Evaluation Design
MCC El Salvador

Performance Evaluation of the Solar Panel Component of the Rural Electrification Sub-Activity

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List of Acronyms

ADESCO	Asociaciones de Desarrollo Social Comunitario
CNE	Consejo Nacional De Energía
ERR	Economic Rate of Return
FISDL	Fondo de Inversión Social para Desarrollo Local
FUSADES	Fundación Salvadoreña para el Desarrollo Económico y Social
GOES	Government of El Salvador
HOH	Head of Household
IE	Impact Evaluation
IRB	Institutional Review Board
KI	Key Informant
KII	Key Informant Interview
kWh	Kilowatt Hour
LOE	Level of Effort
M&E	Monitoring and Evaluation
MCC	Millennium Challenge Corporation
PE	Performance Evaluation
PV	Photovoltaic
RE	Rural Electrification
SI	Social Impact, Inc.
SPS	Solar Power Systems
USD	United States Dollar

Table of Contents

Tables and Figures

Introduction

Social Impact (SI) is pleased to present this Inception Report to the Millennium Challenge Corporation (MCC) in response to their request to conduct a performance evaluation (PE) services of the off-grid solar panel component of the Rural Electrification (RE) Sub-Activity of the MCC El Salvador Compact's Community Development Activity. The purpose of this report is to provide a detailed design for the PE of the Sub-Activity of this component.

The report has ten main sections: 1) Overview of the MCC Compact; 2) Overview of the RE Sub-Activity; 3) Overview of the Solar Panel Component; 4) Economic Rate of Return (ERR) and Beneficiary Analysis Program Logic; 5) Literature Review; 6) Evaluation Design; 7) Data Sources; 8) Analysis Plan; 9) Administrative; and 10) References.

1. Overview of the MCC Compact

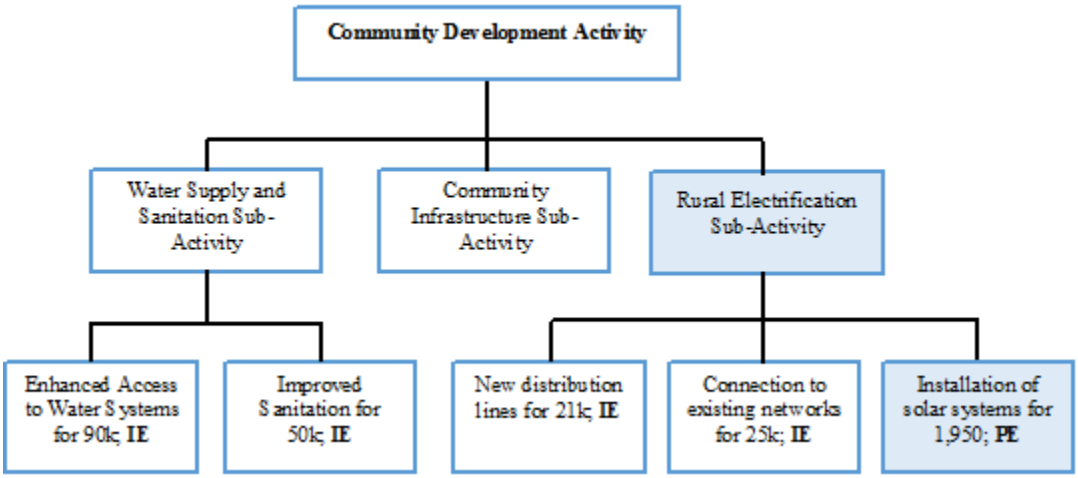
In November 2006, MCC signed a five-year, 461 million United States Dollars (USD) Compact with the Government of El Salvador (GOES) to improve the lives of Salvadorans through strategic investments in education, public services, agricultural production, rural business development, and transportation infrastructure. The GOES set up a management unit called FOMILENIO to implement the Compact from September 2007 to September 2012. Throughout this period, FOMILENIO was responsible for coordination across public agencies, contractors and consultants, and was ultimately responsible for the successful execution of projects within its portfolio.

The MCC El Salvador Compact included three objectives aimed at advancing economic growth and poverty reduction in the Northern Zone of El Salvador:

1. Increased production and employment in the Northern Zone
2. Increased human and physical capital of the residents of the Northern Zone to take advantage of employment and business opportunities; and
3. Reduction in travel cost and time within the Northern Zone, with the rest of the country, and within the region.

The second Compact objective was addressed by a "Human Development" project, which included an Education and Training Activity, as well as a Community Development Activity. The Community Development Activity was comprised of three Sub-Activities, as depicted in Figure 1 below.

Figure 1: MCC El Salvador Community Development Activity Overview



2. Overview of the Rural Electrification Sub-Activity

Under the Community Development Activity, the RE Sub-Activity of the Compact had three components: the construction of new grid distribution lines for 21,000 households, connection to existing networks for 25,000 households, and the installation of 1,950 household solar power systems (SPS).

The targets under this Sub-Activity supported the GOES commitment to improve energy access to rural families that previously did not have electricity service. Prior to this initiative, El Salvador had managed to provide electricity to around 70 percent of its population, with energy services provided only to major centers of population and peri-urban households.

Large areas, including some of the poorest rural communities located in the Northern Region of the country, did not have access to electricity at the time of the project's inception. Census data from 2011 suggested that social and economic indicators in the Northern Region were far below the national average, with 48.4 percent of the population classified as poor and 18.7 percent living in conditions of extreme poverty.[2] In 2006, through the support of the RE Sub-Activity of the MCC El Salvador Compact, the GOES sought to close this gap through wide-scale grid extensions and the provision of photovoltaic (PV)-based residential standalone power systems.

At the conclusion of the project, the grid-based component of the RE project installed 1,500 kilometers of new grid infrastructure that connected and supplied electricity to 37,000 rural households. This included connecting over 10,000 households to existing networks via low voltage extensions. The final total cost of the electrification Sub-Activity reached 30.9 million USD. Average cost per kilometer associated with the construction of the grid came to 15,839 USD.[3] SI conducted a separate impact evaluation (IE) of this grid component.

Where grid-based connections to households were not economically viable due to limited population density and lack of proximity to a grid, the project elected to supply 1,950 PV solar panel systems (at no cost to beneficiaries) in order to provide families with a minimum level of electricity. The design of this component included a training activity and support network to ensure the long-term sustainability of these systems.

3. Overview of the Solar Panel Component

This PE focuses on the solar panel component of the RE Sub-Activity. The original intervention goals for this component included:

- Installation of approximately 950 SPS.
- The provision of technical assistance via regional community development agencies also known as Asociaciones de Desarrollo Social Comunitario (ADESCOs) to create local community associations designed to support long term SPS operation and maintenance.

For an overview of the program logic, see Section 7.2.

The solar panel component of this Sub-Activity had an original target of 950 households. Ultimately, FOMILENIO provided an additional 1,000 households with SPS due to economies of scale, decreasing prices of PV systems, and high demand. The installation of these systems took place in two phases from 2009 to 2010. The first phase was designed to install a total of 950 SPS. This initiative was implemented in two parts due to FOMILENIO's interest in gaining direct experience with technology and field logistics. The first sub-phase saw the installation of 300 SPS with each system costing roughly 1,200 USD per household. The second sub-phase installed the remaining 650 systems. Due to efficiencies in installation

[2] Impact Evaluation of MCC Compact in El Salvador, Rural Electrification Sub-Activity, 2017
[3] Impact Evaluation of MCC Rural Electrification Sub-Activity, November 2016

costs, the project during this period secured a savings of approximately 400 USD per system, indicating that the total cost per system amounted to 800 USD.

