reports.
- d) The UE ICE will appoint someone to be responsible for collecting, processing and presenting data periodically, such as sales of photovoltaic systems, number of facilities, etc.
- e) Annual Tripartite Review Meetings for the assessment of the program's performance.
- f) A Program Conclusion Report will be drafted for consideration during the final Tripartite Review meeting.
- g) Once the Project Document (Prodoc) is signed and the work plan is defined in its initial phase, there will be a review and an adjustment of the program with participation of stakeholders.
- h) To monitor the projects to be implemented in 18 demonstration sites, a person appointed in each Project will submit a quarterly report to the NPD
- i) The ICE-UE will annually submit to UNDP Costa Rica certified financial statements for funds from UNDP GEF, including at least two audits of these financial statements in accordance with the procedures set forth in Manuals and Policies of UNDP.

Table 3-4 shows the documentation received relating to the Project's Monitoring and Evaluation from 2004 to 2011. After reviewing this information, the evaluators were able to infer the performance of these monitoring mechanisms:

- The monitoring mechanisms established by UNDP were used.
- ICE-UE as Project implementing agency has dealt with the same daily tasks using the Annual Work Plan.
- More specifically and related with the monitoring mechanisms, five PIR were elaborated in this Project as follows:
 - PIR 2006 (July 1,2005 to June 30, 2006),
 - PIR 2007 (July 1,2006 to June 30, 2007),
 - PIR 2008 (July 1, 2007 to June 30, 2008),
 - PIR 2009 (July 1, 2008 to June 30, 2009),
 - PIR 2010 (July 1, 2009 to June 30, 2010),

 ²⁷ PNUD-GEG (8 Marzo 2002) Programa de Electrificación Nacional con Energía Renovable en Áreas No cubiertas por la Red. Project Brief. Pág. 42

Progress evaluations towards <u>achieving the goals</u> changed from 2005 to 2010 from S (satisfactory) and MS (Marginally Satisfactory) by the National Coordinator, the UNDP-Costa Rica Office and UNDP Regional Advisor.

Evaluations of the <u>Project Implementation</u> during the 5 years of execution were S (Satisfactory) and MS (Marginally Satisfactory) by the UNDP-Costa Rica Office and the UNDP Regional Advisor and HS (Highly Satisfactory) by the Project Coordinator (see Table 3-5)

- <u>Project Progress Report.</u> It consists only of the PIRs. There are also reports or products of sub contracts by consulting firms and some short reports made by the ICE.
- <u>Tripartite Meetings</u>. *Not recorded* in the *Project Implementation Reports* (PIRs) made, even if indicated in the Monitoring and Evaluation Plan of the *Project Brief*, that the meetings would take place on an annual basis. The Evaluators recorded as shown later the dates when the meetings were held even if not indicated in the PIRs. During the execution of the Project the meetings for UNDP/GEF projects were discontinued.
- <u>Project Closure Report.</u> *There has been no report* by the Executing Agency.
- <u>Meetings of the Programme Steering Committee (PSC)</u>. In connection with these meetings held by the National Commission on Energy Conservation (CONACE), the evaluation team had access to minutes of meetings such as the one held on May 7, 2004, where one of the items in the agenda was the Rural Electrification Project. However, the participation of CONACE in the Project diluted in time and in visits by assessors to the institutions for the collection of information; it was unknown what had finally been their participation; and whether their roles in the Project were sometime transferred to another Government Agency. The National Project Directorate (NPD) formed by a representative of the Energy Sector Directorate and two representatives of ICE, worked in some cases as governing entity given the absence of CONACE in the past 2 years.

	NATIONAL OFF-GRID ELECTRIFICATION PROGRAMME BASED O	ON RE	NE	WA	BLI	EE	NE	RG	YS	ou	RC	ES	, ,										
	Monitoring and Evaluation Activi	ties *																					
	December 6, 2004 to April 29, 20	11																					
Activity	Туре	2004		200	5		200	6		200	17		2	800		2009			20	10	2		1
	Quarters	IV		11 1	II IV	T	11		1	П	111	V I	П	Ш	IV I	П		V I	П	шт	V I	Ш	III IV
	1.1 Inception Workshop Report																			\square			\top
	1.2 Project Annual Report (PAR)		\square			\square	+	+		\square	+	+	+	\square		\top	\square			\square	+	Ħ	+
	1.3 Annual Report on Project Implementation Review (PIR)				<		>	<	>	-		+	×	~		>	<		>	ſŢ	T	Π	T
	1.4 Quarterly Progress Report (brief reports submitted to UNDP CO - QPR)																						
	1.5 Project Final Report												Τ							\square			\top
	1.6 Other Type reports (reports of 5-12 pgs or PP presentations)					\square				\square							\square			\square	T	\square	\top
	Brief report to UNDP, August 2006		\square		\top	\square				\square	\top	+	+	\square		\top	\square			\square	+	\square	+
1. REPORTS	Report of Alexandra Arias to ICE Manager, August 23, 2006		\square		+	\square			+	\square	+	+	+	\square		+	\vdash	+		\vdash	+	++	+
	Report of Misael Mora to Alexandra Arias and UNDP Program Officer, May 28, 2007		Η			\square				H	+	+	+	\square		+	\square		+	\square	+	\square	+
	PP presentación showing Program's current state, June 28, 2007					\square														\square	T	\square	\top
	Activities Report to UNDP, October 31, 2007		Π			\square	1					+	$^{+}$			\top	\square			一	+	Ħ	+
	PP presentation for Tripartite Meeting, June 5, 2008		\square			\square	+	+	+			+	$^{+}$	\square		+	\square	1		(†	+	\square	+
	Report to UNDP, November 25					\square	1					\top	T				\square			ſŤ	+	Ħ	+
	Activities Report of Misael Mora to National Director, Aprol 5, 2010		Π			\square				\square	+	+	$^{+}$	\square			\square			\square	+	Ħ	+
	PP presentation named Execution Report, May 3, 2010																				\pm	\square	\pm
	2.1 Minutes of Tripartirte Evaluations (annual)																			íΤ			Τ
	Augusto 9, 2005																						
	June 27, 2006									\square										\square	\perp		
	January 2007																			\square	\perp		
2. MEETINGS	May 16, 2007																						
	June 5, 2008																						
	November 25, 2008																			\square			
	September 1, 2009				_	\square	\rightarrow	_		\square	\rightarrow	+	+			_				\vdash	\perp	$\downarrow \downarrow$	+
	2.2 Minutes of Regional Steering Committe meetings				_	\square	+	_	_	\square	_	+	+			_	\square	_		\vdash	+	++	+
	See previous section				_	\vdash	+	_	-	\vdash	_	+	+		_	+	\vdash	_		⊢∔	+	++	+
3. Annual Work Plans (AWP) / Annual Operative Plans (AOP)	3. I Allitual Operative Fialis (AOF)								~		-	>						*	-		>		
	4.1 Middle Term Evaluation																						
Levaluations, Audits 4.2 Financial-Technical External Audits						\square	\square			\square							\square			\square	\perp	\square	\perp
	4.3 Final Evaluation																			Ц			
	* According to information given by the consultant team of Final Evaluation																						

• Table 3-4. Monitoring and Evaluation Documentation (2004-2011)

Evaluation as per PIRs													
Classification Categories assigned according to Progress in <u>Achieving the Objectives</u>													
	National Coordination	UNDP Office CR	Regional Adviser UNDP/GEF										
Period													
2006	S	MS	MS										
2007	S	S											
2008	S	S											
2009	S	S	S										
2010	S	S	S										
Classification (Classification Categories assigned according to the <u>Project Implementation</u>												
	National UNDP Office CR Regional Adviser UNDP/G Coordination Image: Coordination Image: Coordination Image: Coordination												
2006	S	MS											
2007	S	S	MS										
2008	HS	S											
2009	S	S	S										
2010	HS	S	S										

Table 3-5. Assessment Rating on Project Implementation According to PIRs

SOURCE: Author

3.2.2.2 Evaluation at the End of Phase I.

The program considered a complete evaluation of Phase 1 (Objective 6 of the Agenda). This evaluation should refocus the second phase however; it became the current Final Term Evaluation because the second phase was cancelled.

3.2.2.3 Financial External Audits

UNDP-Costa Rica handles all financial management and the relevant supporting documentation. UNDP hires financial audits/ external accountants with specialized firms. These include the revision of the CDRs (Delivered Combined Report), the operating procedures used by the Project in accordance with established UNDP and the internal control environment.

The three external audits performed, were clean and without exceptions. However, in 2009 – 2010, the *inventory of all solar systems purchased with funds from GEF was not performed*.

The Evaluation Team believes that no systematic monitoring of the progress of the activities was carried out, given the lack of periodicity of the meetings held, the lack of additional reports of the Project and the non-performance of the inception workshops, and therefore considers that, the monitoring and follow-up of the Project is **MARGINALLY SATISFACTORY**.

3.2.3 Stakeholder Participation

Mechanisms for dissemination of information generated from the Project included the creation of a platform (SIFER), which are expected to allow a continuous transfer process, not only nationally but also regionally (Guatemala, Honduras, Panama, Costa Rica, Nicaragua and El Salvador).

Other products or sources of information related to the generation of knowledge during the implementation of the Project were:

- Final report on analysis of energy legislation related to renewable energy and changes.
- Video on Renewable Energy
- Renewable Energy Manuals, reprinted from GEF projects executed by BUN-CA (Costa Rica)
- Document on:

•

- Organizational Schemes for Project Implementation and
- Financing and Risk Analysis Schemes
- Demonstration Projects in National Parks
- Feasibility Studies
- Tools to prioritize and select communities

The main actors for the generation and dissemination of information were the entities (ICE, DSE and UNDP) and the contractors of various sub-contracts made.

The participation of these key stakeholders is reflected in the following ranges:

- The counterparts at different times assumed costs, which allowed to multiply the scope, for example SIFER was covered by National Energy Information System
- In many cases it was possible to count with the participation and cooperation of other agencies of these key institutions, for example, the scheduled Project training courses were part of ICE's Training Unit which allowed the delivery of the corresponding participation certificates to the attendants.
- It was possible to establish a close relationship with the various public institutions involved in the issue of capacity building and institutions of other kinds as financial entities, the private service sector (specifically consulting firms, equipment vendors).

The figure below shows the relationship of the main aspects of dissemination.

Figure 3-1. Aspects of Project Dissemination

Overall Program Objective

Strengthening the capacity of institutions, companies and communities to develop RE projects



*Source: author

An important aspect to consider is that the governmental nature of the implementing institutions meant that to exchange the knowledge generated with other important national actors such as companies that generate electricity, during meetings held with the National Energy Conservation Commission (CONACE).

While it is considered that the information generated could have been disseminated and capitalized more and, although the SIFER has been well developed as a platform that has not been used (see 3.2.6.1), the evaluators consider that the participation of actors has been **SATISFACTORY**.

3.2.4 Financial Planning

The Project was carried out according to the method of "partial national execution"; according to which transactions, contracts and expenditures for the execution of the Project are authorized by the National Program Directorate, but are subject to review by UNDP, entity making payments directly and responsible for the registration and accounting of transactions.

As external audits to the Program, the Project execution was rated as Medium Risk, because according to the Auditors, there are chances that many of the internal controls for making payments or transactions do not comply with UNDP procedures.

Administration costs (monitoring, fees, trips and operating expenses) reached 13.3% of total GEF resources, which is a very reasonable figure.

Regarding co-financing and according to the PIR to June 30, 2010, co-financing from both ICE and DSE (MINAET) were executed by 100%, as shown in the table below:

Executor	Amount According to Pro-Doc	Amount AccordingTotal ExecutedPercentto Pro-DocExecuted									
ICE	\$694.624	\$694.624	100%								
MINAE	\$251.200	\$251.200	100%								

rubic 5 0. co manenic and his execution

Source: PIR 2009-2010

Taking as reference the budget included in the PRO-DOC²⁸, the implementation of the budget indicates that some data items exceeded the initial estimate. Such is the case of expenses related to Management and Component 3 (To promote investment in renewable energy projects through the development of innovative financial mechanisms) and Component 5 (To assess/ensure Costa Rica's rural electrification program and confirm sites that may benefit from using Renewable Energy) as shown in Table 3-7.

Figures 3-2 and 3-3 show how Component 5: To assess/ensure Costa Rica's rural electrification program and confirm sites that may benefit from using Renewable Energy was the highest expense as foreseen since the beginning. Later, Component 2: Strengthening the capacity of institutions, companies and communities to develop renewable energy projects, and those requiring less resources were Component 3 To promote investment in renewable energy projects through the development of innovative financial mechanisms) and Component 4 (Component 4: To demonstrate the validity of decentralized Renewable Energy systems as a marketable option for electricity generation).

²⁸ Se utilizó como referencia el Presupuesto incluido en el PRODOC ya que el equipo consultor no encontró evidencia de modificaciones presupuestarias solicitadas o aprobadas.

Activity/	Total	Expense	Expense	Expense	Expense	Expense	Total	Remainder	Execution
Component							Expenses		
	Budget	2006	2007	2008	2009	2010	2006-2010	31/12/2010	31/12/2010
Project									
Management and	51.030,00	4.157,53	47.946,61	40.841,15	24.630,62	13.128,08	130.703,99	-79.673,99	
Monitoring									256,1%
Component 1	61.000,00	4.322,06	0,00	15.677,94	0,00	0,00	20.000,00	41.000,00	32,8%
Component 2	194.500,00	7.968,14	18.845,42	95.671,91	9.760,12	0,00	132.245,59	62.254,41	68,0%
Component 3	26.000,00	271,56	35.491,36	304,32	0,00	0,00	36.067,24	-10.067,24	138,7%
Component 4	160.000,00	0,00	7.697,17	3.499,91	390,41	19.409,10	30.996,59	129.003,41	19,4%
Component 5	340.000,00	15.028,17	104.218,34	119.482,52	293.728,36	0,00	532.457,39	-192.457,39	156,6%
Component 6	61.000,00	0,00	1.954,06	210,43	0,00	0,00	2.164,49	58.835,51	3,5%
Training and									
Capacity	88.000,00	2.406,59	12.109,02	0,00	2.030,63	4.112,51	20.658,75	67.341,25	
Building									23,5%
TOTAL	981.530,00	68.308,10	456.523,96	551.376,36	661.080,28	73.299,38	905.294,04	76.235,96	92,2%

Table 3-7. Budget Execution of the Program per Component

Source: Author based on Project information



Figure 3-2. Expenses by Component

Source: Author

Figure 3-3. Budget versus Total Expenses



Source: Author

The 2009 annual expenses show the way in which the main budget execution was carried out, mainly due to completion and termination of subcontract 6.1 Methodology for the Evaluation of Options for Rural Electrification with Renewable Energy Sources (Project portfolio)





Source: Author

3.2.5 Sustainability

The purpose of this section is to assess the extent to which the Project benefits continue within or outside the domain of the Project after it is completed.

3.2.5.1 Development of Technical Capacity

As stipulated in the PRO-DOC, "Component 2: Strengthening the capacity of institutions, companies and communities to develop renewable energy projects", considers the strengthening of national institutional capacities, to support the development of the implementation of these technologies.

One of the activities proposed was to conduct seven workshops *to train 200 officials* representing government companies, NGOs and private companies, in Renewable Energy technologies. According to PIR (July2009 to June 2010), *this indicator was not achieved*. However, the Evaluation Team verified the *training of 126 person during 2007 and 2009, and recently in 2011 through six workshops 99 additional persons were trained, for a total of 225 persons*.

The first of these events called "Workshop on Proposed Models of Project Implementation and Financing Schemes" was carried out on Monday February 19, 2007 with 32 participants from various sectors (government, financial, private companies, and service providers). The objective was to present

to the national financial sector execution models for off-grid rural electrification projects based on renewable energy sources and proposed financing arrangements, in order to promote investments that are self-sustaining in the long term.

The second workshop was "Training in Solar Photovoltaic Systems" carried out in 2009 and addressed to ICE officials, and with the participation of 94 attendants who at the end obtained a certificate certifying their participation. The audience included technicians responsible for providing maintenance to the facilities of the solar photovoltaic equipment in the seven zones covering the country.

The four most recent workshops in March and April of 2011 trained 50 people from the *Huetar Brunca Atlantic Region, Central Pacific Region of Costa Rica. The total number of people trained is 176.*

In terms of sustainability, other important actions performed such as an informational video produced by the Project on 400 buses in the metropolitan area and presented every hour for 4 weeks, showed that more than 130 thousand people had watched it.

3.2.6 MINAE Website

The Renewable Energy window in MINAE's Website (<u>http://www.dse.go.cr/</u>) displays two entries: SIFER Module and Information Module.

3.2.6.1 SIFER Module

The home page has the following components in its Main Menu:

- System (catalogs and its maintenance by the Administrator)
- Then for each of the renewable, hydroelectric, solar, wind, municipal waste, geothermal, biomass, biofuels, the information is presented in the following windows: Design, potential maps, infrastructure, production, marketing and prices. On each of these windows different action can be advanced: record, amend, maintain, delete, queries and comparisons. These actions also apply to the following windows as alternate sources, inventory, projects, legal, market model, technology, and other alternatives.
- All this structure is replicated per Central American country: Guatemala, Honduras, El Salvador, Nicaragua, Costa Rica and Panamá.
- At the end of the page there is a recognition of the "United Nations Development Programme (UNDP) 2008".

Figure 3-5. SIFER Homepage



The information system is structured in different modules as shown in the figure below²⁹.





