# Organizational and Financial Aspects of a Community Renewable Energy Project

**Prepared By:**

**Green Empowerment: Michael Royce and Anna Garwood**

**January 2004**

# Table of Contents

## Introduction

A successful renewable energy project does not depend solely, or even primarily, on the physical and technical infrastructure, but also on the appropriate planning for the social, organizational and financial issues that ensure the project's sustainability.

In addition to providing non-governmental organizations (NGOs) with a resource to help think through these issues, this guide aims to outline the institutional and community roles that are necessary to support a project. Specific examples and templates are also included to help local NGOs and communities complete surveys, estimate budgets, apply for grants, and plan for step-by step project development of the non-technical issues.

While this guide will help NGOs work on the social, organizational and financial issues necessary to build a sustainable community-based renewable energy project, every community is unique and the best lessons are learned at the local level.

**Project Development Steps: Social, Organizational and Financial Issues**

This is an overview of the steps involved in the development of a project for demonstrative purposes and to serve to remind project developers of potential stages and tasks in the completion of a community-based renewable energy project. The actual task list will vary from project to project.

## I. Feasibility Stage

1 Working with the Community
2 Assessing Energy Resources
3 Assessing Energy Needs/Demand
    a. Current Usage
    b. Future Projected Needs
4 Evaluating Potential Revenue-Generating Usages
5 Site Selection
6 Environmental Considerations
7 Evaluate Initial Feasibility

## II. Community Plan

8 Assess What the Community Can Contribute
9 Develop Local Management Structure
10 Determine Residential Rate Structure
11 Plan for Revenue-Generating End Uses to Ensure Economic Sustainability
12 Develop and Sign Community Contracts

## III. Design Stage

13 Civil Design-The Physical Structure of the Generation System
14 Distribution System- Getting the Power to the User
15 Electro-Mechanical Design- Inside the Power House
16 Cost Estimating: Equipment, Materials, and Labor

## IV. Funding Stage

17 Fundraising Research
18 Fundraising and Grant Writing Assistence
19 Funding Solicitation- Letters Of Inquiry, Grant Applications
20 Secure Funding

## V. Pre-Construction

21 Place the Electro-Mechanical Order
22 Define Equitable Labor Input and Construction Timeline with Community

23 Community Mobilization, set clear goals and expectations
24 Obtain Legal Status for the Community-based Organization
25 Skills Trainings for Community Members
26 Complete Power Use Agreement and System Rules
27 Clarify Project Management Roles of Community, NGO, and International Operational Partners
28 Shipment of Electro-mechanical Equipment

**VI. Construction**

29 Ground Breaking Ceremony
30 Civil Construction
31 Erection of Distribution System- Transmission lines, House Wiring, Safety Issues
32 Electro/Mechanical Installation

**VII. Commissioning**

33 Commissioning and Testing the System
34 Completion of Power Management Structure
   a. Bill Collection
   b. Bank Accounts
   c. Money Management- Operation & Maintenance, Operators, Reserve Fund, Loan Repayment (if any)
35 Training of Operators
36 Opening Ceremony

**VIII. Post-Commissioning**

37 Necessary Ongoing Support
   a. Green Empowerment
   b. Non-governmental Organization
   c. Manufacturer
   d. Community
38 Project Review and Evaluation- One Year after Beginning Operation and Beyond

## TIME LINE TEMPLATE

This timeline can be used to plan the project development stages and communicate clearly with the community, funders and other project partners. While this template only shows 12 months, actual project timelines may be several years.