For the second phase, due to economies of scale and savings on key components such as PV panels, the marginal costs of installing additional systems fell substantially, ultimately dropping to 600 USD. Due to these savings, the RE Sub-Activity was granted additional funding which enabled the installation of an additional 1000 SPS.

The initial targeting methodology for beneficiaries of SPS was based on formulas applied by FOMILENIO in which they identified the least-cost solution by comparing cost per km for the grid, total population at the grid node (within 200 meters), and total cost to install a solar panel system. Ultimately, all SPS beneficiaries were located in sparsely populated areas and far too distant from each other to justify connecting non-proximal households to the grid. Resultantly, FOMILENIO delegated individual beneficiary selection to leaders in the targeted communities—specifically, to either mayors' offices or ADESCOs.

Throughout the installation process, the project was accompanied by training and project information supplied by FOMILENIO as well at technical staff from each system supplier (Tecnosol, Tecnosolar, and SEESA). This effort was also accompanied by the presence of representatives from ADESCOs. This component was key to the project, as these entities were supposed to supply support for the creation of community-based organizations that would represent end users if and when operation and maintenance issues arose.

Although this PE will not be able to determine causality between the SPS intervention and macro-level economic impact as defined by the Compact objectives, it will attempt to answer questions relating to the implementation, sustainability, perceived impact, and lessons learned stemming from this work.

4. Economic Rate of Return and Beneficiary Analysis

At the project's closing in 2012, MCC calculated an ERR of 19.4 percent for the grid component of the project (not including Compact administrative costs) and estimated an ERR of 18.4 percent for the solar panel component. Calculations that drive the ERR for both can be found in the IE final report of the grid component of the project.

Based on an analysis of energy costs before and after the project's intervention, the report predicts an estimated savings of 100 USD per year per household when these are connected to the grid and approximately 70 USD per year when they are provided with SPS.

Monitoring and Evaluation (M&E) benchmarks which accompany these assumptions are as follows:

- Households without electricity spend money on candles, batteries for lamps, and kerosene to obtain alternative energy sources to light houses. This cost is typically in the range of seven to 12 USD per month.[4]
- The average consumption of electricity by solar powered households will increase from 3.1 equivalent kilowatt hour (kWh) per month to 10.9 kWh per month.
- The price of electricity will decline from 2.57 USD equivalent kWh before the project to 0.69 USD per kWh for solar powered households.

[4] In a World Bank report that summarizes findings of a nationally administered survey of rural household energy use in Peru, Meier et al found that total monthly expenditure on alternative energy sources overall is 25.1 soles, or roughly 7.73[4] USD (source: https://www.esmap.org/sites/esmap.org/files/ESMAP_PeruNationalSurvey_Web_0.pdf)

The PE of the solar component will not attempt to re-calculate these results, but rather will explore the extent to which the assumptions used for this calculation have held true over time and what other factors contributed to the ERR.

5. Literature Review

According to the International Energy Agency, approximately 1.2 billion people worldwide lacked access to electricity as of 2014[5]. As such, it is apparent that there are significant improvements to be made in terms of providing nearly a fifth of the global population with access to power, especially considering the positive outcomes in health, education, and consumption that have accompanied electrification in previous empirical studies. This review provides background on the development of RE in El Salvador and synthesizes literature on the positive externalities of PV system installations across various development contexts.

In El Salvador, while the national electrification rate is 93.7 percent[6], the Consejo Nacional De Energía (CNE) estimates that 120,000 families in remote areas are still without electricity, indicating a significant disparity in electricity access between urban and rural communities[7]. In fact, the electrification rate in urban areas of the country is 99 percent, while RE is stagnated at 72 percent[8]. In order to address this disparity and provide equitable, affordable, and technically secure electrification solutions, the GOES invested approximately 60 million USD in RE projects between 1999 and 2005[9]. As a result, a 4,000-km electricity distribution network was constructed "with the purpose of benefitting more than 100,000 families with electricity" and "increasing rural electricity coverage from 61percent to 72 percent"[10]. CNE continues to prioritize investment in increasing the electrification rate, and many RE projects in the country have been managed by Fondo de Inversion Social para Desarrollo Local (FISDL), a GOES agency dedicated to local development and poverty eradication.

In locations that are not fitted with an electricity distribution system (such as rural villages and hamlets in El Salvador's Northern Region), small-scale standalone household PV systems have been identified as a good alternative for achieving electrification. Early experience with this technology dates back to 2004 when SEESA, a Salvadoran solar energy supplier, delivered over 400 PV systems, most of which were funded by E+Co, an American nonprofit organization that invests in clean energy enterprises across the globe. The number of solar PV systems in El Salvador as of 2012 can be found in Table 1 below (CNE).

Table 1: Number of Solar PV Systems in El Salvador[11]

Application	Number of Systems	Installed Capacity (Watt Peak)
PV Pump	21	9695
Solar PV	2950	287,956

[5] International Energy Agency. "Energy Poverty." *Energy Poverty*. IEA, 2016. Web.
[6] World Bank Group. "Access to Electricity (% of Population)." *World Bank Global Electrification Database*. World Bank, 2012. Web.
[7] Consejo Nacional De Energía. "Electrificación Rural." *Electrificación Rural*. Consejo Nacional De Energía, 25 June 2010. Web. 01 Feb. 2017.
[8] Reegle Clean Energy Info Portal. "El Salvador Clean Energy Profile." *Reegle - Clean Energy Information Gateway*. Reegle, 2010. Web.
[9] Mayora De Gavidia, Ministry of Economy, Yolanda. "Guidelines of the National Energy Policy of El Salvador." El Salvador, San Salvador. Web.
[10] ibid
[11] The Republic of El Salvador Consejo Nacional De Energía. *The Project for Master Plan for the Development of Renewable Energy In The Republic of El Salvador*. Rep. The Republic of El Salvador Consejo Nacional De Energía, Mar. 2012. Web.

Application	Number of Systems	Installed Capacity (Watt Peak)
Grid-connected PV	12	163,940
Street lighting	246	15,090
Drinking water	2	280
Radio communication	15	n/a
Telecommunication	6	n/a
Total	**3252**	**476,961**

In addition to their relatively low environmental impact, various studies have shown that PV systems have acted as a driver for positive outcomes across many sectors of development. While the vast majority of RE is for residential use, research has also shown that the provision of PV systems in remote areas can increase micro-business development and other productive activities. For example, Glemarec found that an additional household income of approximately 900 USD can be obtained from productive use following electrification[12], and more specifically, a study in Ghana found that an additional income of 12-15 USD per day could be earned in grocery stores due to solar PV lighting[13]. Furthermore, the Agency for Agrarian Development in Chile replaced approximately 1400 fossil fuel-powered pumps with PV water pumps, allowing rural farmers to irrigate their crops with very low operations and maintenance costs and indicating that the benefits of rural PV electrification extend to the agricultural sector[14].

When taking into account the cross-cutting benefits of installing PV systems, it is important to acknowledge the gender dynamics of RE. Off-grid PV systems have been shown to offer an alternative for greater equity, as non-grid locations often house vulnerable female populations. In terms of employment, an electrification randomized control trial found that women worked about 8.9 more hours per week in treated communities[15]. In terms of changes in daily activities due to electrification, empirical evidence shows that women in households with solar home systems spend more time awake and thus increase the share of their days dedicated to childcare, cooking, and cleaning. Additionally, a 2014 study by Aguirre used an instrumental variables approach and found that the 93 additional minutes Peruvian children spent studying daily after receiving access to electricity translated to 0.4 more years of schooling in elementary school children and resulted in higher rates of secondary school enrollment[16] (see summary for improvements in Table 2 below).