The system does not contain information on technology but aims to provide a vision for development of renewable energy by country and to generate reports on queries practiced. Access depends on whether it is an administrator or a user.

²⁹ Developed by Advansys.

The SIFER was designed so that each institution appointed from the energy sector of each country would act as manager of their information and upload it according to the structure of the system.

A virtual training was conducted with a virtual training tool for technical contacts; they were given the key to make the catalogs (small tables where the parameters are located in each country, such as names of fuels). Subsequently a second training went through. This was a fruitless task because in the countries small personnel changes take place when the government changes and there is no continuity.

The SIFER dates back to 2008 and despite having more than 2 years of being in service, no nation has uploaded the information to which they committed, except Costa Rica. During the implementation of the Project, not only the development firm delivered the system and their respective user manuals, but trained staff from all countries to administer the system components within their respective countries.

In the case of Costa Rica, the information is incomplete and outdated. To illustrate, when requesting the wind potential maps, only Costa Rica displays its map as shown in the figure below. Other countries have not uploaded the corresponding information.



Figure 3 7. Wind potential - Maps of the 6 SIFER countries

Therefore, the SIFER has not proven to be a useful information for users and the system is losing ground without having served the nations involved.

It has been recommended to DSE to upload the corresponding information for Costa Rica and once again urge the responsible institutions in every nation to do the same.

3.2.6.2 Information Module

This module *contains Project valuable information* and there are reports on:

- Project Brief
- Project Document (Prodoc)

and reports on Project results:

- 1. Legislation Analysis
- 2. Information System
- 3. National Outreach Campaign
- 4. Financial Mechanisms
- 5. Installation of 18 sites
- 6. Portfolio Revaluation

Empty folders found, correspondent to numbers 3 and 5.

Providing access to Project's information is a highly favorable factor to the executors because it facilitates access to information as it also makes the implementation process more transparent.

3.2.7 Execution and Implementation Modalities

The evaluation team believes that UNDP Costa Rica:

- *Effectively supported* selection, recruitment, assignment of experts, consultants and national counterparts in defining tasks and responsibilities;
- Jointly led with GEF Regional Office in Panama the consultation process for contracts approval;
- *Made arrangements for timely payments regarding hired fees and services;*
- Regarding the consultancy products review, it did not submit evaluations of their quality.

In terms of effectively communicating procedures or responses to consultations made to the executing agencies, ICE and DSE, the change of interlocutors on behalf UNDP directly affected the established times and there were assigned at least 4 Program Officers at different times to the supervision and guidance of this Project.

As above indicated in this report, the seven meetings held acknowledges that UNDP participation regarding to quantity, quality and timeliness of inputs regarding their responsibilities for the Project, remained steadily.

Availability of funds was in line with the needs of the Project, i.e. the provision of resources for timely payments was "following the due process of payment requests".

RESULTS

3.2.7 Results Scope and Objectives Achievement

The following achievements are discussed in relation with the main objective, using as criteria the proposed indicators and sources of verification described in Prodoc.

3.2.7.1 <u>Global Objective</u>

The global objective of the program for the entire Project (Phase I + Phase II) was:

"To reduce greenhouse gas emissions in Costa Rica introducing renewable energy technologies as a viable option for electrification in isolated areas not connected to the grid."

The indicators for both Phase I + Phase II are shown in the table below. Only those of the executed Phase I are considered in this evaluation.

Table 3-8. Project Indicators

Phase I Indicators	Phase I + Phase II Indicators
 Reduction of 5.700 tons of CO₂ emissions after 10 years (calculated value) 16 communities electrified with renewable energy at the Phase end Access of third-party actors to a small scale renewable energy market that works well 	 (NON-applicable indicators. Placed as reference). 7,273 homes in 329 communities electrified with RE and Estimated reduction of 210 thousand tons of CO₂ gas emissions.

Table 3-9 shows the Project's achievements. To estimate the emissions reduced by the Project, the evaluators turned to reconstruct the Project Brief calculation model and use their methodology and calculation facts (see Section 3.3.2.1).

Emissions avoided when the systems' installation is finish in 2011, will be 615.4 tCO2/year, which for 10 years yields 6154 tCO2 avoided, exceeding the proposed 5700 tCO2 (approx. 8%). Hydroelectric generation will avoid 19% of the emissions and the PVS 81%, when it was initially proposed to be 55% and 45% respectively.

Table 3-9. Phase 1	Achievements
--------------------	--------------

Indicators	Achievements/ Outputs Achieved
• Phase I will result in an estimated	• The Project, once closed in 2011, will reduce a total
reduction of 5.700 tons of CO2	of 6.154 tCO ₂ emissions over the next 10 years,
during a period of impact analysis	fulfilling the goal of reducing emissions
of 10 years (3120 tons are derived	
from hydroelectric and 2580 tons	• 16 projects installed (10 in communities, 4 national
from photovoltaic projects ³⁰).	parks, 2 demonstrative projects also considered as 2
• 18 power generation projects (16	educational).
demonstrative and 2 educational)	
with Renewable Energy at the end	• Access of third-party actors in the renewable energy
of Phase I.	market has been through several companies that
• Access of third-party actors to a	supply goods and services in a limited market such as
small-scale renewable energy	the Costa Rican.
market that works well.	

According to Prodoc, the Project's Final Report and documents elaborated by the Government of the Republic are sources of verification of the Project's overall objective achievement. As the Project has just executed Phase I, the following should also be considered:

• Project's Final Report and Documents elaborated by the Government of the Republic

The *Project's Phase I Final Report* was not available for this final assessment, as the National Director of the Program said it is to be developed. As for the documents prepared by the government, we knew about presentations describing the Project and its objectives³¹.

Additionally, we held visits to places where photovoltaic solar systems were installed both, with ICE and GEF resources and verified the presence of the solar generator in Puntarenas, but not the wind generator, or the computer and the flat screen, that are still to be installed at the end of February 2011.

In terms of *access of third actors*, an RE equipment supplier company and a consulting firm were interviewed with which it was evident they participate in the market, that suppliers take advantage of tax benefits from the State and that even if it is a free market, it is underdeveloped.

To estimate the achieved outputs, the evaluators performed the analysis described in Section 3.2.8.

3.2.7.2 <u>Objective 1</u>

Objective 1: Support the implementation of policies and regulations that establish a regulatory framework leaded to the use of renewable energy electrification projects.

³⁰ Prodoc, page 11

³¹ In example: Mora, M. (2008) National program of rural electrification with renewable energy sources in offgrid areas. ICE, power point presentation.
Objective 1 Achievements are in the table below

Table 3-10. Objective 1 Achievements

Indicator	Achievements/ Outputs Achieved
• Laws and norms that regulate the energy sector are modified to include provisions that allow the development of small scale Renewable Energy systems at the end of Phase I.	 The Project developed proposals to modify the regulatory framework but was not able to transcend and remained as proposals. A law proposal was developed to promote Rural Electricity development with renewable resources (LEADER), proposal that only contains legal elements (lack of technicians) and did not transcend. To wait until these modifications have the final approval by the Legislative Assembly or received approval by decree is outside the Project actors' scope.

There is no doubt that making legal and regulatory changes be welcomed by the authorities, required a great support and cooperation at national level, elements that constitute a critical assumption in achieving these results, as anticipated in Prodoc.

According to the Project Brief³², the following should be considered as verification sources of the achievement of specific objective 1:

• Publication in La Gaceta Official Diary of the Government of Costa Rica.

The evaluators considered that the *objective indicator of Component 1 has not been* fully complied mainly because there are no laws and rules governing the energy sector, which include provisions that allow the development of renewable energy projects³³ although proposals were submitted, these did not transcend either at law or decree level.

3.2.7.2.1 Objective 1 Outputs Achievement

The following table shows Objective 1 outputs achievement

Table 3-11. Objective 1 Outcomes Achievement

Searched Outputs	Indicators and Targets	Achievements
1.1 An established normative	By the end of Year 1: MINAE	Water concessions for
and legal framework that allows	implements a simplified	small hydroelectric
development of small scale RE	procedure (e.g. administrative	advantage is proposed but
systems is approved and	executive mandate) for water	not approved.
implemented	concessions for private	
	hydroelectric project	

³² Project Brief, Page 57

³³ With exception of Law 7447 that was again put into effect as of July 2010.

1.2 National technical norms and standards for RE are developed, implemented and disseminated	developers. MINAE sent to Congress at least one proposed amendment to the Law of Waters. (Legislative approval process is uncertain). Executive Decree on technical specifications for micro hydroelectric plants and PV systems produced and adopted by the end of Year 1	ICE's internal regulations for PVS and MCH are employed (applies what it takes from superior regulation) There are regulations for dams, electrical equipment, civil Works. Access to this information via ICE. There are no country rules. It is not possible to promise to achieve an executive
		decree.
1.3 Fiscal incentives for the development of RE projects are in place	Revisions proposed by MINAE for Law 7447- Rational energy use- approved by Congress by the first quarter of Year 2	Amendment to Law 7447 retaking tax exemption for RE projects (Law 8229)

The following should be considered as verification sources of Objective 1 outputs:

- Publication in La Gaceta, Official Diary of the Government of Costa Rica.
- Documents with technical specifications published by the Government.
- MINAE and the Rural Electrification Program documentation.

Valuable outputs were achieved in relation to this objective:

- Review of the current state of water concessions of water for small-scale projects.
- Proposal for simplification of administrative procedures to grant concessions meant for providing electricity services to isolated communities.
- Analysis of legal instruments that refer to RE, the above mentioned LEADER Project, and legal opinions³⁴.

It should be noted that when estimating outcomes time delivery, *in any case the product was achieved within the initial period* as it is well established that the Project execution was not only delayed until almost 2005 but in addition, the Project execution lasted 6 years instead of 2 years as initially proposed.

³⁴ Bejarano, J (2008) <u>Análisis de legislación energética relacionada con la energía renovable e introducción de cambios.</u> Project Document.

3.2.7.3 <u>Objective 2</u>

Objective 2: To strengthen the capacity of institutions, companies and communities to develop renewable energy projects

Table 3-12.	Ob	iective	2	Achievements
1 4010 5 12.	00	1000100	_	1 terne venienco

Indicator	Achievements/ Results Achieved
 Standardized procedure to analyze RE potential in electrification projects in place at the end of Year 1. Participation level in awareness construction workshops. 	 Developed a comprehensive methodology for assessing RE as an alternative to grid extension, called RE tool. This methodology incorporates in an innovative way not only technical but also economic and social variables. This methodology is set on a single user level Excel platform and will be sited in the ICE system (multiuser level). ICE staff has received training on this particular.

The following should be considered as verification sources of achievements related to objective 2:

- Documents of the Government of Costa Rica and,
- Workshop reports

The evaluators consider that Component 2 objective indicator has been satisfactorily met, almost entirely because the multiuser application is still to be developed.

On the other hand, an extensive data updating on communities and remote users on the network has been made.

The RE Tool plus the compiled information would constitute a core tool for future rural electrification development plans in the country.

3.2.7.3.1 Objective 2 Outputs Achievement

Table 3-13. Objective 2 Outputs Achievement

Intended	Indicators and Tasks	Achievements
Outputs		
2.1 Professionals and	200 employees of public	ICE officials trained (7 workshops
in DE to she alo su	services companies, NGOs	held with 1/6 participants)
in RE technology	and private firms	
	(Seven workshops)	
2.2 The National Energy	(Seven workshops)	Website developed and operative
2.2 The National Energy	RE website developed and	There is no information on
strengthened	information documents	Nicercaryo El Schueder Herdures
incorporating RF	modified to include RF	Nicaragua, El Salvador, Honduras
information	technology by the end of	and ranama.
	Year 1	on Costa Pica
		SIFEP does not provide any service
		and there is no record of number of
		visits
		Gives good information on reports
		produced by the Project
2.3 National population	At least three TV spots, five	RE video elaborated. Diffusion
is informed and aware	radio ads and ten press	through ads in public transportation.
of the benefits of	releases issued by the end of	Number of people exposed to video:
decentralized RE	Year 2	134.400. Future spread in schools by
systems		ICE.

The following should be considered as Objective 2 outputs verification sources:

- Government documents
- Workshops reports
- SIEN information documents
- Web visits counter
- Professional Publicity Agencies reports
- Workshops reports *in situ*

This second objective had three outputs. The first one was RE training provided. This was achieved through seven workshops for both ICE officials and other participants from several institutions.

The second output was developing a website within MINAE basically with two modules (See Section 3.2.6): Information system on renewable energy sources (SIFER) and information module. Even as SIFER is a well-structured and operational system, being conceived as a RE information system at a

regional level, information on Costa Rica is incomplete and outdated, while there is no information on the other countries of the region (no information on Guatemala, El Salvador, Honduras, Nicaragua and Panama). Everything indicates that it was not possible that the energy authorities' representatives of such countries did not upload and update the information into SIFER, despite the project's efforts (training provided to representatives of the countries) and the persistence o MINAE officials. *SIFER does not provide any service*.

The website second module contains, *in an excellent way*, information about the Project (Project Brief and Project Document) and almost all the information generated by the example.

The third outcome is related to the information diffusion campaign. The design consists in the development of a video on renewable energy which was disseminated in the public transportation³⁵. It was spotted in 400 buses during 4 weeks and 12 hours a day for a total of 134,400 people impacted³⁶. This video will be replicated by ICE. It will be distributed mainly among the education sector institutions.

3.2.7.4 <u>Objective 3</u>

Objective 3: To promote investment in Renewable Energy projects by developing innovative financial mechanisms.

Indicator: Private capital amount invested in renewable energy projects at the end of Phase I.

Indicator	Achievements/ Outputs Achieved
• Private capital amount invested in renewable energy projects at the end of Phase I.	 The Project assessed several financial mechanisms The truth is that the users of the RE projects in rural areas are in ICE areas of influence and require high co-financing to make the projects viable, which ultimately results that ICE makes the complete investment. <i>Therefore, the fast penetration of RE in the rural sector is determined by ICE execution.</i>

Table 3-14. Objective 3 Achievements

The following should be considered as verification sources of achievements related to objective 3:

• Project's Financial Accounts

The evaluators consider that the *objective indicator of Component 3 achievement* could not be established because the private capital amount invested in renewable energy projects is unknown, as the approach to companies developing RE projects and equipment suppliers would have been required by the executors to obtain, store and process this information in a regular basis. However, the amount of their RE investments can be estimated from ICE's information.

³⁵ The video is available in the digital version of this report.

³⁶ Spotted 4 weeks, every hour, in 400 buses: 4 weeks * 7 days/week * 12 h/day * bus * 400 = 134.400 people.

During the 1998 – 2004 period, ICE acquired an annual average of US\$ 263.475 (in current dollars³⁷) for an annual average of 13.8 kWP³⁸ of purchases. During the Project execution 2005-2010, this figure was US\$ 186.237 current dollars annually, for an average of 10.5 kWP. The latter also shows that the ICE acquisition volume is small and that it was larger during the 1998-2004 period than during the Project (2005-2010) in terms of installed energy. Since ICE is one of the largest buyers of RE in Costa Rica, we can estimate that the size of the photovoltaic market could be double, as per US\$ 400,000 annually (small Aeolian or MCH systems have not been considered).

Year	COST (Millions US\$) Residential	COST (Millions US\$)	COST (Millions US\$) A SP L odges	TOTAL COST (Millions US\$)
1998	53 010	0	11 221	64 231
1999	264,850	20.909	0	285,759
2000	507.725	11.970	2.912	522.606
2001	80.597	4.848	31.814	117.259
2002	217.974	44.260	0	262.234
2003	616.911	59.931	42.102	718.944
2004	234.949	86.318	15.453	336.720
2005	29.005	17.604	8.906	55.515
2006	24.498	41.867	6.554	72.919
2007	50.966	54.653	5.917	111.536
2008	63.632	35.386	4.480	103.498
2009	194.047	79.552	6.948	280.548
2010	343.828	93.256	56.324	493.409
				-
Prom 1998-2004	282.288	32.605	14.786	329.679
Prom 2005-2010	117.663	53.720	14.855	186.237
Prom 1998-2010	206.307	42.350	14.818	263.475

Table 3-15. Evolution of ICE's Investments in PVS between 1998 and 2010

Source: Author, from ICE information.

3.2.7.4.1 Objective 3 Outcomes Achievement

Table 3-16. Objective 3 Outcomes Achievement

Intended Outcomes	Indicators and Tasks	Achievements
3.1 National energy bidding	At least three bidding processes	The Project evaluated
processes are adapted to	for small-scale RE projects	several financial
facilitate small-scale RE	evaluated and validated by	mechanisms.

³⁷ <u>http://www.capitales.com/costarica/herramientas/macro/dev_colon.mhtml</u>

 $^{^{38}}$ Author from ICE information.

	1	1
projects.	month 6.	
3.2 A set of possible financial mechanisms for investment is developed and validated	At least 3 financial mechanisms developed at the end of Year 1.	The truth is that the users of the RE projects in rural areas are in ICE areas of influence and require high co-financing to make the projects viable, which ultimately results that ICE makes the complete investment. Therefore, the fast penetration of RE in the rural sector is determined by ICE execution.
3.3 Raised awareness and involvement of financial sector in RE	At least 20 bank officials trained in RE, Year 1.	Number of participants on workshops: 32, 8 of them representatives of 5 financial institutions.

The following should be considered as verification sources of achievements related to objective 3:

- Contracting procedures on behalf of MINAE
- Contract signed with financial institutions
- Demonstrative projects budget reports and third-party assessment
- Financial workshops reports

Recruitment procedures in the Public Sector are ruled by the Public Administration Procurement Law, and they *are of unchangeable character*, less on behalf the project's executors. Despite two *financial mechanisms*³⁹ were developed, none have been implemented.

3.2.7.5 *Objective* 4

Objective 4: To demonstrate the validity of decentralized RE systems as a marketable option for electricity generation.

Table 3-17 Objective 4 Achievements

Indicator	Achievements/ Outcomes Achieved
 16 demonstrative sites and two educational facilities fully operational at the end of Phase 2. Total implementing costs of completed demonstrative projects are lower than alternative electrification options. 	 16 projects developed 14 pilots and 2 demonstrative. Beneficiaries: 10 communities, 4 National Parks, Marino de Punta Arena Park (solar + Aeolian) and Chirripó Park (hydro + solar). <i>These projects have not been assessed by ICE.</i>

³⁹ Torres, J.E, Betancourt, F. y González, C (2007) <u>Evaluación de Esquemas de Financiamiento y Esquemas de</u> <u>Organización</u>. Project Document The following should be considered as verification sources of achievements of specific objective 4:

- Demonstrative Projects Final Report;
- Demonstrative Projects Financial Accounts.

While evaluators *verified the physical and functioning* existence of the installed equipment in the program by ICE and GEF in several parts of the country (see Section 6.5), the evaluators *did not see the Demonstrative Projects Final Report.*

In terms of Project costs, ICE works with Work Orders for each Project including costs of equipment, manpower, human resources cost among the main cost aspects. The following Table shows the invested cost accounted for participating in projects. This value is US\$ 950,622, being the most expensive project National Park Chirripó (MCH 20 Kw + solar generator) by an amount of US\$ 328,000 (civil Works: US\$ 316,019, manufacturing equipment and structures: US\$ 6,039 and electromechanical assembly: US\$ 6963).

The evaluators did not find an assessment showing that the cost of the fulfilled demonstrative projects are lower than the alternative electrification options, but the experience of the evaluators suggest that this is so because of the remote and dispersed locations and users.

Proj. #	Project Location	US\$
1	Roca Quemada	201.266
2	N.P. Chirripo	328.000
3	La Islita, Punta Arenas	39.208
4	Puerto Lindo, Guacimo	78.066
5	N.P. Barbilla	4.688
6	Refugio Playa Hermosa	20.612
7	Ximiriñak (School, Internet Satellite)	47.576
8	Altos de Pacuare	57.232
9	Vereh:	20.764
10	Mondonguillo / Laguna de Pacuare	56.236
11	Cerro Cacao (National Park)	21.216
12	San Isidro de Dota/ and Cerro Nara	32.363
13	EBAIS Ximiriñak	43.395
	TOTAL	950.622

Table 3-18. Project Costs – ICE Contribution

Source: Author based on ICE information

3.2.7.5.1 Objective 4 Outcomes Achievements

Table 3-19. Objective 4 Ou	tcomes Achievements
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Intended Outcomes	Indicators and Targets	Achievements
4.1 Sixteen pilot projects in rural communities and two demonstration and training facilities developed using RE systems	 16 feasibility studies for pilot projects prepared during first 6 months. At least 3 different bidding schemes tested after 8 months. 8 pilot projects finished and operating after 14 months. 8 additional projects finished and operating after 20 months. 	 8 feasibility studies conducted by 2 private firms (3 by Chirripó Consultants and 5 by INCAE) as well as several made by ICE. 2 proven performance schemes (private turnkey and ICE). 74 modules purchased with UNDP-GEF resources (not fully installed). 1 MCH built (Chirripó Park) instead of the 3 proposed. Training to PVS and MCH users.
4.2 Pilot project results are evaluated and disseminated.	One evaluation and results presentation seminar conducted in each demonstration project site by the end of Year 2.	Seminars on projects evaluation and outcomes presentation were not conducted.

The following should be considered as verification sources of Objective 4 achievements:

- Demonstrative Projects Final Report
- Project's Financial Accounts
- 16 documents with feasibility studies

- 4 contracts published by MINAE
- Demonstrative projects progress reports

16 projects and 2 educational projects should have been held in rural communities. In fact, only 16 were carried out but 2 of them are also educational projects (Marine Park in Puntarenas and Chirripó National Park).

The Project also hired eight feasibility studies with private companies (3 Chirripó Consultants and 5 INCAE), which once assessed by ICE, sought to establish the extent that these studies should have on renewable energy so to standardize their scope.

Before the project's closure, an assessment and outcomes presentation seminar of each demonstrative *Project should be held as the project's final results* clearly showing the technical, economic and environmental advantages of the projects over other electricity supply alternatives.

3.2.7.6 Objective 5 Achievements

Objective 5: To assess Costa Rica's rural electrification programs and confirm sites that may benefit from using renewable energy.

Indicator	Achievements / Achieved Outcomes
• A Rural Electrification Plan that specifies the number of sites to be electrified with renewable energy published at the end of Phase I.	 ICE has endowed a Project Assessment Methodology which includes not only technical and economic information (costs alternatives: grid extension, solar, Aeolian, MCH), but also social and development factors assessment of (RE Tool). This tool allows projects prioritization. A Rural Electrification Plan with RE has not been published.

The following should be considered as verification sources of specific Objective 5 achievements:

- Rural Electrification Program Implementation Plan and
- Feasibility Studies.

The evaluators conclude that *the objective indicator* has not been fully complied mainly because the Rural Electrification Plan with RE has not been published, although the following is available:

- Computer tool (RE Tool) produced by the Project to prioritize RE energy solutions.
- Information generated by the program needed to power the previous software, and
- Many consultancy studies on specific sites, which allow assessing the best energy supply alternatives including RE. While these studies are not as numerous as anticipated in Prodoc

(around 313), they do contain information about the type of places, which results could be used for other locations.

The target set out in the Development Plan is certainly very timid (1500 PVS in the next 4 years).

3.2.7.6.1 Objective 5 Outcomes Achievement

Table 3-21 Objective 5 Outcomes Achievement

Intended Outcomes	Indicators and Targets	Achievements
5.1 An updated portfolio of sites	100% of feasibility studies for	• 8 feasibility studies
that demonstrates the overall	313 sites developed by the end	conducted by 2 private
potential use of decentralized	of Year 2.	firms, plus 10 ICE
RE systems is developed.		feasibility studies.
		• RE Tool developed to
		prioritize RE projects.
		• Primary information on
		sites to be electrified, to
		be posted at the RE Tool.
		• Feasibility studies for 313
		sites were considered not
		viable to be made.

The following should be considered as verification sources of related Objective 5 outcomes achievements:

- Rural Electrification Program Implementing Plan.
- Feasibility Documents.

In 2007 there is a characterization of the communities that lack access to electricity: this is a comprehensive database of communities without access to electricity and includes socio-economic, educational and health services information and potential development of RE⁴⁰. There are 400 scattered communities identified across the country, with diverse number of inhabitants and various productive activities, with and without EBAIS, with different capacities schools. The updated portfolio is the basis for a Rural Electrification Plan with renewable energy solutions when warranted. This information is still pending to be posted at "RE Tool".

The Project developed a methodology for assessing options for rural electrification with renewable energy.⁴¹. This outstanding methodology includes social, economic parameters characterizing RE technology and resources. This methodology is embedded in an Excel software platform named "RE

 ⁴⁰ Salazar, J. y Rivas, J. (2007) <u>Localización, levantamiento de información en campo e implementación del SIG para el Programa Nacional en electrificación Rural con Base en Fuentes de Energía Renovable en Áreas No Cubiertas por al Red.</u> Project Document.
 ⁴¹ INCAE – CLACDS (2007) <u>Metodología para la evaluación de opciones de electrificación rural con fuentes de</u>

⁴¹ INCAE – CLACDS (2007) <u>Metodología para la evaluación de opciones de electrificación rural con fuentes de energía renovable (Projects' Portfolio Final Report).</u> Project Document.

TOOL". The RE TOOL evaluates various options for electrification of a universe of communities at pre-feasibility level and select the best technology option for each community. It also creates a dynamic list on communities to be electrified on or off-grid. A User Manual⁴² was also developed by the Project.

Therefore, the Project developed a methodology, computer tools, user information and training required to establish an updated portfolio of rural electrification projects, using different technologies, including RE.

The Project initially considered conducting feasibility studies on all sites. The Project did not consider feasible to carry out feasibility studies at 313 sites (currently it would be 400) because of the time and cost required, and in many situations it was enough with the reconnaissance, as suggested by an advisory group⁴³.

Even though the Project achieved the overall goal of reducing emissions, installing many PVS (however, several of them are still pending), proposed and promoted legal and regulatory changes and amendments that have not been ongoing in government institutions (activity out of consultants' management), there is a fundamental lack of an evaluation to demonstrative projects. This will allow to clearly establishing (from a technical, financial and economic, environmental, operational and organizational point of view) the goodness of proven technologies; which is a basic argument for a widespread adoption of these technologies. In addition, it should have been reflected as Objective 5 Indicator, in "A Rural Electrification Plan that specifies the number of sites to be electrified with Renewable Energy published at the end of Phase I". To the date of this report, the plan has not been published. Although the above is a fundamental flaw, there are others of minor importance, such as SIFER ineffectiveness, absence of national technical rules on renewable energy sources and no installation of systems acquired with GEF resources.

Based on these arguments, the evaluators consider that the Objectives and Outcomes achievement is **MODERATELY UNSATISFACTORY**.

3.2.8 Renewable Energy Generation and GHGs Emissions Reduction

3.2.8.1 <u>Renewable Energy Generation and Avoided CO2 Emissions during the Entire Project</u>

The initially formulated Project (Phases I+II) considered installing 8984 systems, of which 6049 would be powered by 178 micro-hydroelectrically (MCH) and 2935 individual photovoltaic systems for those applications. Table 3-22 shows the number of systems by application and technology, energy generated for each system and the avoided tCO_2 each year or avoided during 10 years of the system

⁴²INCAE – CLACDS (2007) <u>Metodología para la evaluación de opciones de electrificación rural con fuentes de energía renovable (Manual de Usuario).</u> Project Document

⁴³ Chirripó Consultores, personal discussion.

operation. The annual total energy generated would be 6.33 GWh and 21.107 tCO2/year total emission reduction, for a total of 211.078 tCO2 avoided over 10 years⁴⁴.

3.2.8.2 <u>Renewable Energy Systems Installed by ICE and UNDP</u>

Since 1998 ICE has been installed PVS. Between 1998 and 2004 an average of 154 systems per year were installed, with a total capacity of 17 kwp/year, while during 2005-2010 its number decreased to 61 systems a year and a total of 10.1kwp/year despite the existence of the program (see Table 3.23 and Table 3.24). The current customers' number amounted to 1444, being 70% of them residential users and 180 kwp total capacity installed.

Technology	Application	# of Systems	kWh/Year/ System	kWh/year	t CO2 Avoided /Year	t CO2 Avoided During 10 Years
SFV	Residential	2.114	188,7	398.922,4	1.329,7	13.297,4
MCH	Residential	5.159	859,9	4.436.430,5	14.788,1	147.881,0
SFV	Productive Centre	151	317,2	47.894,9	159,6	1.596,5
MCH	Productive Centre	178	1.352,0	240.648,9	802,2	8.021,6
SFV	School/communal &Health	453	526,7	238.592,8	795,3	7.953,1
MCH	School/communal &Health	178	3.370,4	599.933,0	1.999,8	19.997,8
SFV	Business	151	453,0	68.397,7	228,0	2.279,9
MCH	Business	178	1.487,7	264.817,7	882,7	8.827,3
SFV	Natural Reserve	66	555,9	36.689,1	122,3	1.223,0
MCH	Natural Reserve	0				0,0
	Subtotal	8.628		6.332.327	21.107,8	211.077,6
* Three servic systems are i	ces related to additional I ntegrated in MCH	356				
	Grand Total	8.984		6.332.327	21.107,8	211.078

Table 3-22. Generation and CO2 Emissions Avoided by 8984 Total Project Installations

Source: Author based on Project Brief information.

⁴⁴ **Important note:** in general, it is considered that the methodology scope and details for calculation of mitigated CO2 derived from this project, was validated by the appropriate authorities in its approval, so from now on the evaluation team will limit to recognize as valid the emissions coefficients and other methodology's initial parameters used in the Project Brief.

Year	No. CUSTOMERS PVS Residential	No. CUSTOMERS PVS Communal	No. CUSTOMERS PVS Lodges ASP	CUSTOMERS Total
1998	21	0	1	22
1999	135	6	0	141
2000	247	3	1	251
2001	41	1	9	51
2002	98	19	0	117
2003	302	24	9	335
2004	126	31	3	160
2005	14	6	4	24
2006	11	15	1	27
2007	23	19	1	43
2008	30	5	0	35
2009	69	27	3	99
2010	114	17	8	139
Total	1231	173	40	1444
Prom 1998-2004	138,6	12,0	3,3	153,9
Prom 2005-2010	43,5	14,8	2,8	61,2
Prom 1998-2010	94,7	13,3	3,1	111,1

Table 3-23 PVS ICE Users Evolution Number between 1998 and 2010

Source: Author based on ICE information (installed PVS December 2010)

Year	INSTALLED POWER (kW) Residential	INSTALLED POWER (kW) Communal	INSTALLED POWER (kW) Lodges ASP	Annual Total (kWp)
1998	1,365	0	0,75	2,1
1999	10,125	7,1	0	17,2
2000	22,5	1,11	0,15	23,8
2001	4,92	0,225	2,4	7,5
2002	9,68	3,56	0	13,2
2003	30,4	3	2,26	35,7
2004	12,9	5,3	1,2	19,4
2005	1,4	3,3	0,5	5,20
2006	1,1	2	0,5	3,60
2007	2,4	3,1	0,5	6,00
2008	3,4	2,3	0,2	5,90
2009	9,54	3,56	0,3	13,40
2010	19,045	4,96	2,767	26,77
Total	128,78	39,52	11,53	179,82
Prom 1998-200	4 13,1	2,9	1,0	17,0
Prom 2005-201	0 6,1	3,2	0,8	10,1
Prom 1998-201	0 9,9	3,0	0,9	13,8

Table 3-24 Installed PVS power evolution by ICE between 1998 and 2010

Source: Author based on ICE information (installed PVS December 2010)

The following table shows the number of installed systems for ICE by contractors with UNDP-GEF resources. The total number is 39 installed systems, being 36 of only one module, 2 of 2 modules, and 1 of 6 modules for a total 7.59 kWp installed. When comparing with the modules purchased to Consenergy, 74 in total and for a total power of 12.21 kWp, it was found that there are still 28 modules to be installed.

Loodian	Installed		Modules	Modules to	Power
Location	Systems	Modules	Purchased	be Installed	Installed
San Isidro	5	5	30	25	825
San Isidro	2	4		-4	660
Los Ángeles-Las Marias	31	31	38	7	5115
Parque Marino	1	6	6	0	990
Total	39	46	74	28	7590

Table 3-25	Systems Funded	by the Program a	re in ICE Database (December 2010)
1 abic 5-25.	Systems Funded	by the Hogram a	IC III ICL Database	December 2010)

Source: Author based on ICE information (PVS installed December 2010)

The following table lists the equipment purchased to Consenergy, who won the tender for supply and installation of the systems⁴⁵.

	SOLAR S	YSTEMS		SEV CC	551		UNDP	IOTAL COST	PAYMENT STATE	COMM	ENI
Place	# Modules	Power total (kWp)	Supplied (US\$)	Installation (US\$)	Total SFV (US\$)	Unitary cost (US\$/ SFV)	Other Costs (US\$)	Total cost (US\$)	Note	# Installed modules	Installation date
Cerro Nara y San Isidro de Dota	30	4,95	53.926	11.300	65.226	13.177	0	65.226	Fully paid	9	oct-09
Los Ángeles y las Marías de Sta Cecilia de la Cruz	38	6,27	75.334	26.600	101.934	16.257	0	101.934	Fully paid	31	oct-09
Parque marino	6	0,99	12.249	3.500	15.749	15.908	26.106	41.855	US\$ 38,506 paid at December 2009	6	feb-11 *
	74	12,21	141.509	41.400	182.909			209.015		46	
Power modules=	165	Wp									
* At Feb 2011, the wir	nd generate	or, the comp	uter, the scr	een and the lam	ps still pend	ling to install.					
Other equipment of park	the marine	US\$									
Wind Generator		3446	ò								
Computer/Screen 27		2660)								
Pine House		20000)								
Total		26106	ò								

Table 3-26. Summary of Invoices of Equipment Purchased with GEF Resources to Consenergy

Source: Author based on Consenergy invoices.

The cost for solar equipment generators ranges between U\$ 13.177 and US\$ 15.908 per installed kWp, which is a reasonable cost. These systems have been partially installed (46 modules installed) as it can be verified in Table 3-26. Therefore, 74-46 = 28 modules *are pending to be installed* and to be included into ICE database; these are in ICE warehouses together with their peripheral equipment. All the Marine Park' peripheral equipment *is also pending installation*⁴⁶.

⁴⁵ Consenergy invoice: See information file: llaveenmano.pdf.

⁴⁶ According to ICE information, two wind generators were installed in the Marine Park in May 2001.

It is recommended for ICE to proceed and install those equipments as soon as possible, before this cooperation program closes.

During the Project Term ICE built a MCH with 20 kW power at the Chirripó Park, additional to these PVS.