Table 2: Improvements in Key Sectors of Development Following PV System Installment

Sector	Country	Outcome
Economic Growth and Savings	**Multiple**	900 USD increase in annual incomes due to increased productive economic activity (Glemarec, 2012)
	Ghana	12-15 USD daily increase in earnings at small businesses (Obeng et al 2010)

[12] Glemarec, Y. Financing off-grid sustainable energy access for the poor. Energy Policy 2012, 47, 87–93.
[13] Obeng, G.Y.; Evers, H.D. Impacts of public solar PV electrification on rural micro-enterprises: The case of Ghana. Energy Sustain. Dev. 2010, 14, 223–231
[14] Feron, S.; Heinrichs, H.; Cordero, R.R. Sustainability of rural electrification programs based on off-grid photovoltaic (PV) systems in Chile. Energy Sustain. Soc. 2016, 6, 32
[15] Arraiz, Irani, and Carla Calero. *From Candles to Light: The Impact of Rural Electrification*. Working paper no. IDB-WP-599. Inter-American Development Bank, May 2015. Web.
[16] Aguirre, J. 2014. "Impact of Rural Electrification on Education: A Case Study from Peru." Mimeo, Research Center, Universidad del Pacifico (Peru) and Department of Economics, Universidad de San Andrés (Argentina).

Sector	Country	Outcome
Agriculture	**Chile**	Significant decrease in operations and maintenance costs for rural crop irrigation (Feron et al 2016)
Education	**Peru**	93 additional minutes spent studying daily, and 0.4 additional years of schooling gained (Aguirre, 2014)

While PV systems have been empirically studied, the majority of RE literature focuses on grid extension as the primary pathway for RE. As a result, more statistics have been produced on the effect of grid extension than have been produced on the effect of PV system provision. Many studies have shown that electrification resulting from grid extension has had similarly positive effects in additional key sectors of development, such as health. For instance, a 2014 study by Baron and Torero found that grid extension had the capacity to reduce indoor air pollution and thus improve respiratory health in Northern El Salvador[17]. Additionally, a natural experiment by Gonzales and Rossi in Argentina found evidence that providing access to a high-quality electricity supply reduces the incidence of low birth weights by 20 percent relative to the baseline proportion of one child out of 100[18]. A key report produced by Khandker et al provides additional evidence for positive outcomes in sectors mentioned above; the study found a 12.2 percent increase in annual total income attributable to RE since families spent less on traditional lighting sources such as candles, kerosene, and fuelwood[19]. In addition to improved outcomes in consumption savings, the authors also found that grid extension increased school attendance by 6.3 percentage points for boys and 9.0 percentage points for girls[20]. While statistics generated by studies focusing on grid extension are not direct indicators for potential outcomes in PV system provision, the positive impacts illustrate the benefits of RE overall, regardless of electricity source.

Evidence Gaps[21]

The estimates of the impacts of infrastructure access, and specifically RE access, have been subject to numerous criticisms which are fundamentally associated with endogeneity problems and reverse-causality. Although access to infrastructure affects productivity, income, and economic growth, it also affects the supply and demand of infrastructure. By neglecting this simultaneity, there is a possibility of biasing estimated impacts. Similarly, a number of empirical studies have demonstrated statistical inconsistencies due to a narrow variance of methodologies used to measure these factors (Huang, 2008).

Until very recently, the possibility of identifying causal relationships between access to electricity and its impacts on productivity or rural incomes was limited to macroeconomic studies using time series analysis. These studies attempted to identify whether or not these investments precipitated the effects that are attributed to such investments. While a number of evaluations have been done since that time, barriers have led to few large-scale deployments of household scale solar panel provision. These barriers, while not only pertinent to renewable energies, have stymied larger investments in such policies, and typically manifest themselves in the form of policies and a range of social, political, and institutional constraints [(Karekezi, 1994); (Miller, 1998); (Duke et al., 2002)].

[17] Barron, M., and M. Torero. 2014. "Short Term Effects on Household Electrification: Experimental Evidence from Northern El Salvador." Mimeo.
[18] Gonzalez, M., and M. Rossi. 2006. "The Impact of Electricity Sector Privatization on Public Health." IDB Working Paper No. 219, Inter-American Development Bank, Washington, DC.
[19] Khandker, Shahidur R., Douglas F. Barnes, and Hussain A. Samad. *Welfare Impacts of Rural Electrification: A Case Study from Bangladesh*. Working paper no. 4859. The World Bank, Mar. 2009. Web.
[20] ibid
[21] This literature review was taken from the IE design for the first two components of the RE-Activity. All references can be found in that document.

As mentioned above, the IE of the RE project addresses some of these literature gaps. That stated, little evidence exists regarding the implementation and impact of the third component of this Sub-Activity: the installation of 1950 SPS and the provision of technical assistance for the creation of community associations for the management of SPS operations and maintenance. Without a strong understanding of obstacles and successes encountered, perceived intended and unintended impact, and the sustainability of this type of intervention, it is difficult to ascertain whether or not it is worth replicating in other areas.

6. Evaluation Design

Evaluation Type

This is a summative qualitative PE of the solar panel component of the solar panel component of the RE Sub-Activity. The final report will include information from the IE of the grid component of the project as a complement to the data collected on the PE for the solar panel component. The PE will utilize the IE data (e.g. energy costs and ERR calculation)—understanding that it examined a different population—as a benchmark, along with the additional data gathered from field visits, the literature review on the solar panels, and basic implementation to evaluate the Sub-Activity.

Program Logic

The overarching logic associated with the solar component of the RE Sub-Activity—and reflected in Annex I—is poverty reduction through economic growth. This objective drives the evaluation questions that MCC developed as well as an understanding of the short and medium-term outcomes identified. The outcomes for the solar panel component are somewhat simpler than those for the grid-based component, owing to the low power levels available to SPS homeowners. In short, MCC hypothesized that installation of SPS would provide a lower-cost form of energy to households. However, the outcomes of lower per-unit energy cost to beneficiaries was uncertain. Whereas grid based electricity can provide sufficient power for a wide variety of income generation opportunities, SPS can only provide enough power for basic lighting and low power DC appliances, such as radios or cellular phone battery chargers. On the other hand, lighting with solar power eliminates the need for candles or kerosene lamps and, therefore, can potentially improve indoor air quality while reducing respiratory ailments. Other potential benefits include evening study times for school age children and leisure time for other activities that were not previously available. Though access to low power energy does not automatically preclude income generation activities, the options available to homeowners are more limited.

This PE will attempt to verify if any of these short and medium-term outcomes were obtained from the intervention.

Evaluation Questions

All of the evaluation questions are derived from the program logic and are ultimately linked to the ERR. The ERR measures the effectiveness of a program by contrasting the discounted flows of costs and benefits of a specific intervention. This is directly tied to the outcome of reduced price of electricity, which should yield a positive ERR for the intervention. Data from the IE of the RE Sub-Activity shows an ERR of 19.4 percent. This specific aspect of the RE Sub-Activity is assumed to yield a similar positive ERR. However, without any quantitative data, this PE will not be able to determine the exact ERR of the solar component.

Based on the evaluation scoping mission, conducted in El Salvador in January 2017, SI proposes a slight re-wording of the evaluation questions proposed by MCC to focus on the solar component and reflect the availability of data. Adjustments are denoted in italics.

Effectiveness:

i. To what extent was the solar panel component of the RE Sub-Activity implemented according to the original plans? (Include analysis of scope, timing, costs, and public perceptions)

a. Were the process and output targets achieved according to original plans and according to revised plans? If not, why?

ii. To what extent did the solar panel component reach the intended beneficiaries?
   a. Were there any unintended beneficiaries?
   b. Were some targeted households more likely than others to actually become beneficiaries?

iii. What were the facilitators of implementation and what challenges were encountered?