3.2.8.3 <u>Renewable Energy Generation and CO_2 Emissions Avoided by Phase I</u> According to Prodoc, Phase I will result in an *estimated reduction of 5700 tons of CO*₂ for an impact analysis period of 10 years (3120 tons from hydroelectric projects and 2580 tons by photovoltaic projects).

This is Project's Phase I overall target and against which achievements of Phase I must be compared, obviously with the same methodology used in the Project Brief to estimate the emissions of the whole Project.

The following are the assumptions that will be made:

- The same methodology used for the Project Brief will be employed.
- All UNDP funded systems, even uninstalled, are considered. The Puntarenas Marine Park will also be included, starting operations on March 2011, and the 28 modules in ICE warehouses.
- All PVS installed by ICE between 2005 and 2011 will be considered as promoted by the Project, as well as the MCH for Chirripó Park (in order to estimate the systems to be installed by ICE in 2011, the average value of the PVS installed between 2005 and 2010 will be used).
- To calculate the energy generated by the RE systems, the following capacity factors will be used (CF):

0	PVS	FC = 20%	(equals
0	PVS-hybrid Aeolian,	FC = 20%	
0	MCH	FC = 30%	

Error! Reference source not found. shows solar, wind and MCH power accumulated until 2011, the generation of these systems and CO₂ emissions avoided year by year.

3.2.8.4 Emissions Reduction in 10 Years

In 2011, the avoided emissions will be 615.4 tCO_2 /year at the end of the systems' installation, which yields 6154 tCO_2 avoided during 10 years, exceeding the proposed 5700 tCO_2 (approx. 8%). Hydroelectric generation will avoid 19% emissions and 81% PVS, when 55% and 45% respectively was proposed initially.

Therefore, the program has accomplished the overall target of reducing emissions 5700 tCO_2 exceeded by 8%, although not with the composition of the reductions for each technology.

			RURAL ELECTRIFICATION PROGRAM					
	ICE	GEF	ICE + GEF	ICE	GEF	ICE+GEF	ICE+GEF	
YEAR	Solar Power (kWp)	Solar Power (kWp)	Accumulated Solar power (kWp)	Accumulated Hydroelectric Power (kW)	Accumulate Aeolian Power (kW)	d Generation (MWh)	Avoided a Emissions (tCO2 / year)	
2005	5,20	0	5,20			9,1	30,4	
2006	3,60	0	8,80			15,4	51,4	
2007	6,00	0	14,80			25,9	86,4	
2008	5,90	0	20,70			36,3	120,9	
2009	6,80	6,6	34,10			59,7	199,1	
2010*	25,78	0,99	60,87	20,0		159,2	530,7	
2011**	8,88	4,62	74,37	20,0	1,0	184,6	615,4	
TOTAL	62,16	12,21				490,3	1.634,3	
Average ICE 2005- 8,88 kWp ** Power installed by ICE during 2011 has been supposed the same as 2005-2010 average.						2010		
** 26 modules included currently at ICE warehouses to be installed in 2011								
Capacity Factors								
SFV	20%							
SFV+Aeolian 20%								
MCH	30%							
Source: Author.								

Table 3-27 Renewable Energy Generation during UNDP-GEF-ICE-DSE Program

Source: Author.

3.2.8.5 Program Insertion into the RE Potential Market

Re potential market in Costa Rica is limited and it is considered that ICE is responsible for about half. The number of PVS installed by ICE during 2005-2010 period (10 kWp/year) were installed below the average for 1998-2004 (17 kWp/year), being ICE a determinate factor in this market, there was no dynamization of the same in ICE that can be considered as a program outcome.

3.2.9 **Sustainability**

This section purpose is to assess the extent to which Project's benefits will continue within or outside the Projects' domain after it is concluded.

3.2.9.1 Technical Capacity Development

As set in Prodoc, "Component 2: to strengthen the capacity of institutions, companies and communities to develop Renewable Energy projects", includes strengthening national institutional capacities to support the development of these technologies application.

One of the proposed activities was to carry out seven workshops that would train 200 officials representing public companies, NGOs and private companies in renewable energy technologies. As indicated in the last PIR (July 2009 to June 2010), this indicator was not achieved. However, the evaluation team revealed that in two of the workshops held in 2007 and 2009, 126 people were trained and most recently, in 2011, over 99 people were trained through six workshops, for a total of 225.

The first of these events was named "Workshop on Proposed Models for Projects Implementation and Funding Schemes", held on Monday February 19, 2007 with 32 participants from various sectors (government, financial, private companies, services providers). The aim was to present to the national financial sector, Project implementation models for rural electrification with renewable energy in off-grid communities and proposed funding models, in order to promote self-sustaining long-term investments.

In 2009 "Training in Photovoltaic Solar Systems", the second workshop held and addressed to ICE officials with 94 participants which at the end obtained a certificate attesting their participation. The audience included the maintenance technicians responsible of the solar photovoltaic equipment installation in the seven areas covering the country.

Other important actions were held in terms of sustainability, as the informational video on renewable energy produced by the Project and presented in 400 metropolitan area buses, showing the video every hour during 4 weeks revealed that more than 130 thousand people had seen it.

3.2.9.2 <u>Economic and Sociopolitical Sustainability of the Rural Electrification Program</u>

Users requiring rural electrification projects are in ICE areas. In relation to the Project it is undeniable ICE's enormous financial capacity to go on with it, *therefore, the economic sustainability of rural electrification is given*. To achieve that Costa Rica is fully electrified with RE in a period of about 4 years in places where these energy forms are more advantageous than grid extensions, is wholly feasible (ICE is entirely in charge of Project's Phase II implementation) and the only risk is that there will be no political will to achieve it.

3.2.9.3 Other Aspects of Program Sustainability

According to the consultants' findings, this Project has demonstrated technical, operational and environmental viability to employ PVS and MCH for rural electrification. These technologies do not involve major environmental risks, except for the PVS batteries inadequate final disposal and watersheds inappropriate management, MINAE is in charge of its management and regulation.

The Program's technical, operational and environmental sustainability is considered to be high given the equipment purchased quality and periodic maintenance by ICE. In more general terms, however, a highly important risk remains to be the lack of political decision and insufficient ownership of the necessary resources to achieve in the short term 100% of rural electrification in the country, as already indicated in section 3.1.1 of this report.

SPECIAL TOPICS

The role of both ICE and DSE was mostly related to Project coordination functions, the expected outputs of all the components were outsourced, which could have affected its appropriation level by the key agencies involved.

In terms of output mechanisms, the Project did not foresee alternatives to transfer or verify that the generated knowledge should be properly transferred to the interested parties, for example the premises obtained in relation to the financial mechanisms were not sufficiently discussed or transferred to a financial counterpart. While on February 19, 2007 a meeting with staff of various institutions was held, among which there were eight representatives of five financial institutions both national and multilateral, and there is no record of follow-up activities that could have been derived from the presentation.

BARRIERS CURRENT STATE

The Project' evaluators consider that the barriers current state after the Project will be as follows:

Table 3-28 Effect of the Project on Technical barriers

	BARRIER STATE	BARRIER STATE
	BEFORE PROJECT	AFTER PROJECT
•	Lack of technical rules and standards for isolated systems construction, operation and	• ICE employs its own rules and standards. As they did not rise to the national standard, ICE
	maintenance. As a result, the performances are	should facilitate their access.
	variable and prevent their sustainability.	• Partially removed barrier.
٠	Limited technical knowledge among energy	Removed barrier.
	systems providers in the country and region.	
•	Limited technical capacities to identify,	• ICE has the ability to develop RE projects.
	design, install, operate and maintain small	<i>Removed barrier.</i>
	scale renewable energy systems.	
•	Lack of knowledge and experience to take	• ICE has developed capacity for RE
	advantage of available renewable resources for	advantage
	decentralized rural electrification.	Removed barrier.

	Table 3	3-29	Project's	Effect o	ver Techn	ical Barriers
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	BARRIER STATE	BARRIER STATE
	BEFORE PROJECT	AFTER PROJECT
•	Lack of a regulatory situation conducive to promote small renewable energy projects. These incentives may be necessary to reduce investment risks, taking into account the consumers remote and dispersed nature and related administrative costs.	 Proposals presented to reform the regulatory situation. The task of achieving the modification exceeds the competencies of the implementing institution and the consultants. Not removed barrier, valuable information and proposals presented.
•	Lack of tax incentives in the long term within the law 7447 framework, which relates to promote renewable energy in Costa Rica. This law is reviewed each year and at the latest revision, incentives to eliminate import taxes to equipment using new and renewable sources were eliminated.	 Reestablished incentives <i>Removed barrier</i>.
•	Lack of specific budget in sector institutions to carry out renewable energy promotion programs in areas not connected to SNI.	 Limited resources employed for RE. Currently employed resources will lead at that total electrification of CR take a decade or more. <i>Barrier not removed</i>.
•	Project implementation delays due to the limited number of technical staff trained at all levels in government institutions.	 Staff trained and targets met in terms of trained people. ICE has the ability to develop RE projects. <i>Partially removed Barrier</i>.
•	Lack of a legal regulatory framework adapted to small scale hydroelectric projects in terms of water concessions. Other actors who want to build hydroelectricity plants have to go through the process.	 "Concession Law Framework for advantaging hydraulic power for hydroelectric generation" is currently approved in second reading, which means that only need to be promulgated by the Executive into a Republic law. <i>Removed barrier</i>.

BARRIER STATE	BARRIER STATE
BEFORE PROJECT	AFTER PROJECT
• The scattered rural population has false expectations on the conventional grid expansion (at lower prices) in the short term.	 This false expectation continues. With their demonstration systems, the Project shows a solution to rural population which is more feasible for the State and users. Partially removed barrier.
• There is no available information on small scale renewable energy sources use at local level.	 Demonstration projects are an information source and have not been evaluated by ICE. This evaluation will provide critical information for future RE use plans in rural electrification schemes. <i>Partially removed barrier.</i>
• Lack or slight knowledge on renewable energy technologies among public employees (i.e. educators, doctors) who continuously visit rural areas and need electricity to provide public services such as education and health.	• Partially removed barrier.
• Lack of information on these forms of alternative energy related to business opportunities.	 RE marketers perfectly know the existing business opportunities. <i>Removed barrier</i>.

Table 3-30. Project Effect on Information Barriers (Communication, Education and Training)

4. **RECOMMENDATIONS**

To ICE – DSE (MINAET)

- Prepare Project's Final Report.
- To consider the *continuity and strengthening* of the program's achievements, because it is an effort that responds to the real needs of rural inhabitants and disadvantaged populations in the country.
- RE use in the rural sector is in line with the country's environmental policy, with the country's goal of carbon neutral by 2020, with the Millennium Development Goals and with the real possibility of achieving 100% of the country's rural electrification without resorting to foreign loans. Costa Rica became an icon in Latin America and was the first 100% electrified nation of the Latin American subcontinent.

Disseminate existing information as the Informative Video, and SIFER's existence.

- For the Project's closure, the following recommendations are made to ICE:
 - To install all those PVS which are in their warehouses.
 - \circ Finish installing the equipments and the wind turbine in the Marine Park⁴⁷.
 - To conduct a technical, economic and environmental performance evaluation of the systems installed to promote its use in the country.
 - To use thoroughly the RE Tool as a rural electrification planning tool in the country.
 - To establish the Project's Cycle of RE projects in ICE.
 - To prepare the Project's Final Report so it can close.
- For the Project's closure, the following recommendation is made to DSE:
 - o To include Costa Rica's information in SIFER and expand it for its use

To PNUD-GEF

- During Prodoc's formulation, to consider a more suited countries reality of the actions accomplished, especially in terms where a project can generate legal and regulatory changes. Indicators for these activities normally request changes at the end of the Project, achievements entirely outside of the consultants and institutions scope.
- Monitoring of all Project's activities should be more regular and strict, leaving records of meetings and decisions taken, and monitoring the Project's compliance and opportunity. It must be more systematic concerning the Project's information and it must develop a protocol for the generation of reports.

⁴⁷ According to ICE information, two wind turbines were installed during May 2011 in the Marine Park.

- The Project value as a demonstration Project was lost, at least in technology terms due to its long management. What became a novelty in 1999 was no longer in 2005 because ICE itself had already installed more PVS up to 2005 than those that were going to be implemented.
- The added value of the demonstration projects evaluation via ICE as the executor has not been done and this assessment is a RE technologies advantages/disadvantages demonstration in situ which would be a basic argument for the massive use of such systems in rural electrification.
- To incorporate gender issues in Project management. To incorporate gender perspective as part of the activities of this type of projects will allow analyzing women roles and responsibilities both as beneficiaries of electricity supply in their communities and in their role as energy service users such as domestic, productive or communal uses. To plan specific activities as workshops or meetings aimed to develop an awareness-raising process on gender issues, taking advantage of the technological incursion and extending their benefits with social outcomes. To determine women participation can also value their role in equipment maintenance and use, and possibly generate an active participation in more productive uses of electricity.
- To request the External Auditor to include the photovoltaic equipments purchased as part of the Project's assets inventory in the 2009 Audit Report period.
- To request ICE and DSE the preparation of the Project Final report.

5. LESSONS LEARNED

For UNDP and GEF:

- Time elapsed between formulation, design, approval and implementation of a project cannot lengthen for extended periods as in this case, which resulted not only that the Project partly lost its demonstrative character, but country's and implementing institutions priorities affected the pace and scope of the proposed activities.
- As foreseen in its design, 24 months to implement a program that is expected to remove barriers at national level, is a short time, especially considering that some results required the participation of key actors, i.e. the legislation proposal where both DSE and ICE participated in feedback, institutions themselves requiring internal consultation before enacting operational aspects.
- In terms of in kind co-financing it is important not only to clarify the staff members responsibilities in the Project, but also their real time availability assigned, as part of the commitment to ensure being able to comply with what was set in the Project. And, that in addition the implementation of activities does not reload in an unrealistic way performance with other functions assigned by the partner institution.
- Budget resources allocation has to go hand in hand with the indicator and the expected product scope, specifically in the informative campaign case where the required resources were not provided to meet the described scope.
- Project proposed indicators must directly depend on the implementing agencies and the related actors' management, and wait to obtain products such as changes in legislation, tax incentives, is in a development context outside the implementing institutions scope.
- The establishment of coordination and information relations with governmental agencies regulating the electricity sector is in many cases affected by the guidelines of the changes in hierarchy, which once entering in their positions modify existing policies and priorities.
- Establishment of projects management committees in political bodies must describe the associated risk that this entails.
- Products such as software design can quickly be outdated or disabled for use.

For ICE and DSE (MINAET)

- Concerning the preparation of reports in Spanish and English, minutes, agendas, and the meeting presentations, it is important to take into account coordination and monitoring requirements intensity mainly in a project of this nature,. Many of these activities are entirely unfamiliar to the existing ICE and DSE institutional mechanisms.
- Institution's human resources allocation to carry out required functions of the Project involves a

technical work linked with the institutional work in this case, however coordination work requires efforts beyond officer's daily work, such as reports preparation, meetings convene, thorough review of the products delivered, among others. This is why it must be assessed if a single person may meet the time demands required by all the coordination functions, or more human resources should be allocated.

- It is necessary to provide feedback not only to the progress of consultancies, and administrative procedures and techniques required, but also to analyze and share the contents of the products among Project key personnel and not leaving this function only to the Project Coordinator or Director.
- A continuous or periodic follow-up process to some workshops participants should be contemplated, such as the financing workshop where representatives of five financial entities attended: It is unknown if the information provided at the workshop was practical for their professional work or if the institution considered financing or not RE projects and the reasons for it.
- To systematize the achievements and to disseminate the information that may be of public nature would have a greater impact on the Project achievements, i.e. to develop beneficiary communities with photovoltaic solar energy case studies would visualize even more this joint effort between UNDP, GEF, ICE and DSE.

6. ANNEXES

TÉRMS OF REFERENCE

Project Final Evaluation

"National Off-Grid Electrification Program based on Renewable Energy Sources"

1. INTRODUCTION

1.1 UNDP/GEF Monitoring and Evaluation Policy (M&E)

United Nations Development Program (UNDP) and Global Environment Fund (GEF) monitoring and evaluation policy (M & E) has four objectives:

- 1) To monitor and to evaluate results and impacts;
- 2) To provide elements for decision making and carrying out necessary amendments and improvements;
- 3) To promote responsibility in the use of resources;
- 4) To document, feedback and disseminate lessons learned.

It uses a set of tools to ensure the Project's effective M & E. This should be applied continuously throughout the Project period, for example: indicators regular monitoring or as a physical exercise at any given time, such as mid-term reviews, audit reports and final evaluations.

According to UNDP/GEF M & E policies and procedures for all GEF supported projects, whether these are medium or full size, a final evaluation should be undertaken at the end of their implementation. GEF projects require a final evaluation (or for a previous phase) prior to an additional funding request (or for Project subsequent phases). While the final evaluation is a requirement to consider support to request subsequent phases, this does not mean an endorsement for a next phase.

Final evaluations are intended to determine Project importance, operation and success; to search for potential impact samples and outcomes sustainability, including Project's contribution to capacity building and the achievement of global environmental goals. Will also identify and document lessons learned and make recommendations aimed to improve designs and implementation of other UNDP/GEF projects.

1.2 Program Objectives and its Context:

The "*National Off-Grid Electrification Program based on Renewable Energy Sources*" was signed on December 2004 by the Minister of Environment and Energy, UNDP-Costa Rica Resident Representative and ICE Executive President.

However the first contact with a UNDP/GEF project initiated by 1998 when there was an approach between UNDP and Comisión Nacional de Conservación de Energía (CONACE) *National Commission on Energy Conservation* to explore partnership opportunities.

PROYECT DOCUMENT PDF Block B or Preparatory Assistance was signed on 22 May 1999. The objective was to identify, assess, and prioritize the existing barriers in rural electrification based on renewable energy sources and design actions to reduce or eliminate technical, institutional, financial, and human resource barriers related to rural electrification with alternative sources. Also, needs are identified and a process is initiated to develop a National Program to support renewable energy development for rural establishment.

From a global point of view, the Program overall objective is: "to reduce Greenhouse Gas Emissions by promoting the use of decentralized renewable energy systems in areas isolated from the (SIN) National Interconnected System of Costa Rica."

Local national aims: "the Project will help remove existing barriers that prevent the utilization of renewable energy sources in remote rural areas that are inaccessible through conventional grid extensions." This phase will "focus on the creation of a systematic approach within the Costa Rican energy sector⁴⁸ to rural electrification with renewable energy." "This will include the creation of an institutional, financial, and regulatory environment supportive of such systems."

To fulfill the objectives as expected, the following items and subcontracts were developed:

1. To Support the Implementation of Policies and Regulations that favor the use of Renewable Energies in Electricity Projects. (Sub-contract 1).

2. To Strengthen Institutions, Companies and Communities Capacity to Develop Renewable Energy Projects.

□ Renewable Energy Information Module on the web site, and SIEN Information System on internet.

□ Hardware for sub-contract 2 Information Module implementation.

□ Launch of a dissemination campaign at national level and promotional workshops conduction. (subcontract 3, originally MINAE's responsibility, but moved to ICE in 2007).

3. Assessment of other Projects' Financing and Execution Schemes to Promote Investment (sub-

⁴⁸ This section mentions all the components and their corresponding subcontracts, that according to ICE internal organization, facilitates external evaluators consultation, even though the evaluation covers the entire project and not only these subcontracts.

contract 4).

4. Pilot Projects and Training. Validate Decentralized Renewable Energy Systems as Market Options for Electricity Generation. (Subcontract 5)

Subcontract 5: "Systems and Training Design and Installation on 18 Sites" (pilot projects).

"Pilot Projects materials and "turnkey" services provision (this refers to specific bidding process applied by ICE). ICE tendered these pilot projects to ensure that the company to be hired would be responsible for imports, installation and to educate the community on renewable energy use.

5. Evaluate Costa Rica's Rural Electrification Programme and confirm sites benefiting from Renewable Energy.

It was divided into two sub-contracts:

Sub-contract 6.1: Methodology for the Evaluation of Rural Electrification Options of Energy Sources (Project Portfolio).

Sub-contract 6.2: Feasibility Studies. 7. Final Evaluation (sub-contract 7).

Project Endorsement Context

The first concept document of the "Photovoltaic Electrification National Grid" Project was developed in 1997 with collaboration of UNDP Programme Officer, MINAE Energy Sector Directorate and Head of ICE Energy Conservation Area. This process did not continue because it was considered necessary to raise more than one energy option (not only the photovoltaic technology) to ensure that the Project was approved by GEF.

During 1998 and 1999 the Project Document was reconsidered as the National Off-Grid Electrification Programme based on Renewable Energy Sources, which includes other energy sources such as biomass, wind energy and micro-hydraulic.

In early 1998 the operation of the necessary mechanisms for the document preparation is delegated to the National Commission on Energy Conservation (CONACE) requesting preparatory assistance to develop a Project Document for UNDP.

On April 14, 1999 a request to electricity distributors in the country is made asking to confirm their participation in the Project.

On June 22, 1999 the Project Document PDF block B/COS/98/G41 is signed, by the former Minister of Energy, Mrs. Elizabeth Odio, and UNDP-Costa Rica Resident Representative starting research work.

In January 2001 the company Sol Dos Mil delivers its final reports and feasibility studies for the implementation of pilot projects for rural electrification with renewable energy.

On June 14, 2001 the Minister sent a note to ICE Executive President requesting support for the Project.

The delay between Project's initial conceptualization process and GEF approval was about four years. This is why it was necessary to hire an external consultant to update the Project context and proposed activities, however this included political commitments that were not viable and MINAE and ICE disagreed, so the proposal had to be adapted again. Within these commitments the consultant included 313 feasibility studies in the Prodoc, which neither the available money nor the time would have allowed to meet.

The mass communication campaign as presented in the PRODOC was also not feasible for several reasons:

□ The necessary resources to carry out a massive campaign largely exceeds the approved funds.

 \Box ICE and the distribution companies valued that holding a renewable energy sources massive campaign in the country could mislead the population, as that would create an expectation on its not viable provision and could collapse the national installation capacity.

 \Box The communication campaign has been handled in a different way: through a video developed that is being posted on the metropolitan area buses screens.

 \Box This video had also been distributed to educational institutions such as EARTH University, National Biodiversity Institute (INBIO), and it is intended to reach all country's schools through the Ministry of Public Education.

 \Box A computer was acquired for the graphic material design that will be released once the companies obtained the systems for renewable energy use.

2. EVALUATION OBJECTIVES

This independent final evaluation (FE) is an UNDP/GEF requirement and has been organized according to UNDP/GEF monitoring and evaluation policies and procedures. It is therefore mainly initiated by UNDP-Costa Rica and it will be funded by the Project resources.

This Final Evaluation overall objective is to analyze the Project implementation, to review the Project achievements to accomplish the Project objective and its expected outcomes. This evaluation will establish the Project relevance, performance and success, including the outcomes sustainability. This evaluation will also collect and analyze specific lessons and good practices with respect to the strategies employed and the implementation arrangements, which may be relevant for other projects in the country and other countries in the world.

The main stakeholders of this FE are:

 \Box Government of the Republic with the national climate change strategy adopted in 2009 (this initiative proposes to turn Costa Rica in a carbon-neutral country in 2021).

- □ Ministry of Environment, Energy and Telecommunications.
- □ United Nations Development Programme

□ Instituto Costarricense de Electricidad

- □ Global Environment Fund (GEF)
- □ Rural Electrification Cooperatives and Electrical Distribution Municipal Enterprises
- Costa Rican communities that would not be electrified through electrical distribution grid
- □ National System of Conservation Areas
- □ Ministry of Public Security and Police
- □ Ministry of Public Education
- □ Ministry of National Planning and Economic Policy

The Final Evaluation must submit a comprehensive report on an accomplished Project performance, evaluating the Project design, the implementation process, achievement of outcomes and goal, including goal and outcomes changes during its implementation, if relevant. Final evaluations have also four complementary purposes:

 \Box To promote accountability and transparency, evaluate and disseminate the Project achievement levels;

□ To summarize lessons that can help to improve selection, design and implementation of UNDP-GEF implementation future activities;

□ To provide feedback on recurring topics through the portfolio and need care and improvements related to previously identified topics; and

 \Box To contribute in databases with inclusions and analysis reports on UNDP-GEF operations effectiveness to achieve global environmental benefits and monitoring and evaluation quality throughout GEF system.

For more details on this evaluation scope, please refer to Section 7.

3. EVALUATION EXPECTED OUTCOMES

This section includes special issues to consider and the elements to be included in the evaluation report in accordance with UNDP/GEF guidelines. It also highlights specific aspects to be dealt under each category. Annex 2 provides a more detailed guidance on GEF project terminology and reviewing criteria.

The expected outputs of this assessment are two.

<u>Oral presentation of the evaluation main findings</u> to UNDP Costa Rica representation, this presentation must be made before mission end in order to allow clarification and validation of the evaluation findings.

<u>Evaluation Written Report.</u> The second product is the final evaluation report which contains the findings, operation evaluation, lessons learned and best practices recommendations and description. This report should be based on GEF guidelines and patterns for final evaluations and must follow the structure and include the specific directions provided in the next section. This report should be presented by electronic means to the CO (UNDP Office in Costa Rica), RCU (UNDP-GEF Regional Coordinating Unit) and to Project team, two weeks after the conclusion of the assessment mission. These parties will review the documentation and will provide feedback to the evaluation team within the month that draft assessment report was delivered. The evaluator will review these comments and

submit a final report within a one-week period. The RCU and CO will sign a formal authorization form, which will be sent together with the final evaluation report. The evaluation report scheme should be structured using the Report Preparation Guide provided in the relevant section.

The first version of this report should be submitted in electronic format within two weeks after completion of the Mission in the country. This version will be delivered to interested parties and comments to the evaluator will be sent within a period of three weeks. These comments should focus on possible data errors found and not on questioning evaluators' perceptions and findings. If there are discrepancies on evaluators' team impressions and findings and those of stakeholders, these differences should be explained in a specific annex attached to the final report.

Report General Considerations:

 \Box Font: Times New Roman – size 11, single space; paragraph numbering and table of contents (automatic); page numbers (bottom center); graphics, tables and photographs (when relevant) are appreciated.

Extension: maximum 50 total pages, excluding annexes.

□ Delivering Schedule: first draft within a period of 1.5 weeks after completion of the Mission in the country.

 \Box Document must be sent (MS Word or PDF format) in Spanish (except the Executive Summary, no more than 3 pages and should be written both in English and Spanish to: UNDP-GEF Regional Coordination Unit, UNDP Costa Rica and Project Team). These stakeholders should provide their comments prior to its completion. If there are any discrepancies between the evaluators' team impressions and findings and the above mentioned parties, these should be explained in an annex attached to the Final Report.

IV. EVALUATION METHODOLOGY AND APPROACH

An evaluation approach guide will be presented below. However, it should be clarified that the evaluation team (comprising one international and one national evaluator) is responsible for reviewing the approach as necessary. Any change must be consistent with international standards, and rules and professional standards adopted by NU2 Evaluation Group. These also have to be authorized by UNDP before being applied by the evaluation team.

(i) **Documentation review** (documental study): the documentation list is included in Annex 2. All documents will be provided in advance by the Project Team, by UNDP Regional Office and CO. The Project Team and UNDP regional office and CO will provide a temporary cover for each document, describing the relative importance of each key section and topic that should draw the attention of the evaluators. The Evaluation Team can consult all relevant information sources, including but not limited to the following documents list: UNDP / GEF evaluation policy, Project Document, Project Reports, Project's Steering Committee minutes and decisions, Project budgets, Project work plans, progress reports, PIR, Project documents, UNDP guidance documents, relevant national legislation to the Project and any other material that may be considered useful. The Project Coordinator will also provide a report of Project achievements and lessons.

(ii) Interviews. These are carried out as a minimum with the following organizations and people:

- □ MINAET Energy Sectorial Directorate Director
- Project Director and National Alternate Director
- Project Coordinator
- Project Coordinator Assistant
- □ Field Projects Officer and DSE Tasks Coordinator
- UNDP Programme Officer
- Regional Technical Advisor of UNDP-GEF Regional Coordination Unit

Users of Chirripó National Park, Pacific Marine Park, Cerro Nara and San Isidro de Dota, Las Marías de la Cruz systems and a number of projects carried out by ICE to agree.

(iii) Field visits must be made at Chirripó National Park, Pacific Marine Park, Cerro Nara and San Isidro de Dota, Las Marías de la Cruz and a number of projects carried out by ICE to agree. Likewise to MINAET DSE offices and SINAC, UNDP in San Jose.

(iv) Semi-structured interviews - the team should develop a semi-structured process, which can ensure coverage of different aspects. Focus groups with Project beneficiaries will be carried out whenever the evaluation team deems it necessary.

(v) Questionnaires.

(vi) Participation Techniques and other collecting and data analysis approaches

V. EVALUATOR TEAM

(NOT transcribed)

VI. ARRANGEMENTS FOR EVALUATION IMPLEMENTATION

(NOT transcribed)

VII. EVALUATION SCOPE AND SPECIFIC PROBLEMS TO BE ADDRESSED

FE scope will depend on the type, size, emphasis area and context of the country in which the Project is implemented. FE should adequately revise and assess **a number of key stakeholders' prospects** in all cases. In most cases, FE should include **field visits** to find out Project's achievements and conduct interviews with key stakeholders at the national level and when appropriate, also at local level. GEF resources use and co-financing within country's broader scope should also be analyzed.

In general, it is expected that the final evaluation (FE) explores the following five main criteria:

Relevance. The length in which the activity responds to local and national development priorities and organizational policies, including changes over time.

 \Box Effectiveness. The extent in which an objective is met, or on the likelihood that it can be achieved.

- □ **Efficiency**. The extent in which outcomes are delivered with lower resources spending as possible, also called profitability or efficiency.
- Outcomes. Positive and negative, planned and unforeseen changes and effects produced by a

development intervention. In GEF terms, results include Project direct products, short and medium term outcomes and longer-term impacts including environmental global benefits, replication effects and other local effects.

• **Sustainability**. The probabability that an intervention will continue generating profits during an extended period of time after its completion. Projects need to be sustainable in environmental, financial and social aspects. The following aspects should be covered in the FE report:

General Information about the Evaluation:

FE report will provide information about the time when the assessment was carried out; visited sites; people who were involved; key questions; and methodology. More details are given in the terms of reference template (TORs) in Annex 2.

Project Outcomes Assessment

The FE will at least evaluate **outputs and outcomes achievement** and will provide outcomes assessment. This evaluation seeks to determine to what extent the Project outcomes were achieved, or are expected to be achieved, and assess whether the Project has driven any other positive or negative consequence. During Project outcomes evaluation, the FE will determine the achievements scope and deficiencies in achieving Project goal as provided in the PRODOC, it will also indicate any change that has been made and if such changes were adopted and achieved. If the Project does not establish initial conditions, the evaluators jointly with the Project team, should try to define and to establish properly the intervention achievements and results, which were the initial conditions. Considering that it is expected that most GEF projects achieve the expected results at the end of the Project, **Project outcomes evaluation should be a priority**. The outcomes are probable or achieved effects in the short and medium term of intervention products. Examples of outcomes may include, but not restricted to strengthened institutional capacity, a greater public awareness (when behavior changes), and changes in policy and market frameworks.

To determine Project outcomes and objectives achievement level, the FE will evaluate the following three criteria:

 \square **Relevance**: Were Project results consistent with the focus areas / programme operational strategies and country priorities? Evaluators must also determine if the results specified in the assessment Project documents are actually the outputs and not outcomes or inputs.

 \Box **Effectiveness**: Are Project outputs proportional to the expected outputs (as described in the Project Document), and according to the problems that the Project was intended to solve (i.e. Project's original or modified objectives)? In the expected outcomes, original or modified, are only products/inputs, then evaluators should assess whether the Project had real results, and if so, it is necessary to determine whether they are proportionate to the real expectations of these projects.

 \Box **Efficiency**: Was this Project profitable? Was the Project the least expensive option? Does Project implementation delayed in any way and, if so, did this affect its profitability? Wherever possible, evaluators should also compare cost time relation against Project and other similar projects outputs. Relevance, effectiveness and efficiency evaluation must be as objective as possible, including

sufficient and convincing empirical evidence. Project monitoring system must ideally provide quantifiable information that can sustain a robust Project effectiveness and efficiency evaluation. Given that projects have different objectives, outcomes assessed are not comparable and may not be added. To determine whether the portfolio condition is healthy, Project outputs will be classified as follows:

Highly Satisfactory (HS): in terms of relevance, effectiveness and efficiency, Project did not present inconveniences in its objectives achievement.

Satisfactory (S): in terms of relevance, effectiveness and efficiency, Project presented minor disadvantages in its objectives achievement.

Marginally Satisfactory (MS): in terms of relevance, effectiveness and efficiency, Project presented moderate disadvantages in its objectives achievement.

Marginally Unsatisfactory (MU): in terms of relevance, effectiveness and efficiency, Project presented significant drawbacks in its objectives.

Unsatisfactory (U): in terms of relevance, effectiveness and efficiency, Project presented serious deficiencies in its objectives achievement.

Highly Unsatisfactory (HU): in terms of relevance, effectiveness and efficiency, Project presented severe deficiencies in its objectives achievement.

The evaluators will also **qualify real (or anticipated) Project long term positive and negative impacts or emerging effects**. Impacts generally have a long term, evaluators may not have the possibility to completely identify and evaluate them. However the evaluators will indicate the steps to follow in order to asess Project impacts, especially impacts on local populations, local environment (i.e. increase in the number of individuals who know technologies for using renewable energy, rural electrification through grid distribution versus rural electrification with renewable energy sources, cost–effective rural electrification projects, reduction of greenhouse gas emissions, improvement of living conditions for rural areas inhabitants, improvements in safety, teaching-learning processes, sanitation when using renewable energy sources). And whenever possible, it shall also indicate the way to report GEF impacts findings in the future.

Project Outcomes Sustainability Evaluation

FE will evaluate as a minimum the **"probability of outcomes sustainability after Project end and will provide a rating"**. Sustainability assessment will set particular emphasis on risks analysis that may affect Project outcomes persistence. Sustainability assessment should also explain how other important contextual factors, which are not those resulting from the Project, will affect the sustainability. TORs template found in Annex 2 provides more details on sustainability evaluation.

Catalytic Role (replicability)

Final evaluation also **describes any Project catalytic or replicable effect**. If effects are not identified, the assessment will describe catalytic or replicable actions that the Project carries out.

Assessment of Monitoring and Evaluation Systems

FE will assess whether the Project met its M & E design requirements and M & E plan implementation. GEF projects should allocate appropriate budget for the design and implementation of the M & E plan. It is also expected that Project managers will use M & E system information generated during Project implementation, to improve and adapt the Project. Due to GEF projects long duration, these are encouraged to include long-term monitoring plans to measure outcomes (such as environmental outcomes) after Project end. EF reports will include separate assessments of achievements and deficiencies of these two types of M & E systems.