Outcomes:

iv. What are the perceived or observed outcomes of the solar panel component on the following:
   a. Are households using the solar panels?
   b. How have energy consumption patterns changed (i.e. sources of energy)?
   c. Has the cost of energy changed?
   d. How has total energy consumption by source changed?
   e. Has household member time allocation changed (for women, men, children)?
   f. Has air quality improved?
   g. Has the household changed or increased their productive activities/income-generating activities?

v. What, if any, are the differential outcomes for women vs. men?

Sustainability:

vi. How sustainable are the outcomes likely to be from the *solar panel component*?
   a. Are systems being maintained properly? Why or why not?
   b. What types of households are able to maintain the solar panels?
   c. Do households expect the grid to reach their homes in the near future?

Lessons Learned:

vii. What lessons can be learned from the *solar component*?

ERR

i. *To what extent have the assumptions underlying the ERR held true?*

Methodology

Given the absence of a counterfactual for the solar panel component, this PE will use a non-experimental design to assess the effectiveness, perceived impact, sustainability, lessons learned, and ERR of the solar panel component.

The solar panel component of the PE will rely on qualitative data, given the contextual restraints associated with significant quantitative data collection.

Gender Analysis

The evaluation team, hereinafter referred to as "the team," knows that as in any development program, the success of the intervention might vary across gender and will explore this through evaluation question v. To collect the necessary data, the team will endeavor to interview a mix of men and women heads of households (HOHs).[22] Upon random selection of each household, the team will request an interview with the primary decision-maker of the household—or, if that person is unavailable, the person who is most knowledgeable about household decisions regarding time and income allocation. The team will work with its local data collection partner on how best to identify these individuals as well as times that are conducive to participation by men and women. Where possible, the team will interview men and women decision-

[22] HOHs refer to the primary decision-makers in the household. This is oftentimes men; however, women HOHs refer to one of three possible cases: 1) single women; 2) women whose husbands live outside the household 3) male HOH's wives or other female relatives who are involved in or knowledgeable of making household decisions.

makers within the same household, which should yield a mix of men and women respondents and thus a diversity of perspectives.

The team will also employ a gender sensitive approach during data collection. All methodologies will consider the privacy and confidentiality of respondents while also including gender specific questions. The team will—to the greatest extent possible—conduct interviews at times and places accessible to both men and women equally, namely at their homes. To ensure the comfort of respondents, interviews with men will be led by the male team members, whereas female researchers will lead interviews with women.

The team will analyze male and female responses separately to discern possible trends between them. During data collection, the team will regularly consider whether or not information fully represents the different effects and opinions of men and women.

Definition of Population

The SPS component was conducted in the same departments as the other RE components, however it was not implemented in all of them. The communities targeted for the solar panel component were far removed from the grid and located in remote locations. FOMILENIO determined that the cost of extending the grid to these rural communities was cost prohibitive; instead these communities would be eligible to receive the SPS. Table 3 shows the distribution of households within the municipal departments.

Table 3: Distribution of Households within Municipal Departments

Department	Municipalities	Total SPS Installed
Cabañas	Ilobasco, San Isidro, Ciudad Dolores, Sensuntepeque, Tejutepeque	265
Chalatenango	Citalá, San Ignacio, La Palma, Nueva Concepción, Tejutla, San Francisco Morazán, Dulce Nombre de María, Quetzaltepeque, San Isidro Labrador	276
La Union	Anamorós	95
Morazán	Perquín, San Fernando, Arambala, Meanguera, Joateca, Cacaopera, Corinto, Sensembra, Yamabal, Chilanga, Osicala, Delicias de Concepción	957
San Miguel	Sesori, Nuevo Eden de San Juan, Ciudad Barrios, San Antonio del Mosco	176
Santa Ana	Metapán, Santa Rosa Guachipilín	181
Total		**1950**

Sampling Approach

The team considered strategies for sampling both communities and households with MCC and arrived at the following decision:

Community-level sampling

Stratified purposive sampling: The team understands based on anecdotal information that many beneficiaries that have ceased to use their SPS because the grid arrived in their locales. As such, the team feels that it is important to select a mix of communities representing areas where the grid is or is not present and explore to what extent that affects the sustainability of the SPS use. In addition, the team would want to stratify along geographic lines, with a selection of four out of the six departments where the greatest number of SPS were distributed (i.e. Morazán, Chalatenango, Santa Ana, and Cabañas). The team is aware

that context varies greatly along the geographic regions and would thus ensure that different areas are represented in the sample, based on the proportion of SPS provided in each department.

The team anticipates selecting eight cantons stratified by grid presence such that the team will have a mix of communities that are more or less remote in each of the four departments. This level of stratification will enable to the team to compare communities with and without grids within the same departments.

Individual-level sampling

Once the cantons are identified, the team will pursue interviews with ten randomly selected SPS recipients. As such, the team anticipates a total sample size of roughly 80 beneficiaries—a fairly standard sample size for a qualitative study of this nature. However, the team will endeavor to include male and female HOHs in the sample. The team plans to conduct a five to ten minute structured observation in concert with beneficiary interviews.

In addition to employing this methodology for beneficiary selection, the team will use purposive sampling to select non-beneficiary key informants (KIs). For example, the team anticipates interviewing at least one local authority (from the mayor's office and/or ADESCO) in each municipality. The team took a similar approach during the scoping trip, employing a mix of purposive and snowball sampling to identify stakeholders for various consultations.

Timeframe

The team will collect data regarding the solar panel component in March and April of 2017. The PE will also utilize data from the IE and the report will be submitted to the MCC in June 2017 (see Annex V for a Gantt chart of evaluation activities).

- **Scoping trip:** January 16 – January 20
- **SI submits revised design report/qualitative protocols**: February 3
- **MCC reviews report/protocols and sends feedback:** February 17
- **SI submits revised report:** March 3ddressed
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- **Evaluation Management Committee reviews revised protocols:** March 17
- **Fieldwork:** March 20 - April 14
  - **Follow-up interviews in/around San Salvador and piloting of instruments:** March 20-22
  - **Data collection in beneficiary communities:** March 23-April 12
  - **Preliminary data analysis and out-brief:** April 14
- **SI submits draft evaluation report:** May 5
- **MCC reviews report and sends feedback:** May 26
- **SI submits revised final evaluation report:** June 16

The team notes that Holy Week takes place April 10th-14th, which may present some challenges to completing the final days of data collection, as local governments are likely to be closed. The team will thus aim to complete as much fieldwork as possible before April 10th . In addition, it is likely that MCC and GOES stakeholders will not be available for an out-brief on April 14th. Nevertheless, the team will plan to stay in country to collaborate on data analysis activities and can provide out-briefs for anyone willing to meet that on April 14th. The team can also conduct a remote out-brief the following week.

7. Data Sources

Existing Data Sources

No baseline data exists for the solar panel component. Instead, a document review coupled with interviews with FOMILENIO staff and IPs have yielded basic data regarding implementation, rationales for the changes in targets, and costs. To the appropriate extent, the data collected from the IE will be used in concert with new data sources, including information stemming from household and community surveys as well as ERR analysis.

New Data Sources

The following are data collection methods that will be used to answer the key evaluation questions above for the solar panel component. Table 4 following the narrative description here depicts the data collection methods and sources that will be used to answer each evaluation question. Similarly, it outlines proposed indicators the team will use in determining those answers.