• Specific Topics to be Considered:

□ Analysis on "Management Distribution" effectiveness

□ Analysis on this type of Project Steering Committee's performance figure and mode of operation.

□ Planning and monitoring mechanisms that the program will use to provide continuity to management undertaken with the Project.

□ Technical and financial Project counterpart.

7.2. Final Report Scheme

1. Executive Summary

- Brief Project Description
- Evaluation Context and Purpose
- □ Key Conclusions, Recommendations and Lessons Learned
- □ Table Summary of the Main Ratings Received

2. Introduction

- Evaluation Purpose
- □ Key Issues Addressed
- Evaluation Methodology
- Evaluation Structure

3. The Project (s) and its (their) Development Context

- □ Project Inception and Duration
- Problems that Project Intends to Address
- Project Immediate and Development Objectives
- Main key Partners
- Expected Results

4. Findings

Besides the relevance, effectiveness and efficiency evaluation above described, a descriptive assessment should be provided. All criteria marked with (C) should be classified using the following divisions: Very Satisfactory (VS), Satisfactory (S), Moderately Satisfactory (MS), Moderately Unsatisfactory (MU), Unsatisfactory (U), and Very Unsatisfactory (VU). Please see Annex 2 for terminology explanation.

Project Formulation

This section describes the problem context which the Project aims to address. It should describe how useful are the Project conceptualization and design to address the problem, emphasizing on
Project and logical framework consistency. This section should seek to provide answers to the following questions: Was the Project well formulated? Were there some changes made to the Project's logical framework during implementation and, if positive, were these changes successful, or are better and bigger impacts expected?

 \Box Conceptualization/design (C): this should evaluate the design approach used and proper appreciation of problem conceptualization, and if the intervention strategy selected was the best option to address barriers in the Project area. It should also include logical framework evaluation and an assessment on whether Project components and proposed activities to achieve the target were appropriate, feasible and responded to the Project's institutional, legal and regulatory environment context. It should also evaluate the defined indicators guiding the implementation and measuring achievements, and whether other relevant projects' lessons (i.e., in the same focal area) have been incorporated into the Project design.

 \Box National ownership: Evaluate the Project's initial idea originated in local, national or sectorial development plans and if the Project responds to the national interests in terms of environment and development.

 \Box <u>Key stakeholder participation (C)</u>: Assesses the information dissemination, key stakeholders consultation and participation in the design and implementation stages.

 \Box <u>To replicate the approach</u>: Determines the ways in which Project lessons and experiences must be replicated or scaled in other Projects design and implementation (this is also linked to actual practices developed during implementation).

 \Box <u>Other aspects</u>: To assess the approach used within Project formulation, the comparative UNDP advantage as an implementation agency for this Project, consideration of the linkages between projects and other interventions in the sector, and definition of clear and appropriate implementation arrangements during the design phase.

Project Implementation

 \Box Implementation approach (C): Regardless the fact of whether the Project was or not well designed the following query should be, *how well was the Project implemented?* This section should include the following aspects assessment:

(i) If necessary, the use of a logical framework as a management tool during implementation and any other change made to this in response to changing conditions and/or feedback from M & E activities.

(ii) Other elements indicating adaptive management, such as real and comprehensive work plans developed in a routine way to reflect adaptive management; and/or changes in management agreements to improve implementation.

(iii) Electronic information technology use/establishment in the Project to support implementation, participation and monitoring, as well as other Project activities.

(iv) Relations among involved institutions and others and the way in which these relations have contributed to Project objectives effective implementation and achievement.

(v) Technical capabilities associated with the Project and its role in its development, management, and achievements.

 \Box Monitoring and Evaluation (C): including an assessment of whether there has been an adequate and regular supervision of the activities during the implementation, as to establish the contributions extent, working hours, other required actions and products, according to what is stipulated within the plan. Or; if formal evaluations or actions on the results of monitoring supervision and evaluation reports were carried out. If formal evaluations have been carried out, assess whether actions have been taken concerning results and conclusions of these. To assess this evaluators proposed to use the following criteria: (i)) to assess whether there has been an appropriate M & E system enabling to follow up Project progress towards the achievement of results and Projects objective; (ii) To assess whether suitable M & E tools such as,. baseline, clear and practical indicators, data analysis, studies to assess the expected results for certain Project stages (outcomes or progress indicators) have been used.. (iii) To assess if there were resources and capacities to carry out monitoring in an appropriate manner, and if the M & E system was used for the Project's Adaptive management/administration.

- Key stakeholders participation (C): This should include Project implementation information dissemination mechanisms assessment and key stakeholders participation level on management, emphasizing the following:
- (i) Production and dissemination of Project generated information.
- (ii) Local resources users and NGOs participation in Project implementation and decision-making, and an analysis on strengths and weaknesses of Project approach used in this area.

(iii) Establishments of partnerships and collaborative Project developed relationships with local, national and international entities; and, their impact on Project implementation.

(iv) Governmental institution involvement in Project implementation; level of Government support for the Project.

 \Box <u>Financial planning:</u> includes Project actual cost analysis, financial management (including disbursements related aspects) and co-financing. If a financial audit has been carried out, the main findings should be submitted in the FE. See more details and explanation of concepts in Annex 3. This section should include:

- \Box (i) Project actual cost by objectives, products, activities.
- □ (ii) Achievements profitability (has this Project been profitable?).
- □ (iii) Financial management (including disbursement issues).

 \Box (iv) Co-financing. In addition to co-financing analysis, evaluators must complete the co-financing and own and external resources table provided in Annex 3.

• <u>Execution and implementation modalities</u>. This should consider the effective participation of UNDP counterpart and Project Coordination Unit in the election, recruitment, assignment of experts, national counterpart consultants, and staff. Also, in the definition of areas and responsibilities, quantity, quality and dates to Project's imputs regarding implementation responsibilities, enactment of the necessary legislation, budget disbursement and extension, that could have been affected by the Project's implementation and sustainability, by UNDP and GoCR inputs quality and promptness, and

by other parties responsible for providing inputs to the Project, and by the scope that the implementation of the Project could have had. This section should provide answers to the following questions: Was Project implementation carried out efficiently and effectively? Was there effective communication between the critical actors in response to implementation needs? Was the Project cost management reasonable and cost-effective?

Outcomes

 \Box <u>Outcomes/achievements obtained with Project aims (C)</u>: this FE seeks to determine Project outcomes and objectives scope, and if there was a positive or negative impact. For this, it is important to identify Project achievements and shortcomings in accomplishing outcomes and objectives. If Project did not establish the baseline (initial conditions), evaluators, along with the Project team, should seek to determine, through the use of special methods, how to properly establish the achievements, outcomes and impacts. This analysis must be based on specific Project indicators.</u>

□ This section should also include the following reviews:

<u>Sustainability</u>: Including an ongoing evaluation of the extent of benefits both within and outside the Project scope, and then to GEF aid/external assistance at this stage until completion. Assessment on sustainability will emphasize on risks analysis that may affect Project outcomes persistence. Sustainability evaluation must also explain the way in which other important contextual factors that are not the Project outcomes, will affect the sustainability. Following reference is made to the four sustainability dimensions or aspects of the Project outcomes. Each of the four Project outcomes sustainability dimensions or aspects will be qualified as indicated in footnote number 3.

• <u>Financial resources</u>: Are there financial risks involved in sustaining the Project results? What is the probability that the economic and financial sources are not able to sustain Project results once GEF help ends (resources may come from multiple sources, such as public and private sector, income generation activities, and trends that indicate if there will be adequate sources to support the results of the Project in the future)?

• <u>Socio-political</u>: Are there other social and political risks that could undermine Project outcomes longevity? What is the risk that person concerned ownership level is insufficient to allow Project outcomes/benefits to be sustainable? Do key stakeholders consider that if Project benefits continue, this will benefit them? Is there sufficient stakeholders' public awareness for Project objectives in the long term?

• <u>Institutional framework and governability</u>: Do legal, political frameworks and structures and governance processes constitute any threat to Project benefits continuation? While evaluating this parameter, it must also be considered if the necessary systems for accountability and transparency and the necessary technical "knowledge" are in place.

• <u>Environmental</u>: Are there any environmental risks that could undermine the future flow of Project environmental benefits? The EF should assess whether certain activities in the Project area constitute a threat to Project outcomes sustainability. For example, construction of a dam in a protected area can flood a large area and thereby neutralize biodiversity related to the benefits achieved by the Project.

Contribution to Improve National Staff Skills

Conclusions and Recommendations

This section is to provide this assessment's conclusive points and specific recommendations. **Recommendations should be as specific as possible**, indicating to whom they are addressed. Please complete the table's management response relevant columns provided in Annex 4 with main recommendations. This section may include:

□ Final observations or Project relevance, effectiveness, efficiency, results and sustainability summary;

- □ Final observations of Project outcomes and objective achievements;
- □ Project design, implementation, monitoring and evaluation corrective actions;
- □ Reinforcing Project initial benefits follow-up actions;
- □ Proposals on future guidelines to reinforce main objectives.

Probable (P): There are no risks affecting this sustainability dimension.

Moderately Probable (MP). Moderate risks affecting this sustainability dimension.

Moderately Improbable (MI): There are significant risks that affect this sustainability dimension. Unlikely (U): Severe risks that affect this sustainability dimension.

Lessons Learned

Evaluators will present Project lessons and recommendations on all aspects considered relevant in TE report I. It is expected that evaluators put special attention in analyzing the lessons and propose recommendations on aspects related to factors that help or hinder: Project objectives achievement, Project benefits sustainability, innovation, catalytic effect and replication, and Project monitoring and evaluation. Some questions to consider are:

 \Box Is there something worth to be mentioned/special/to criticize which was learned during this year Project implementation, that is important to share with other projects so that this error can be avoided / take advantage of this opportunity?

- □ What would you do different if you were about to start the Project again?
- □ How does this Project contribute to technology transference?
- □ To what extent does UNDP GEF projects were relevant to national / local efforts to reduce poverty / to improve democratic governance / to strengthen crisis prevention and resilience / to promote gender equity and women empowerment? Please explain.

 \Box Was this Project able to generate global environmental benefits, along with contributing to national environmental management and achievement of sustainable development priorities? If so, please develop.

7. Evaluation Report Annexes

- \Box TORs Evaluation
- □ Itinerary
- □ List of people interviewed
- □ Field visits summary
- \Box List of revised documents
- □ Questionnaire used and outcomes summary
- □ Stakeholders comments (only if discrepancies with evaluation findings and conclusions)
- □ RCU and CO forms authorization and revision

6.2 ITINERARY

Air itinerary of H. Rodriguez, land itinerary of K. Fajardo and H. Rodriguez.

Date	Day	Hour	Flight	Land
Feb 06-11	Sunday	23:59	Bogota - San Jose	
				Cerro Nara (Quepos), San Isidro de Dota
				(Prov. San José), Turtle Reserve Playa
				Hermosa, Parque Marino del Pacífico de Punta
Feb 11-11	Friday-Saturday	07:00		Arenas
				Reserva Altos de Paquare (Batán, Prov.
Feb 13-11	Sunday-Monday	07:00		Limón)
Feb 17-11	Thursday	18:45	San Jose - Panama	
Feb 20-11	Sunday	16:30	Panama-Bogota	

Date	Hour	Institution	Name	Position	City	Indic	Tel	e mail
Feb-07-11	08:30	Consultant	Kattya Fajardo	Project Consultant	San Jose	506	22854579	<u>kfajardo@bun-ca.org</u>
F 1 07 11	14.00		Monserrat Blanco Lobo		с т		5 22961544	monserrat.blanco@undp.org
Feb-07-11	14:00	UNDP	Paula Zúñiga	Environmental Program	San Jose	506		paula.zuniga@undppartners.org
			Luiza Carvalho	Resident Representative		506	22962493	luiza.carvalho@undp.org
Feb-08-11	Feb-08-11 08:00 UNDP		Lara Blanco	Assistant Resident Representative	San Jose	506	22961544	lara.blanco@undp.org
Feb-08-11	10:00	ICE-UEN	Misael Mora	Program Coordinator	San Jose	506	22206954	MMora@ice.go.cr
			Jesús Sánchez Ruiz	Director		506		jasanchez@ice.go.cr
F 1 00 11	14.20		Alexandra Arias Alvarado	UEN	C I	506		
Feb-08-11	14:30	ICE-UEN	Carlos López Molina	Director - UEN Customer Service period 2005-2010	San Jose	506		
Feb-09-11	09:30	ICE-UEN	Julieta Bejarano	Director – Juridical Division	San Jose	506		<u>jbejarano@ice.go.c</u> r
Feb-09-11	11:00	ICE-UEN	Misael Mora			506		
Feb-09-11	13:30	DSE	Gloria Villa de La Portilla	Director – Juridical Division	San Jose	506	2573662	gvilla@dse.go.cr
E-h 10 11	10.00	CONGENERCY	Carlos Oreamuno	Technical Area Director	Can Iara	506	2200668	c.oreamuno@consenergy.net
Feb-10-11	10:00	CONSEINERGY	Paul Wright	Marketing	San Jose	506	2200668	p.wright@consenergy.net
E-1. 10.11	15.00	ICE LIEN	Luis Diego Ramirez		Can Iara	506	22206954	lramirezr@ice.go.cr
Feb-10-11	15:00	ICE-UEN	Jason Salazar		San Jose	506	22208040	jsalazaral@ice.go.cr
Feb-15-1	09:30	DSE	Jorge Pérez	Systems Administrator	San Jose	506	22573662, E 228	
Feb-15-11	16:00	CHIRRIPO CONSULTORES	Leonardo Ramírez	Manager	San Jose	506		
			Luisa Carvalho	Resident Representative	San Jose	506	22961544	luiza.carvalho@undp.org
			Lara Blanco	Assistant Resident Representative	San Jose	506	22961544	lara.blanco@undp.org
		UNDP	Jose Fernando Mora	Operations Manager	San Jose	506	22961544	
			Monserrrat Blanco	Environmental Program	San Jose	506	22961544	monserrat.blanco@undp.org
			Paula Zuñiga	Environmental Program	San Jose	506		paula.zuniga@undppartners.org
Feb-17-11	14:00		Nobelty Sánchez	Dirección Sectorial de Energí	a San Jose	506	2573662	
			Jesus Sánchez	Director UEN	San Jose	506	22205556	jasanchez@ice.go.cr
		ICE LIEN	Misael Mora	Program Coordinator	San Jose	506	22206954	MMora@ice.go.cr
		ICE-UEN	Luis Diego Ramírez	Engineer	San Jose	506	22206954	Lramirezr@ice.go.cr
			Jason Salazar	Engineer	San Jose	506	22206954	
		Consultant	Kathya Fajardo	Evaluator	San Jose	506	22838835	kfajardot@hotmail.com
		Consultant	Humberto Rodríguez	Evaluator		57	300 215 8765	humberto.rodriguez.m@gmail.co

6.3 LIST OF INSTITUTIONS/PEOPLE VISITED

feb

Place:	San José, Costa Rica
Consultants :	Humberto Rodríguez, Kathya Fajardo
	National off-grid electrification programme based on renewable energy
Project:	sources
Mission Date:	February 7–16, 2011
Objective:	1. To obtain first hand key information

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2. To evacuate doubts on documentary review previously made.

Date	Meetings and Main Considerations				
	1.	8-11 am Coordination Meeting with Kathya Fajardo			
Feb. 7	2.	2:15 pm Meeting with Mrs. Montserrat Blanco, Environmental, Energy and Risk Management Program Officer and Mrs. Paula Zúñiga Environmental, Energy and Risk Management Program Consultant UNDP CR, UNDP office.			
		The Project has been successful by its goals, however because of long negotiation processes it has been delayed. It appears that there was little approchement between MINAE and ICE however there is advance in terms of transversal and inter-agency cooperation.			
		The Project has achieved the objectives, Eng. Misael Mora, Coordinator, has been very committed.			
		UNDP has participated in follow-up meetings with the Coordinator and the National Alternate Director. In terms of indicators, some goals were very ambitious, i.e. about 300 feasibility studies.			
		No Projects were enhanced by exhibiting them at national and international levels.			
	3.	8:00 am Mrs. Luiza Carvalho, UNDP Resident Representative and Mrs. Lara Blanco, UNDP Assistant Resident Representative			
Feb. 8		Two situations that affected activities development: started in a moment of discussion of international cooperation and initial doubts of the executing agency, being this the first experience as executor of UNDP/GEF projects (emerged numerous legal concerns).			
		Is important to reflect Project impacts on ICE in this assess. The initiative viewed from the regional plans, for example SICA Initiative in its 20-20 Plan.			
		Pay attention to Project Steering Committee minutes (role of CONACE)			

4	 2:00 pm Jesús Sánchez Ruiz and Alexandra Arias Alvarado, and Mr. Carlos López Molina (National Director – 2005 to 2010). ICE
	 Project chronology 1998 conversation with UNDP 1999 PDF–B Project in 2 phases: Phase I / exploratory phase Phase II / full coverage – it was approved Value: 22 MUS\$ + 17 Phase II was not ratified
	2003 was ICE strike because budget Adopted Steering Committee structure change (CONACE – had a break) Some changes to activities were made because they were not updated.
	The Project was ratified and signed for the first phase One year delay / a number of changes / for procurement, implementation, etc.
	There was an investigation by the comptroller (ICE) for UNDP funds. One year (2005).
	It started in 2005, DSE bought some things, a team work was formed, with staff (consultants, legal division and procurement) to prepare biding cartels.
	There was a long learning process in the cartels preparation.
	A task force for PCHs was formed - equipment was tested, modifications; the environmental part also had to be adapted, TORs preparation.
	2006 Low execution 2007 there was 24% execution – consultancies results
	Products valuation according to ICE
	PRODUCT 1.
	An analysis of all legislation related to RE. Law 7447, art. 28, known as the Law on Energy Rational Use, allowed exemption to the RE. Five years ago, Tax simplification Law ended with exemptions. Article reentered into force a year ago, which is considered as very positive.
	PRODUCT 2A. Web: information network - software was purchased – power, inventory, projects, infrastructure, prices,

	PRODUCT 2B Information Dissemination Campaign, a video for renewable energy was made / showed up in buses.
	COMPONENT 3. Implementing and financing Scheme - see consultant Julieta Bejarano presentation.
	To make viable projects 80 per cent is ICE + 20% non-refundable resources.
	COMPONENT 4.
	Validation of renewable energy systems 16 pilot projects solar and hydro 14 pilots by US\$ 724.000 ap + 2 demonstration projects ICE works with work order of each project - equipment, manpower, human resource costs. Beneficiaries: 4 National parks + 10 communities + 2 demonstrative (Marine Park + Chirripó thic hydro photovoltais solar)
	Chirripó transport costs was elevated, all materials were moved by helicopter
	COMPONENT 5. Projects Evaluation methodology Technology balanced Portfolio - social assessment methodology, productive use, rural equity, etc. Solar, wind network costs. Multi-criteria selection methodology.
	Portfolio 8 pre feasibility studies
	Project outcomes were eased by institutional support; ICE supported them, consultancy companies always responded / TORs development delayed 2 years.
	 Some limitations due to: Internal administrative procedures Time for terms elaboration, signatures, etc. Times and movements (learning) not well calculated The Project officer in charge is only 1 person and had many people responsible Too much internal procedures / lot shared delay
	UNDP procedures are not so flexible Mrs. Julieta Bejarano, Legal Consultant, 10:30 am
Feb. 9	 The following aspects were discussed: Outstanding points of her work: 7200 Law goes up to 20 MW; its legislative reform is in the Legislative Assembly and law EG.

There was no follow-up to proposals at the Assembly. Waters Law from 42, regulatory authority Water concessions are given by MINAET for everything that wasn't 7200 and 7508, a legal gap remains for water concessions for generation. The law that allowed unions to generate up to 60 MW concessions matter was then closed. Administrative procedure description to process concession permits - Issue was detracted because these were minor projects and instead a series of legal opinions were requested. 6. Mr. Misael Mora, ICE National Coordinator, 12:30 pm Shared general information about the documentation previously submitted to consultants. Agenda was reviewed and details of the proposed field missions were finished. 7. Mrs. Gloria Villa, Energy Director (DSE), 2:30 pm The following aspects were discussed: Project in line with country's social and environmental policy guidelines and also energy aspects. **Project Evolution** There were delays in the Project's formulation due to changes in GEF mechanism. At the beginning it was only solar, and then all sources. GEF does not accept biomass. It was divided into 2 phases. The first phase was approved. UNDP procurement mechanisms are slow, subject to consultations, review in Panama, etc. Regarding purchases: prior to awarding a purchase, biddings and purchasing processes were repeated. There were also delays on GEF not available resources. Legal component: This work has allowed to visualize options and helped to clarify and raise ideas. As the definition of water resources management. Component of the information system. Equipment issue was punished. The system was integrated with existing systems. SIFER was within the information system platform (SIEN). It filled an existing gap. Other countries have used it. GEF wanted a regional information system.

	MINAET set the initial platform, staff, equipment, communications, and interfaces between servers.
	Education/information component: These tasks were moved to ICE.
	i.e.: seeking to save with materials. BUN-CA designed some materials. Authorization was requested to BUN-CA to use those materials and save resources.
	The Project has served to generate confidence that this kind of programs and projects. ICE had no tradition in carrying out this type of projects. How to design projects' cartels (contracts' terms of reference). How to implement projects.
	For example, the Distributed Generation Project (UEN public service + UEN planning), not-served populations update.
	8. Mr. Paul Wright G. Marketing and Sales Manager, Consenergy (PV
	Providers), 10 am
	The following are in the market since 1995: Siemens - Shell - Solar World equipments, distributors of: Morning Star, PIM Group - Mexico - Controllers, DC-DC, luminaries, Phocus. Batteries: EASTPENN distributor has lines DECCA, MK.
	A tender was made with three areas: (4 companies, but only two submitted equipment samples and were disqualified) for the North Zone (54 equipment - 165 Wp solar World 24 VDC, 150 Ah Gel, SS15-MPPT 15 A VDC, investor S300 300 WAC COTEK, 120 V AC, 60 Hertz, 4 PIM lamps (2 pin) and for the South Pacific, on the way to Quepos, Cerro Nara and Puntarenas Marine Park.
Feb. 10	There was a delay of 1.5 years, new customers - customers who were gone given the period extension, contract was for 211.500
	LAW 8829 IS A MODIFICATION TO LAW 7447 - RENEWABLE GENERATION SYSTEMS ARE EXEMPTED OF ALL TAXES
	UNDP made the payments / it was inconvenient that they had to consult in Panama.
	9. Mr. Luis Diego Ramirez and Mr. Jason Salazar, ICE field team, 2pm (RE Tool revision)
	98.8% territory ICE there is requests for customers that require electricity

	Client cost: according to IDB up to US\$ 3,000/client, in accordance to his experience is necessary to evaluate other criteria: potential development of the community, access way, community socio-economic level.
	Social points: new concept If has a school = 1 point If it has a high school = 1 Ebais (Integral Basic Health Equipment) = 2 points Gravel road= 1 point Dirt road = 0.5 Trail (bridle path) = 0.25
	Recommend improving the TORs design. Cost Estimations
	Clients/equipment quantity User geographical location/locality GPS Equipment inventory per user Payment all pay 1000 colones/month Currently charge rent not rate: ARESEP
	10. Mr. Jorge Pérez – Manager to DSE Systems. Tel. 22573662 Ext. 228 (TELECONFERENCE)
	To enter the system, should receive a password. Any request received. There is still few information entered.
Feb. 15	Application was expected to be of regional scope, when drew up and comment to colleagues from other countries, for national authorities of Guatemala, Honduras, El Salvador, Costa Rica and Nicaragua - in the Panama case there was not too much identification in this respect - with the others visited country by country, was in 2007.
	The structure was designed. A virtual training was established with a virtual training tool for technical contacts, password was given so to make catalogs (small tables where parameters of each country are located- fuels names), there were two training sessions and was an unsuccessful work because the Government is changing, there is no staff, and response has been almost non-existent.
	Jorge participated in the training, national contact, as well as Mr. Guillermo Lopez from ICE.
	DSE has no staff to do this, however it was committed with ICE to enter the information. When the system was about to finish, Mr.

	Perez had the responsibility to put this forward.
	There were two workshops: video conference in 2008. No nation has uploaded information despite the fact that they have called to contacts cell phones; they have committed but nothing.
	The software was hired to ADVANSYS - in JAVA and in database SQL Layer 1. Database. Layer 2 Programming Layer 3. Web layer Hardware-bought a 4 GB RAM Dell server, 1/2 Tb disk, it is set up on TOMCAT.
	11. Mr. Leonardo Ramírez, General Manager, Chirripó Consultores. (services providers, elaboration of feasibility studies), 4:30 pm
	It was a comprehensive work involving other specialists: other consultants: Gustavo Jimenez (wind and PCH) Agustin Rodriguez (market analysis and distribution network)
	There were two contracts for three feasibility studies: (Hydroelectric Project La Peña, Network Extension Project Nicoya-Lourdes farm and Wind Project Los Andes)
	The activities agreed in the contract were outdated in some cases due to implementation long period, Nicoya farm case - because it was staked and budgeted for network extension. In this case was a further justification to the Project.
	Intervention actions were carried out by Misael Mora – UNDP contract - periodic meetings with ICE and not with UNDP - presentation of invoices to ICE, its approval and invoices to UNDP (there is no IVA tax but there is an income tax).
	 Recommendations: Resources for pre feasibility and not feasibility would be better used. It is difficult to find anything other than photovoltaic to be profitable, not mini networks. Networks are well spread across the country as an isolated community have an autonomous generation system and be cheaper than grid extension.
Feb. 16	12. Mr. Luis Diego Ramírez, Mr. Jason Salazar and Mr. Misael Mora ICE implementing team, 4:30 pm (More thorough revision of RE tool,

	doubts clarification by the evaluation team).
	The system is mono user and is going to be multi-user. The technical team provided information to the consultant team, later ICE team validated the system by entering actual cases that they configured for specific technologies (grid, hydro, photovoltaic cases). There is currently much field information. They ran information on several occasions (about 10 cases per technology), specific verifications were made; 1 grid, hydro, PV and wind case to determine the analysis results- Validation tool.
	There were things that did not give the logical result because of technology i.e. it did not correspond to reality. Once the package was validated, a sensitivity analysis with real information from the sites was made.
	RE TOOL - is a recognition tool (serves to build the portfolio), then it will be brought to java platform multiuser level, Oracle database, so that it can be operated regionally.
Feb. 17	Presentation of first findings in UNDP (see power point presentation and assistance list in Annexes Section)

6.5 FIELD VISITS SUMMARY

6.5.1 Central Pacific

Visits were held to PVS installed at the following sites:

Cerro Nara (Quepos) and San Isidro de Dota (Prov. San Jose) February 11, 2011

PVS installed in this region are both from ICE's previous projects and GEF Project. The first vsystem visited is located at 23 km from of Quepos and the last one at 30 km. The grid goes from Quepos to km. 14.

The PVS installed are of two types: for individual and institutional residence (schools, communal halls). Individual PVS have the following elements:

- 165 Wp Module
- Switchboard with the following elements:
 - o 300 W inverter
 - Charge regulator
 - Battery of deep discharge gel 150 Ah
 - Power strip connections
 - o Breaker

• Metal Base to support the battery

It is convenient to note that the supplied components quality is good and the systems capacity is generous:

- The solar panel has a good capacity (165 Wp) as in many countries it is usual to install panels between 70 and 100 Wp, so this panel has twice the capacity of those installed in other countries for homes.
- The inverter is equally generous: 300 W.
- The battery has good capacity (150 Ah) against to what is installed in other countries for home applications (100 Ah) and the battery is of maintenance-free sealed gel.
- Charge regulator is equally of good capacity (10 A).
- The components on the switchboard are well mounted
- The battery base is strong.
- The systems are generally well installed.

Figure 6-1 shows a PVS installed in a home in San Isidro de Dota, with its components and with ICE's invoice and payroll inspection and maintenance record images.

Visits were also made to the school and communal hall; systems that could not be inspected because they were closed. These systems were installed by GEF-ICE-DSE program. There are 2 systems, each one of 2 module (165x2=230 Wp), and inverters of 600 W, duly registered in ICE database, and whose installation date was October 2009.

Figure 6-1. <u>PVS home type – San Isidro de</u> <u>Dota</u> <u>USER: Saturnino Acosta</u> <u>Visit Day: Feb 11, 2011</u>



Solar Module of 165 Wp.



ICE's Invoice in Colones 1000.



Switchboard with Inverter of 300 W (upper left), charge regulator (upper right), connexions power strip (center) and breaker (lower left). Battery of 150 Ah of deep discharge gel, mounted on a methalic base.



System Inspections Record by ICE.

<u>Playa Hermosa Turtle Reserve</u> February 12, 2011

Manager: Belfort Cubillo Cell 88 91 6522

There are two installed PVS in this turtle reserve by GEF program. Both systems are registered in ICE database, with a total installed capacity of 600 Wp.

The manager was very satisfied with the PVS performance and recognized its value for the turtle reserve work.

Puntarenas Pacific Marine Park February 12, 2011

This PVS is part of UNDP-GEF program and has demonstrative – educational purposes.

Consists of:

- 660 Wp PVS
- Batteries Bank of 4x150 Ah
- 2 kW Inverter

The day of the visit, the system was not completed, was not operational and still lacking to:

- Install a 1 kW wind generator
- Install a computer and a large screen.

The system is expected to be completed during the month of March 2011.

Figure 6-2. <u>PVS Tortugario Playa Hermosa –</u> Jaco (Playa Hermosa Jaco Turtle Reserve)

Visit Day: Feb. 12, 2011

Manager: Belfort Cubillo Celular 88 91 6522



System #1. Solar Modules Arrangement



System #1. Switchboard with inverter of 2 kW, regulator, breakers, connexions power strip and outlets



Gel Battery of 150 Ah deep discharge, mounted over a methalic base. – Note ICE PNUD installation date June 28, 2010



System #2. System Switchboard

Figure 6-3. Pacific Marine Park – Puntarenas

<u>Visit Day</u>: Feb. 12, 2011 Administrator: Flor Lemus Celular 88809282



Solar Modules Arrangement (4x165=660 Wp)



<u>View of Switchboard with Outback Regulator</u> (upper left), 2 kW inverter (upper right), batteries bank



Marine Park - Center Descriptor



House where information center on renewables will be established

6.5.2 Atlantic

<u>Altos de Pacuare Reserve (Batán, Prov. Limón)</u> February 13 and 14, 2011

The Barra Pacuare bearings

PVS visited in three different places:

- Laguna Madre de Dios (10° 12.395' North, 83 ° 16. 335' West). the Ebais and the lodge has 2 PVS.
- Subsequently visited the school and three PVS from individual users in Bocas of Pacuare.
- Finally visited the tortugario in the neighbourhood.

All these PVS were installed by ICE, some since several years ago.

We have the following conclusiones for these visits:

Users satisfaction

- Users are satisfied with the systems and appreciate them because they provide energy at a very low rate (US\$ 2/month).
- Recognize that employing other lighting systems would be much more expensive.
- In cases when there were problems, they have had difficulty communicating with maintenance personnel.
- ICE maintenance personnel is qualified.
- Several have expressed that they would like to have more power. Since they already have a PVS supplied by ICE, then the solution is to buy in a particular level and this becomes in high costs for users.
- ICE standard PVS are generous in capacity (165 Wp) and supplied AC unlike many nations where the power is less than 100 Wp and are generally only DC 100 Ah batteries (ICE: 150 Ah).

Figure 6-4. Altos de Pacuare Reserve (Batan) <u>Visit Day</u>: Feb.13 and 14, 2011



EBAIS PVS



Lodge PVS



ICE Technician providing maintenance to a PVS



School with solar energy (modules on the other side of cover)



Tortugario Mondonguillo – ICE and private Solar Modules

6.6 LIST OF REVIEWED DOCUMENTS

TABLE 0-1. PROJECT DOCUMENTATION

File #	Name of Document	Date	Author 1	Type Document
1	Auditing Dec. 01532	Dic-01		Auditing
2	BRIEF	Mar-02	ICE	Brief
3	Spanish brief word	Mar-02	PNUD	Brief
4	Spanish BRIEF PDF	Mar-02	PNUD	Brief
5	Spanish brief word doc	Mar-02	PNUD	Brief
6	Spanish brief word docx	Mar-02	PNUD	Brief
7	Costa Rica final brief 04-09-2002 English	Mar-02	PNUD	Brief
8	3 CLEP 34921	Nov-03	PNUD	
9	CONACE Meeting	May-04	CONACE	
10	4 Summaries Installed Capacity photovoltaic panels ICE	Dic-04	ICE	Product
11	4 PRODOC Rural Electrification Project	Dic-04	UNDP	PRODOC
12	6 II phase cancellation	Mar-06	ICE	Cancellation
13	PIR July 2005-June 2006	Jul-06	UNDP	PIR
14	6 UNDP Rep 06	Ago-06	ICE	Report
15	6 UNDP Rep 06001	Ago-06	ICE	Report
16	Annexes PIR 2006	Oct-06	UNDP	PIR
17	7 Funding Scheme SUMMARY	Jan-07	Betancourt / Consultant	Product
18	7 Organizational Scheme SUMMARY	Jan-07	Betancourt / Consultant	Product
19	7 Financial Workshop	Jan-07	UNDP	Product
20	Funding scheme SUMMARY	Jan-07	F Betancourt / Consultant	Product
21	Organizational Scheme SUMMARY	Jan-07	F Betancourt / Consultant	Product
22	Financial Workshop	Jan-07		Product
23	7 workshop memory	Mar-07	Torres, Betancourt, González / Consultants	Product
24	Labor Report 28.03.2007	Mar-07	ICE	Report
25	QOR Jan-Mar 2007	Mar-07	UNDP	QOR
26	Workshop memory consultants Betancourt, Torres, González	Mar-07	Torres, Betancourt,	Product
27	PIR July 2006-June 2007	Jun-07	UNDP	PIR
28	New image Meeting Project	Ago-07		ICE
29	7 PNER Report (Modified x Ale)	Sep-07	ICE	Product
30	Report to UNDP 07 (1)	Oct-07	ICE	Report
31	CD-ICE - RE TOOL	Nov-07	ICE	Product
32	7 Project Budget 12-11-2007	Dic-07	UNDP	
33	7 Report to UNDP 07 damaged	Dic-07	ICE	
34	Project Budget 12-11-2007	Dic-07	UNDP	Budget
35	8 Legal Barriers (jbh) March 9 2008	Jan-08	Bejarano / Consultant	Product
36	Auditory Report 07537	May-08		Auditing
37	9 28 June Steering Committee Presentation UNDP- GEF	Jun-08	ICE	
38	SIFER User Manual	Jun-08	DSE	Product
39	SIFER User Manual	Jun-08	DSE/Consultant	Product
40	PIR July 2007-June 2008	Jul-08	UNDP	PIR