Document Review: The document review provided the team with background on the activities and their implementation as well as existing monitoring and other reporting data. It also helped the team identify the critical assumptions underlying the solar panel component and any emergent findings. The team explored these preliminary findings during the January 2017 scoping trip and will continue to build upon throughout the upcoming fieldwork and data analysis.

In addition to the documents already reviewed, the team will examine IE baseline and endline data on air quality, cost of energy and energy consumption rates, and household income/consumption for the solar panel sites from the IE. As mentioned above, the team understands that these data may not exactly reflect the realities for the solar panel component beneficiaries; however, they will serve as a helpful benchmark for information collected during this PE.

DC-based Interviews: The team will supplement its document review with key informant interviews (KIIs) with Washington, DC-based individuals involved with the El Salvador Compact and particularly the solar panel component.

Field-based KIIs: Through the scoping trip, the team began gathering data via semi-structured KIIs from relevant stakeholders, (see section 8.4 below). As discussed, there are additional stakeholders—namely in rural communities—that the team will interview through the course of fieldwork. The team developed KII guides which help to reveal rich insights and views about a program's performance (see Annex II). The team will work to take the KII guide a step further by including a mini-survey with closed-response questions. This permits descriptive quantification of KI responses, such as “Seventy-three percent of KIs said the project was effective,” rather than “most” said, or “some” said.

For MCC staff, GOES officials, and FOMILENIO staff, interview protocols cover the planning and implementation of the solar panel component, targets and monitoring of outcomes, and perceived sustainability. The GOES officials that the team already interviewed were involved at the Compact development stage, including officials from the CNE. For community leaders, HOHs, and community organizations, the protocol will include reach, perceived outcomes, gender differential outcomes, and perceived sustainability, i.e. current and expected future use of the systems.

The PE plans to use both community leaders (e.g. mayors and ADESCOs who took part in helping to identify their recipients of the SPS) and HOHs for the KIIs to capture different perspectives about the intervention. Relative to HOHs, the community leaders would most likely provide broad answers that are an average for the community whereas the HOHs will specifically give answers regarding their experiences. Additionally, the community leaders could also provide insight on the overall sustainability of the project, since they will have a greater view of how many homes still have the SPS more so than an individual recipient will likely be able to do.

Field-based Individual and Group Interviews: The team will conduct individual (KIIs) and group interviews with the direct beneficiaries of the solar panel component. The protocols ask questions on use

of the SPS (or lack thereof) as well as perceived outcomes. These interviews will help the team gain an understanding about the ground-level barriers to sustainability and glean practical lessons learned about operationalizing rural solar electrification programs. The team will disaggregate findings by gender and other salient factors as they become evident.

Direct Observation: Though most evaluation teams informally observe what's actually going on at assistance activity sites, the team will develop a direct observation guide that can be employed to allow for a more systematic, structured process. Advantages to direct observation are that processes or outcomes can be studied in their natural settings, providing a richer understanding of the situation. This may reveal conditions, problems, or patterns many KIs may be unaware of or unable to describe adequately. For example, according to the M&E Plan, there is a concern that poor maintenance of the solar panels "will reduce the useful life of standalone solar systems and the electricity consumption of the beneficiaries of the rural electrification project." The team will not only be able to talk to relevant stakeholders about the maintenance of solar panels, but also observe the panels first hand to determine whether or not they are in sound condition and whether or not community members are using the panels.

Key Informant List

The scoping trip included meetings with the following individuals:

- MCC Headquarters Staff
  - Rebecca H. Goldsmith, Director M&E
  - Lisa K. Fillingame, Results Reporting Analyst
- MCC Staff in San Salvador
  - Jose Antonio Ramos, Development Assistance Specialist
- Former FOMILENIO I Staff in El Salvador
  - José Angel Quirós, Chief Executive Officer – Fundación Salvadoreña para el Desarrollo Económico y Social (FUSADES) (Former Executive Director FOMILENIO)
- FOMILENIO II Staff in El Salvador
  - José Suay, General Manager
- GOES Officials: National (in capital)
  - Ingeniero Raul Gonzales, Director, CNE
  - Doris Margarita Jaime, Directora de Seguimiento y Evaluación - Secretaria Técnica de la Presidencia
- Implementing Partner Staff (from the contractors that installed SPSs)
  - TecnoSolar – Ingeniero Arturo Solano/Gerente
  - Tecnosol - Licenciada Karla Rivas
- NGOs (or other firms that participated in the project)
  - ADEPRO – Rafael Gochez, Director

The team plans to use the field work to focus on gathering the perspectives of people in the beneficiary communities as well as other KIs identified during the scoping trip, including:

- Mayors
- ADESCOs
- Recipients of SPS in selected communities
- FISDL

Table 4: Evaluation Design Matrix

Evaluation Questions	Tool	Source	Comments / Indicators
1. Effectiveness: i. To what extent was the solar panel component of the RE Sub-Activity implemented according to the original plans? (include analysis of scope, timing, costs, and public perceptions) a. Were the process and output targets achieved according to original plans and according to revised plans? If not, why?	Desk Review KIIs	*KIIs:* • MCC Staff • FOMILENIO Staff • GOES Officials • Implementing Partner Staff	• Observed effectiveness of scope, timing, costs through desk review and site visits. • Reported issues/concerns with scope, timing, cost, and reach to beneficiaries.
ii. To what extent did the solar panel component reach the intended beneficiaries?	KIIs Group Interview	*KIIs:* • FOMILENIO Staff • GOES Officials – National (in capital) and local at implementation sites • Implementing Partner Staff • Beneficiaries and Community Leaders *Group Interviews:* • Beneficiaries	• Reported issues/concerns with scope, timing, cost, and reach to beneficiaries.

Evaluation Questions	Tool	Source	Comments / Indicators
iii. What were the facilitators of implementation and what challenges were encountered?	KIIs	*KIIs:* • MCC Staff • FOMILENIO Staff • GOES Officials • Implementing Partner Staff • Beneficiaries and Community Leaders	• Reported facilitators and challenges to implementation. • Facilitators of implementation and challenges can be expected to emerge from the data collected for this question.
2. Outcomes: i. What are the perceived or observed outcomes of the solar component on the following (impacts for grid extension and connections; and perceived outcomes for solar panels): a. Are households using the solar panels?	KIIs Group Interviews Secondary Data Observation	*KIIs:* • Beneficiaries • MCC Staff – El Salvador • GOES Officials – National (in capital) and local at implementation sites • Implementing Partner Staff *Group Interviews:* • Beneficiaries	• Percent of respondents still using their SPS. • Note: Details on unintended and positive or negative effects of the programming can be expected to emerge from data collected for these questions. The data will be analyzed to understand the unintended effects versus intended.
b. How have energy consumption patterns changed (i.e. sources of energy)?	Mini-survey	Beneficiaries	• Perceived energy sources relative to before the solar panels using a five point Likert scale.
c. Has the cost of energy changed?	Mini-survey	Beneficiaries	• Perceived spending on energy relative to before the solar panels using a four point Likert scale.
d. How has total energy	Mini-survey	Beneficiaries	• Perceived energy consumption distribution relative to before the solar panels using a four point Likert scale.