(Continuación)

41	Tripartite Meeting, Nov 2006	Nov-08	UNDP/ICE/MINA ET	unión T
42	9 Budget and Execution, 2009	Jan-09	UNDP ?	Budaet
43	9 Summary performed and available	ene-09	UNDP?	Budget
-	9 PIR 2009 Monserrat Form		-	J
44	1322_Climate_Change_Mitigation_EXCEL_2007 (3) Changes by Misael 29-9-2009	Jan-09	UNDP	PIR
45	Final Audit Report 08533	Jun-09		Auditoria
			Sosa, Carrillo y	
46	Audit Report 07537 Year 2007	Jun-09	Asociados,	Auditoria
			Auditores	
			Sosa, Carrillo y	
47	Informe Final Auditoria 08533 Año 2008	Jun-09	Asociados,	Auditoria
			Auditores	
	9 PIR 2009 Monserrat Formulario			
48	1322_Climate_Change_Mitigation_EXCEL_2007 (3)	Jul-09	UNDP	PIR
	Changes by Misael 29-9-2009			
49	newimage	Aug-09	ICE	Acta Reunión
50	9 00034921 - Expenditures 2009 CDR – Rural Electrificació	n Dec-09	UNDP	
51	9 CDR modified- Rural Electrification	Dec-09	UNDP	
52	9 docs - consuntants	Dec-09	ICE	
53	9 GEI 2008v2	Dec-09	ICE	GEI
54	Budget and Execution 2009	Dec-09	ICE	Presupuesto
55	10 Project Extention Request	Jan-10	ICE	
56	10 AWP Rural Electrification	Jan-10	UNDP	
57	execution 1 accumulated to 2009	Jan-10	ICE	
58	Budget Execution_accumulated to 2009	Jan-10	ICE	
59	10 feasibility studies Lourdes Farm Nicoya	Feb-10	CHIRRIPO CONSULTANTS	Product
			CHIRRIPO	
60	10 lapeadegolfitoylosandesdelacruz	feb-10	CONSULTANTS	Product
61	10 POA2010 con firma revisión 13 de febrero	feb-10	PNUD	POA
62	9 00034921 - CDR 4QTR 2009 - Electrificacion Rural	mar-10	PNUD	Report
	9 Audit UNDP RURAL ELECTRIFICATION 2010		Sosa, Carrillo y	
63	Provided by Misael Jason and Alexandra includes	abr-10	Asociados,	Audit
	Directors review		Auditores	
64	Informe abril 09	may-10	ICE	Report
65	10 PIR 1322 - UNDP_GEF_ST_2010_V11_CCMitigation	jun-10	UNDP	PIR
66	10 PIR 1322 Costa Rica-CC-LAC_ PIR 2010 30 Aug RCU últimas adiciones Misael 29 set.	jun-10	UNDP	PIR
67	10 PIR 2010	jun-10	UNDP	PIR
68	11 Notifice of DVD's to BUNCA	ene-11	ICE	Product
69	SFV INSTALLED SINCE 1998 TO NOV 2010	ene-11	ICE	Report
70	IUCE BD Docs Feb 15 2010	feb-11		Data Base
71	DVD's to BUNCA	feb-11		DVDs
72	UNDO Officers in charge	feb-11	UNDP	
73	4 Videos ICE		ICE	Product
74	Audit Dic 01532			Audit
75	Cancellation of Phase II			
76	Churripo Capitalization			
77	Clínica y Escuela Roca Quemada			Foto
78	Llave en mano - Ofertas Consenergy			Cotización
79	Manual MC Hidroeléctricas ICE			
80	Manual MC Hidroeléctricas ICE_2			

81	Prodoc Spanish docx		UNDP	Prodoc
82	Rural Electrification Program UNDP-ICE-GEF (SUMMARY)		ICE	Report
83	Rural Electrification Program UNDP-ICE-GEF (SUMMARY FOR DON CARLOS LÓPEZ)		ICE	Report
84	Internet test in Ximiriñak.PSF		ICE	Product
85	Re-component 4subcontract5designpurchaseinstallation			
86	Common travelled	Sep-07	ICE	Product
87	Summary ICE Photovoltaic panels installed capacity		ICE	Report
88	Summary executed and available		ICE	Report
89	Travelled Summary	Sep-07	ICE	Product
90	Photographic Register	Oct-08	ICE	Product
91	Turnkev		ICE	Quotation
92	Internet test in Ximiriñak.PSF		ICE	Product
93	Travelled Summarv		ICE	Product
94	Combined Delivery Report by Activity with Encumbrance	Jan-10	UNDP	Budget
95	Combined Delivery Report by Activity with Encumbrance	Mar-10	UNDP	Budget
96	Combined Delivery Report by Activity with Encumbrance	Mar-10		Budget
50	Project 00034921 – Rural Electrification – Expend from		UNDI	Laugu
97	January 1 to September 30 2009 - CDR	Jan-10	UNDP	Budget
98	00034921 – Rural Electrification Project – Expenditures	Mar-10	UNDP	Budget
	January 1 to December 31 2009 - (CDR Official)			
99	Initial delay			Report
100	Auditory Final Report 2009	Jun-10	UNDP	Report
101	Participants List SFV Course		ICE	Product
102	Isolated Rural Communities Prone to Renewable Electrification in Costa Rica	Feb-07	José Torres	Presentation
103	Combined expenditures Report 2008	Mar-09	UNDP	Report
104	Combined expenditures Report 2009	Mar-10	UNDP	Report
105	Participants Workshop on proposed models for rural electrification projects implementation with renewable energy and financing schemes		ICE	Product
106	Project 00034921 – Rural Electrification - Expenditures	Feb-10	UNDP	Budget
107	Register list Workshop on proposed models for rural electrification projects implementation with renewable		ICE	Product
108	energy and financing schemes Dynamic Workshop on proposed models for rural electrification projects implementation with renewable		ICE	Product
109	energy and financing schemes	lan-07	Betancourt /	Presentation
103	COMPONENT II – Feasibility Studies and Models		Consultant	Report
110	For Communities off-grid	Jun-10		Report
112	Budgets and Activities 2007	Dec-06	UNDP	Report
112	Combined expenditures Report 2009 (CDRs) Project 000	lan_10		Penort
114	Evaluation of Financial and Organization Schemes	Apr-07	UNDP	Report
115	Evaluation of Financial and Organization Schemes	Apr-07	UNDP	Report
116	Characterization of Projects and Organization Schemes	Jan-07	UNDP	Report
117	Evaluation of Projects Financial and execution Schemes	Jan-07	UNDP	Report
118	PROJECT INVENTORY 2008 ADDENDUM -	Jan-09	ICE	Report
119	Workshop Memory – Communities characterization evaluation of projects funding and execution schemes	Mar-07	UNDP	Report
120	Meeting Minute No.: 02-2007-UNDP	May-07	UNDP	Report

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121	Project Metrics for Climate Change Indicators	Jan-11	UNDP	Report
122	Project Metrics for Climate Change Indicators	Jan-10	UNDP	Report
123	Execution Report	May-10	ICE	Presentation
124	Workshop on Projects execution and funding schemes Proposed models	Feb-07	PNUD	Report
125	Results			Report
126	Installed SFV December 2010 Don Jesús	Jan-11	ICE	Report
127	BRIEF_ National off-grid electrification programme based on renewable energy sources	May-02	UNDP	Report
128	PRODOC_ National off-grid electrification programme based on renewable energy sources	May-02	UNDP	Report
129	PRODOC Summary National off-grid electrification Programme based on renewable energy sources	May-02	DSE	Report
130	Analysis of energetic legislation related to Renewable energy and changes inclusion	Jan-08	UNDP	Report
131	Proposal of mechanisms to be implemented to establish An information on renewable energy sources regional web (Central American Isthmus)	Jan-07	ICE	Report
132	FORTH PRODUCT – Preliminary Version Appendix II – User Manual	Feb-07	INCAE-CLACDS	Report
133	Evaluation of Funding and Organization Schemes	Apr-07	UNDP	Report
134	51 Projects Evaluated		ICE	Report
135	FORTH PRODUCT – Versión Preliminar Apéndice I – Memory and Calculation Methodology	Feb-07	INCAE-CLACDS	Report
136	FORTH PRODUCT – Preliminary Version Appendix II – User Manual	Feb-07	INCAE-CLACDS	Report
137	FIRST PRODUCT	Feb-07	INCAE-CLACDS	Report
138	SECOND AND THIRD PRODUCT	Feb-07	INCAE-CLACDS	Report
139	FOURTH PRODUCT	Feb-08	INCAE-CLACDS	Report
140	FOURTH PRODUCT FINAL REPORT	Apr-08	INCAE-CLACDS	Report
141	57 PROJECT PRIORITIZATION RESULTOS		ICE	Report
142	Methodology for evaluation of rural electrification Options with renewable energy sources (Projects portfolio) - Component I: Analysis, selection and prioritization Methodologies	Apr-08	INCAE-CLACDS	Presentation
143	Localization, field information gathering for National off-grid electrification programme based on renewable energy sources	Sep-07	ICE	Report

STAKEHOLDERS COMMENTS

The period during which the comments were received was from March 18 to April 28, 2011.

6.5.3 ICE AND MINAET-DSE COMMENTS

During March 18 to April 28 period, electronic mails were received with additional information, comments and documentation mainly related with meetings carried out, lists of participants in training workshops and the number of projects executed, information that has been incorporated in the text of the final report.

The report of March 18, 2011 was also received with comments *made on one side of the electronic document* by the Alternate Project Manager, Engineer Alexandra Erias, and notes in the same text by

the National Project Coordinator, Engineer Misael Mora, and by the Technical Director of the Energy Sector Directorate, Engineer Nobelty Sanchez.

Due to the fact, that the comments were made on one side of the Word text, a digital version was performed with the comments and the corresponding answers given by the consultants.

6.5.4 UNDP COMMENTS

Most of the comments received by the Implementing Agency as for the Executing Agency were made directly to the text from the draft sent by the Consultant Team on March 24, 2011. All comments were followed and some of them gave place to modifications in the Report that have been incorporated in the final version.

The comments and observations that were not included directly into the text, but were introduced separately, are included with their respective answers as follows:

6.5.4.1 From the Office of the Regional Climate Change Mitigation Technical Advisor

Note: The original texted received is in Blue.

"Dear Colleagues:

I am submitting the comments to the Report made by the Panama Regional Unit:

1 -It is necessary that the Evaluator and the Project Coordination Unit totally agree that the data presented in the evaluation is the best information available for the Report. If there is any disagreement concerning the data, or some additional information that can be useful for the evaluation, this is the right moment to mention it so it can be considered in the final version.

R. As to unify the information received by the Project Coordination Unit, the Evaluating Team not only checked the information again but also included new references such as the last training workshops carried out in March and April 2011.

2 – Concerning monitoring, it is important for the Evaluation Document to reflect very clearly, which are the requirements of this monitoring that were accomplished and which were not accomplished. This applies for UNDPs monitoring as implementing agency, as for ICE as executor. Each one of these agencies has their monitoring role and it is important to reflect the accomplishment of both processes. Likewise, it is requested to clarify the discrepancies highlighted by ICE's comments, in which they inform that the annual tripartite meetings were carried out, even though the evaluations suggested they were not made. It is requested to clarify if in the perception of the evaluators there was lack of compliance in the monitoring process, a low quality of the same, or lack of the appropriate documentation.

R. Concerning the monitoring subject, and to unify all the references sent from ICE as from UNDP the evaluating team elaborated a new table shown in section 3.2.2 as Table 3-4: Monitoring Activities, which includes the monitoring processes mentioned in Prodoc and the activities carried out under this subject during 2004-2011. Results of this analysis considered that the monitoring and evaluation of the Project was SATISFACTORILY MODERATE and NOT UNSATISFACTORILY MODERATE, as exposed in the previous version (draft submitted on March 24)

3 – The lessons learned section expose a series of learning points for UNDP and GEF, which are appreciated as implementing agency. Considering that the beneficiary of this Project is the country, it is suggested to the evaluators to expand the section of lessons learned for the national counterparts. R. These were included in section 5-1

4 – The qualifications given by the counterpart are well justified, in almost every component.
However, more clarity and precision in the evaluation justification is also requested to the evaluators in order to achieve Objectives and Results. This chapter presents a lot of information, but it is not clear to the reader, which are the key elements that determine the evaluator's qualification.
R. It was introduced previously to the qualification (Section 3-3.1). The next paragraph recaps the reasons, for why the MODERATELY UNSATISFACTORY qualification was provided:

Although the *Project reached the global objective to reduce emissions*, it installed many PVS (although several are still pending installation), it proposed and promoted changes and legal and regulatory amendments that have not been implemented in government institutions (activity outside consultants management). Besides other achievements, *the fundamental lack of an evaluation on the demonstrative projects still exists*. This will allow to clearly establishing (from a technical, financial, environmental, operational and organizational point of view) the goodness of given technologies, basic argument for the massive adoption of these technologies, that should have been reflected in "A Rural Electrification Plan to specify the number of sites to be electrified with RE, published at the end of Phase I". The plan has not been publish up to the date of this Report. Although the above is a fundamental deficiency, others of less importance have been noted, such as SIFER's lack of operation, the non-existence of national technical norms on Renewable Energy sources and the systems acquired with GEF resources that are pending installation.

5 -It is requested to ICE and/or UNDP Costa Rica to explain the evaluators comments concerning the solar system inventory bought with GEF resources. If these were not covered by the corresponding audits, the appropriate documentation has to be presented in order monitor the purchase and use of the systems.

R. It does not correspond to the consulting team to answer observation 5.

It is requested to the evaluators to include an annex that have all the commentaries receive to the proposal, and the given actions that correspond. It is important to stand out that the incorporation of commentaries stays on the evaluators' judgment, standing as independents. If the evaluators considered that some commentary is not relevant or should not be incorporated in the evaluation, this must be written in this annex.

R. It is included as section 6.7 from the Final Evaluation

Best Regards,

Oliver Page"

6.5.4.2 From UNDP Costa Rica

Note: The original text received is in blue.

"We share the comments of our RTA, Oliver Page, and we make some additional contributions in the enclosed document and below. Thank you!

1. We would like to insist in the importance of considering all the information provided by the Project during the evaluation mission as a result of the first review of the version for the evaluation report comments. Some of this information can help clear related subjects with the Project monitoring and evaluation.

R. We have written and made the respective inclusions especially in the Monitoring subject. The assessment that was given was reassigned resulting in a better qualification to this section.

2. Please retake recommendation from RTA of reviewing the evaluation concerning the objectives and results range. It is important to retake the qualifications obtained in the PIRs. CO does not coincide with the qualification of "marginally satisfactory". Although the Project confronted difficulties in its execution, these were surpassed, the goals reached and the initiative had a definitive impact in the institutional appropriation for the need to ensure the use of Renewable Energy systems in areas not covered by the network. Our qualification would be, as indicated in the PIRs, "satisfactory".

R. Section 3.3 justification has been extended: The outcomes scope and objectives achievements to clarify key results that sustain the qualification.

The evaluating team included the new qualification scale in the section presented March 24, according to the explanation included in section 1-1 of this report.

3. Concerning the tripartite meetings we have been informed that they were discontinued as mandatory practice in CO projects.

R. We have taken note and the information is shown in Table 3-4 of this report.

4. There is an inconsistency in the report concerning the initiative's sustainability, which was indicated in the text.

R. We have taken note and enlarged the text in the section 3.3.3 of this report.

5. Please check if Prodoc demands reports of advance or final to the Project. If it is not like this, this aspect cannot be considered in the evaluation as a non-fulfillment from the initiative part.

R. As indicated in the section: Part IV. Prodoc Monitoring and Evaluation Plan (clause f) Project Final Report, This report must be presented during the last three months of operation. This report will recap all the activities, goals, program products, lessons learned, objectives accomplished and not accomplished. (Page 21)

6. Please, check the document's wording.

R. We took note and improved this aspect.

7. Please check that recommendations in the Executive Summary are the same ones as in the report.

- R. We took note and improved this aspect.
- 8. Please remember that the Executive Summary must be submitted in English.
- R. It is included in the final version.

6.5.5 Answers to Comments from ICE and MINAET-DSE

ICE and MINAET-DSE comments were performed in the report's text. Observations were answered by the evaluating team in the same report. Some of them gave place to modifications in the report that have been incorporated in the final version.

Due to the fact, that the comments were made on one side of the Word text, a digital version was performed with the comments and the corresponding answers given by the consultants. This version can be found in the DVD that contains the Project information.

Regarding additional documents received after submission of the evaluation report preliminary version, the evaluation team received from the Project Coordinator close to 20 emails with additional information, observations, complimentary documents and photos about different subjects. Most of this emails sent on March 28, 2011 refer to tripartite meetings or DNP meetings (5 emails) and to the elaboration and presentation of progress reports prepared by ICE (7 mails). All reference documents with achievement dates between December 2004 and April 2011 were taken into account by the evaluators as complimentary information obtained from the Project.

The last emails with dates April 25 and May 6 regarding the training subject carried out by ICE, were also incorporated as shown in Section 3.2.5 of this report.

6.5.6 DVD WITH COMPLETE REPORT

Contains the reports and all the Project information.

This DVD will be enclosed in the final printed version.

LAST PAGE OF THIS REPORT