Evaluation Questions	Tool	Source	Comments / Indicators
consumption by source changed?			
e. Has household member time allocation changed (for women, men, children)?	Mini-survey	Beneficiaries	• Perceived time allocation relative to before the solar panels using a three point Likert scale. • Answers disaggregated by men and women.
f. Has air quality improved?	Mini-survey	Beneficiaries	• Perceived indoor air quality using a six point Likert scale.
g. Has the household changed or increased their productive activities/income-generating activities?	Mini-survey	Beneficiaries	• Perceived increase in income generating activities using a six point Likert scale.
ii. What are the differential outcomes for women vs. men?	KIIs Group Interviews	Beneficiaries	• Reported differences between men and women.
3. Sustainability: i. How sustainable are the outcomes likely to be from the solar panel component?	KIIs Group Interviews Observation Secondary Data	*KIIs:* • Beneficiaries • MCC Staff – El Salvador • GOES Officials – National (in capital) and local at implementation sites • Implementing Partner Staff	• Evidence of committed government officials or other influential promoters who support the intervention, understand its value, and can help maintain or promote maintenance as applicable. • Evidence of systems in place to provide maintenance to the solar panel component; and/or change batteries.

Evaluation Questions	Tool	Source	Comments / Indicators
		Group Interviews: • Beneficiaries	• Percent of respondents still using their SPS. • Percent of respondents that replaced their batteries if they failed.
4. Lessons Learned: i. What lessons can be learned from the solar panel component?	KIIs Group Interviews Observation Desk Review	*KIIs:* • Beneficiaries • MCC Staff – El Salvador • GOES Officials – National (in capital) and local at implementation sites • Implementing Partner Staff *Group Interviews* • Beneficiaries	• Details of lessons learned and factors that affect transferability can be expected to emerge from data collected for questions 1 to 3. These responses will be analyzed to classify the most common lessons by type (e.g. implementation, outcomes/impact, sustainability, and ERR) and types of factors. • Lessons regarding the evaluation process.
5. ERR: i. To what extent have the assumptions underlying the ERR held true?	Desk Review KIIs Group Interviews	*KIIs:* • Beneficiaries • GOES Officials – National (in capital) • Implementing Partner Staff	• Assumptions that have held true.

8. Analysis Plan

The team will organize, disaggregate, and aggregate the data obtained from different methods and sources named in the matrix above; and triangulate it for correspondence among findings. The team will distill and organize findings according to the evaluation questions and draw conclusions directly from these findings for the solar panel component. Recommendations will be based solely on the conclusions reached.

The team will use parallel analysis to examine the evidence from its document review, KIIs, group interviews, and mini-survey. In this "methods triangulation" analytical approach, the team will analyze data related to an evaluation question, and relevant indicators, obtained using different methods in parallel, and then across our data collection methods. For example, the team will first analyze relevant documents to develop preliminary findings about the evaluation question, 'To what extent was the solar panel component implemented according to the original plans?'; second, the team will analyze data from KIIs with MCC staff in Washington, DC and El Salvador to develop preliminary findings regarding actual implementation; third, the team will analyze data from interviews with key stakeholders from field visits to develop preliminary findings on the same topic. The team will also disaggregate data and do the same analysis for data collected from different sources—e.g. women, beneficiaries, government organizations, and IPs. The team may also collect two responses to key questions using the same respondent to enable "data triangulation" from within the same method(s). For example, in an interview guide, the team may obtain two responses to the same key question from the same respondent by using two contrasting scales to measure perceptions of solar panels. Finally, the team will analyze findings across the data collected using different methods, different instruments within the same method(s), and different sources to develop higher-level findings. This method, source, and data triangulation will increase the reliability and validity of our findings and conclusions.

The team will code qualitative data using Excel-based tally sheets to identify trends in responses and determine frequency of specific themes or topics. Basic quantitative analysis will be done using Excel for quantitative data stemming from Likert scale questions in the mini-survey and yes/no responses in group interviews.

9. Administrative

Summary of Institutional Review Board (IRB) Requirements and Clearances (in-country, international)

SI's internal IRB exempted this study from review.

Data Access, Privacy, and Documentation Plan

The team is committed to the confidentiality of evaluation data. As such, team members will incorporate a confidentiality statement into the introduction of each data collection tool. This statement will assure respondents that no names, photos, or identifying information will be included in the report without prior written consent of the informant. Unless explicitly required or authorized by MCC before data collection, the team will not release raw qualitative data to anyone outside of the immediate team.

Dissemination Plan (description of products and on-line, presentation dissemination efforts)

The final PE report for the solar panel component will be written in June 2017 using the template agreed upon with the MCC. SI proposes to conduct a series of dissemination presentations to stakeholders, including:

i) Presentation of the report to MCC Headquarters staff
ii) Presentation to MCC staff in El Salvador

iii) Presentation of findings to key GOES stakeholders (CNE, Secretaria Tecnica)
iv) Presentation of findings and key recommendations to other El Salvador stakeholders (FOMILENIO II, FUSADES)

The timing and format of these presentations will be determined in consultation with MCC upon conclusion of the field work.

Evaluation Team Roles and Responsibilities

The team will be comprised of two members. Mr. Julio Patiño has more than 20 years on rural solar electrification projects. As a subject matter expert, Mr. Patiño will serve as Team Leader, providing subject matter expertise while leading the field work component, analysis, report development, and dissemination. Mr. Patiño will be joined by Ms. Gabrielle Plotkin, who brings five years of M&E experience. Ms. Plotkin will design the PE and support data collection, analysis, and report writing. Mr. Mike Duthie, SI's Vice President for IE, will provide oversight and quality assurance throughout the PE.

SI will also employ the services of ADEPRO, a local data collection firm, for the interviews outside the capital. Mr. Patiño and Ms. Plotkin will observe interviews as appropriate, but the firm will hire local researchers to lead the interviewing and note-taking in order to make respondents feel more at ease and thus provide candid responses to the questionnaires.

Budget and Level of Effort

The total cost of the solar panel component reached 1.6 million USD. The evaluation activities are anticipated to amount to 216 thousand USD, including level of effort (LOE) for all team members and headquarters staff as well as ODCs for logistics, travel, data collection, and other administrative tasks. The total costs for the solar component represent about 13 percent of the total cost of the solar panel component. The total LOE estimated for this PE can be found in Annex IV.

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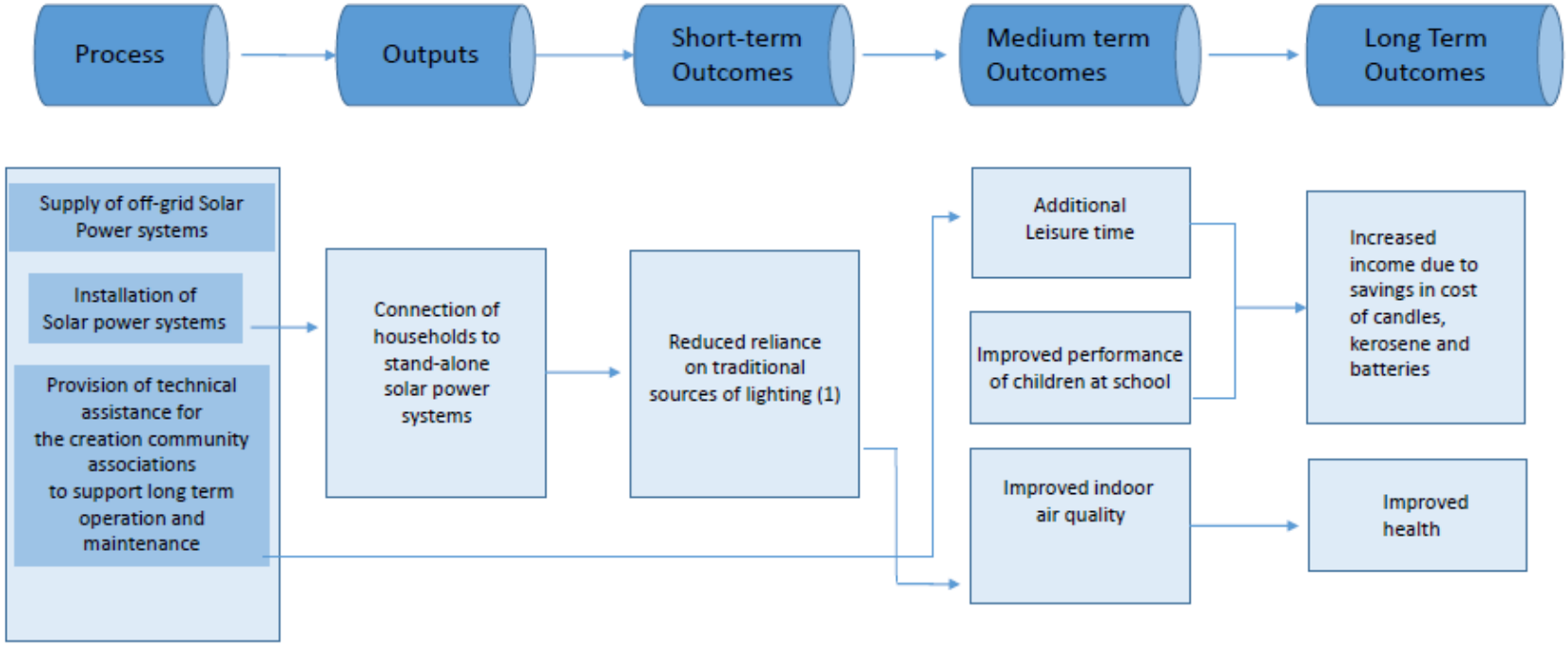
Annexes

Annex I: Solar Panel Component Logic Model



Assumptions:

1. Households will save the money necessary for O&M on the solar panels.
2. Increased access to energy will lead to a reduction in alternative energy sources that are harmful to health, such as the use of kerosene lamps and the burning of wood.
3. Children of households with access to energy will have more hours of light to study and complete school work.
4. With access to energy, households will watch TV, use the light to read, and participate in other leisure activities.

Annex II: Draft Data Collection Protocols

Questions for FOMILENIO/MCC Staff

Name	
Sex	
Title/Affiliation	
Location of Interview	
Date of Interview	

Our names are [NAMES] and we are working with Social Impact, Inc. (SI)—a firm that has been contracted by MCC to evaluate the solar component of the FOMILENIO I compact. If you agree to participate in this interview, we will talk about your experience with the program. The interview is expected to take 30 minutes. Any information you provide that can identify you will be kept strictly anonymous by the parties conducting this study, including MCC employees, employees of the survey firm, and researchers, to the maximum extent permitted by the laws of the United States of America and the laws of El Salvador.

Your participation is voluntary and you may choose not to answer any or all questions for any reason. In other words, you have the option to not participate and there will be no consequences for nonparticipation. You may contact Social Impact, Inc. if you have questions, concerns, or complaints about the study or your rights as a participant. If you have any questions for us, please feel free to ask at any time.

- In what capacity were you involved with FOMLIENIO I? What, if any, was your role in relation to the solar panel component?

- What did you expect to result from the solar component? How would you know if it was effective?

- What challenges did the program encounter (*probe: scope, timing, costs*)? What adaptations to the plans did you make in response?
    - What have you learned from this project? (*probe: about SPS, community needs, working in rural areas, etc*.)

Questions for Beneficiaries:

Name(s)	
Sex(es)	
Title/Affiliation	
Location of Interview	
Date of Interview	
Time of Interview	

My name is [NAME] and I am working with [SURVEY FIRM]. We are gathering information on the solar panel systems distributed by the FOMILENIO I program in your community in order to improve projects in this and other communities. Our study is funded by the Millennium Challenge Corporation, an agency that provides assistance to other countries' development projects, and is being carried out by Social Impact, Inc. If you agree to participate in this interview, we will talk about your community, your household, and members of your household. The interview is expected to take 30 minutes. Any information you provide that can identify you will be kept strictly confidential by the parties conducting this study, including MCC employees, employees of the survey firm, and researchers, to the maximum extent permitted by the laws of the United States of America and the laws of El Salvador.

Your participation is voluntary and you may choose not to answer any or all questions for any reason. In other words, you have the option to not participate and there will be no consequences for nonparticipation. You may contact [SURVEY FIRM] if you have questions, concerns, or complaints about the study or your rights as a participant. If you have any questions for me, please feel free to ask at any time.

- When did your family receive the SPS?
- Why did your family receive the SPS?
- Are you still using the system? Why or why not?
- Are you taking steps to maintain the system? Why or why not?
    - If yes, what measures do you take to maintain the system?
- What do you do if the system malfunctions? *(probe: check the battery, call a specialist, etc.*)
- Since using the new light and/or electricity sources provided through the renewable energy system, do you have more time for other household tasks? Income generating activities? If so, how much?
- What has been the biggest difference in home life since you received the system?
- How did the system affect the men in your family? Was there any difference with the effect it had on women? Children?
- Approximately how much (in dollars) do you spend per month on energy (fuelwood, candles, or kerosene), for your home?

- How often do you communicate with local community leaders (e.g. mayors and/or ADESCOs)?

MINI-SURVEY:

- Thinking back to the time before you received the system:
    - What energy sources did you previously use for lighting (candles/flashlights/other)? How has your use of those systems changed since the installation of the systems (it has increased a great deal/it has increased slightly/it has not changed/it has decreased a great deal/it has decreased slightly/do not know)?

    - What difference (if any) has there been in the cost of energy you use (it has increased a great deal/it has increased slightly/it has not changed/it has decreased a great deal/it has decreased slightly/do not know)?

    - Would you say your total level of energy for lighting has changed since you received the SPS? If so, by how much (it has increased a great deal/it has increased slightly/it has not changed/it has decreased a great deal/it has decreased slightly/do not know)?

    - In your opinion, how much has the SPS changed the air quality in your home (if at all) (it has improved a great deal/it has improved slightly/it has not changed/it has worsened slightly/it has worsened a great deal/do not know)?

    - Has the installation of the SPS affected how you spend your time after dark (yes/no/do not know)?

- Do you expect the grid to reach your community in the next year? Five years?

<u>Additional questions for households in communities with grid access:</u>

- Are you connected to the grid?
    - If yes, do you still use their solar panel as well? Why or why not?

    - If yes, how did you decide to connect to the grid?

    - If no, why not?

Observation Guide:

Site Location (district/municipality/canton)	
Date of Visit	
Time of Visit	
Weather Conditions	
Persons Present	

- Tigo/other carrier cell phone reception available (yes/no).
- Community has grid access (yes/no).
    - If yes, household is connected (yes/no).
- The SPS is working (yes/no).
- SPS panel is free from shade (yes/no).
- All light fixtures (bulbs) are operating correctly (yes/no). Quantity?
- The charge controller is functioning properly (yes/no).
- Battery is covered by objects (e.g. clothes) (yes/no).
- Battery is clean (yes/no).
- Battery is not available (yes/no).
- Devices connected: (cellphone charger, television, radio, etc.)
- Other connections observed (i.e. a second battery)

Questions for Implementers

Name	
Sex	
Title/Affiliation	
Location of Interview	
Date of Interview	

Our names are [NAMES] and we are working with Social Impact, Inc. (SI)—a firm that has been contracted by MCC to evaluate the solar component of the FOMILENIO I compact. If you agree to participate in this interview, we will talk about your experience with the program. The interview is expected to take 30 minutes. Any information you provide that can identify you will be kept strictly anonymous by the parties conducting this study, including MCC employees, employees of the survey firm, and researchers, to the maximum extent permitted by the laws of the United States of America and the laws of El Salvador.

Your participation is voluntary and you may choose not to answer any or all questions for any reason. In other words, you have the option to not participate and there will be no consequences for nonparticipation. You may contact Social Impact, Inc. if you have questions, concerns, or complaints about the study or your rights as a participant. If you have any questions for us, please feel free to ask at any time.

- Please describe your company's involvement in this program.

- What challenges did you encounter in the implementation of this project (*probe: scope, timing, costs*)? What adaptations to the plans did you make in response?

- Are you aware of how beneficiaries were chosen to receive systems? Please describe your knowledge of this process.

- Your contract included provisions about training beneficiaries on use and maintenance of the systems. How did you determine the format of these trainings?

- Did you train local providers or individuals to perform maintenance on the systems? If so, under what circumstances (which/why/how)?

- What was the most important factor in driving SPS cost reductions over time? (*probe: equipment costs, logistics, other*)?

Questions for Local Authorities (Mayors/ADESCOs):

Name	
Sex	
Title/Affiliation	
Location of Interview	
Date of Interview	

My name is [NAME] and I am working with [SURVEY FIRM]. We are gathering information on the solar panel systems distributed by the FOMILENIO I program in your community in order to improve projects in this and other communities. Our study is funded by the Millennium Challenge Corporation, an agency that provides assistance to other countries' development projects, and is being carried out by Social Impact, Inc. If you agree to participate in this interview, we will talk about your community, your household, and members of your household. The interview is expected to take 30 minutes. Any information you provide that can identify you will be kept strictly confidential by the parties conducting this study, including MCC employees, employees of the survey firm, and researchers, to the maximum extent permitted by the laws of the United States of America and the laws of El Salvador.

Your participation is voluntary and you may choose not to answer any or all questions for any reason. In other words, you have the option to not participate and there will be no consequences for nonparticipation. You may contact [SURVEY FIRM] if you have questions, concerns, or complaints about the study or your rights as a participant. If you have any questions for me, please feel free to ask at any time.

- How long have you been in your current role? Were you in this position when the FOMILENIO program installed the SPS?

- How did you identify beneficiaries for the SPS? Were there specific criteria used? Who were the people most likely to become beneficiaries? Least likely?

- Did anyone benefit from the installations besides the SPS recipients?

- What changes have the systems brought to your communities? Were any of these unexpected? (*probe: increase of other infrastructure projects, accidents, increased amount of hazardous waste, changes in relationships between connected and non-connected families, etc.?*)

- What actions are you taking to ensure the sustainability of the SPS installation?

- What actions are your community members taking to maintain the systems?
    - Do beneficiaries participate in the community?

    - Do they pay the five USD monthly fee? If not, why not? Are some more able to pay than others?

    - What have you learned from this project? (*probe: about SPS, your community's needs, etc*.)

- Battery disposal/recycling program?

Annex III: Program Documents Reviewed

The following documents were supplied by MCC to the team. The team reviewed these documents as part of its preparation for the scoping trip:

- Criterios de Selección Electrificación – ENG (2008)
- Criterios de Selección Proyectos de Infraestructura Comunitaria (2008)
- El Salvador I Rural Electrification Program Logic (2015)
- El Salvador PE EMC Comments/SI Response MCC (2015)
- Registry of SPS Beneficiaries (2016)
- 1 Informe Tecnosol (2015)
- 1er Informe Tecnosol (2016)
- 2 Informe Tecnosol (2015)
- 2do Informe Tecnosol (2016)
- 3 Informe Tecnosol (2015)
- 3er Informe Tecnosol (2016)
- 4 Informe Tecnosol (2015)
- 4to Informe Tecnosol (2016)
- Informe Final Levantamiento de Información Cualitativa de Beneficiarios
- Anuncio de Solicitudes Perfiles IC (2007)
- Beneficiarios Directos Electrificación Rural (2015)
- Manual SEESA (2015)
- Manual Tecnosol (2015)
- Recopilación de Información Cualitativa de Beneficiarios 2011/Estudio Sobre Los Sistemas Fotovoltaicos – ADEPRO
- MCC El Salvador Rural Electrification PE Evaluation Design (2016)
- Objetivos del Prediseno
- Presentación Final de Fomilenio (2012)
- El Salvador Infrastructure Evaluation Plan

Annex IV: Level of Effort

Proposed Staff	Position Title	Labor Category	Consultant Onboarding and Start-Up Logistics	Team Planning Meeting & Client Meetings	Scoping Trip to El Salvador	Revise Evaluation Design Report	International Travel (DC/Bolivia to El Salvador)	In-brief with MCC El Salvador	Data Collection	Out-brief with MCC El Salvador	International Travel (El Salvador to DC/Bolivia)	Data Analysis	Draft Evaluation Report	Final Evaluation Report	Quality Assurance	Presentation and Dissemination	Contract Close-out	Total
			Start-up and Fieldwork Preparation				Fieldwork					Data Analysis, Reporting, and Dissemination						
			Solar Power Component Performance Evaluation															
Evaluation Team																		
Julio Patino	Team Leader	Senior Analyst	1	1	6	8	0.5	1	22	1	0.5	9	7	6	0	2	0	**65**
Gabrielle Plotkin	Evaluation Specialist	Junior Analyst	1	1	6	8	0.5	1	22	1	0.5	8	6	4	0	2	0	**61**
Margarita Villatoro	Logistician	Administrative Assistant	1	1	3	0	0	0	20	0	0	0	0	0	0	0	0	**25**
Home Office Support Team																		
Mike Duthie	Program Manager	Program Manager	0.5	1	0	1	0	0	1	0	0	0	0	0	3	0.5	1	**8**
Kristen Grimsland	Research Assistant	Research Assistnat	5	3	0	1	0	0	10	0	0	0	3	3	2	1	4	**32**
Julia Higgins	Adminstrative Assistant	Administrative Assistant	6	4	0	1	0	0	10	0	0	0	2	1	2	1	5	**32**
TOTAL LOE			**14.5**	**11**	**15**	**19**	**1**	**2**	**85**	**2**	**1**	**17**	**18**	**14**	**7**	**6.5**	**10**	**223**

Annex V: Evaluation Schedule Gantt Chart

MCC El Salvador Solar Panel Component PE: Work Plan January 2017 - June 2017																															
Months		January					February				March				April				May					June							
Week of (Monday)		1/2	1/9	1/16	1/23	1/30	2/6	2/13	2/20	2/27	3/6	3/13	3/20	3/27	4/3	4/10	4/17	4/24	5/1	5/8	5/15	5/22	5/29	6/5	6/12	6/19	6/26				
	Invoice Reports		X					X				X					X				X				X						
Start-up and Fieldwork Preparation	Conduct Desk Review																														
	Scoping Trip SOW	X																													
	Scoping Trip																														
	Scoping Trip Report					X																									
	First Draft Evaluation Design/Qualitative Protocols					X																									
	MCC feedback with response																														
	Final Draft Evaluation Design/Qualitative Protocols									X																					
	IRB reviews revised protocols																														
Fieldwork	Travel to El Salvador																														
	In-brief with MCC El Salvador																														
	Data collection																														
	Preliminary data analysis																														
	Out-brief with MCC																														
	Travel from El Salvador																														
Data Analysis, Reports, and Dissemination	Data Analysis																														
	First Draft Evaluation Report																		X												
	Local Stakeholder feedback/Public Statement of Difference/Support																														
	MCC feedback with response																														
	Final Evaluation Report																								X						
	PPTs and dissemination of final results																									X					
	Contract Closeout																														

Key	
Implementation of tasks	
Submission of deliverable	X
Culturally significant holiday or observance*	
Out-of-country fieldwork	