| | | MONTHS TO COMPLETE | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **No.** | **Description** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **I** | **Feasibility Stage** | | | | | | | | | | | | |
| 1 | Working with the Community | | | | | | | | | | | | |
| 2 | Assesment of Energy Resources | | | | | | | | | | | | |
| 3 | Assesment of Needs/Demand | | | | | | | | | | | | |
| 4 | Site Selection | | | | | | | | | | | | |
| 5 | Environmental Considerations | | | | | | | | | | | | |
| 6 | Evaluate Initial Feasibility | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| **II** | **Community Plan** | | | | | | | | | | | | |
| 7 | Assess what the Community can Contribute | | | | | | | | | | | | |
| 8 | Develop Local Management Structure | | | | | | | | | | | | |
| 9 | Determine Rate Structure | | | | | | | | | | | | |
| 10 | Plan for Revenue-Generating End Use | | | | | | | | | | | | |
| 11 | Develop and Sign Community Contracts | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| **III** | **Design Stage** | | | | | | | | | | | | |
| 12 | Civil Design | | | | | | | | | | | | |
| 13 | Distribution Design | | | | | | | | | | | | |
| 14 | Electro-mechanical Design | | | | | | | | | | | | |
| 15 | Cost Estimating: Equipment, Materials and Labor | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| **IV** | **Funding Stage** | | | | | | | | | | | | |
| 16 | Fundraising Research | | | | | | | | | | | | |
| 17 | Fundraising and Grant Writing Training or Assistence | | | | | | | | | | | | |
| 18 | Funding Solicitation-Letters of Inquiry, Grant Applications | | | | | | | | | | | | |
| 19 | Secure Funding | | | | | | | | | | | | |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **V** | **Pre-Construction** | | | | | | | | | | | | |
| 20 | Place the Electro-Mechanical Order | | | | | | | | | | | | |
| 21 | Define equitable labor input and Contruction Timeline with Community | | | | | | | | | | | | |
| 22 | Community Mobilization-Set clear goals and expectations | | | | | | | | | | | | |
| 23 | Obtain legal status for Community-based Organization | | | | | | | | | | | | |
| 24 | Skills Transfer Trainings | | | | | | | | | | | | |
| 25 | Complete Power-Use Agreement and Systems Rules | | | | | | | | | | | | |
| 26 | Clarify project management roles of community, NGO and International Operational Partners | | | | | | | | | | | | |
| 27 | Shipment of electro-mechanical equipment | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| **VI** | **Construction** | | | | | | | | | | | | |
| 28 | Ground Breaking Ceremony | | | | | | | | | | | | |
| 29 | Civil Construction | | | | | | | | | | | | |
| 30 | Erection of Distribution System-Transmission lines, house wiring, safety issues | | | | | | | | | | | | |
| 31 | Electro-mechanical installation | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| **VII** | **Commissioning** | | | | | | | | | | | | |
| 32 | Commissioning and testing the system | | | | | | | | | | | | |
| 33 | Completion of Power Management Structure | | | | | | | | | | | | |
| 33a | Bill Collection | | | | | | | | | | | | |
| 33b | Bank Accounts | | | | | | | | | | | | |
| 33c | Financial Management-Operation and Maintenance, Operators, Reserve Fund, Loan Repayment | | | | | | | | | | | | |
| 34 | Training of Operators | | | | | | | | | | | | |
| 35 | Opening Ceremony | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| **VIII** | **Post-Commissioning** | | | | | | | | | | | | |
| 36 | On-going support from community, NGO, Green Empowerment, Manufacturer | | | | | | | | | | | | |
| 37 | Project Review and Evaluation (one year after operation) | | | | | | | | | | | | |

# Feasibility Study

This guide focuses on the non-technical aspects of the feasibility stage. The feasibility study will be the initial blueprint for the project and will be developed and expanded as the project moves forward

Choosing The Right Community

1. Need and Desire for Electricity.
2. Strong Community Based Organization or Committee to work with the NGO.
3. Available Energy Resource.
4. Commitment of Local Resources for Project Development, including unskilled manpower, access to skilled manpower, capitol, and locally available materials.
5. Ability to Pay for the Power and Manage the Utility.
6. Economic Development Opportunities.
7. Willingness to Protect Critical Watersheds and other natural resources.
8. Potential for Project Replication.

Once we have determined that we are in the right community we can begin the quantitative detailed feasibility study. The following process represents our approach to feasibility studies. To assist our partners with future work we have created project development forms for each survey step.

Community Surveys

1. Community Issues to Address (Page 10-12)
    - This series of questions aims to help project planners think through the social and organizational issues that will need to be addressed through the entire process of project development.

2. Project Planning and Impact (Page 13-15)
    - This survey covers the necessary information that will be used to plan the energy project and think through the impacts of the energy system.

3. The Baseline Community Survey (Page 16-20)
    - This survey documents the economic status of the community through village based indicators. The completion of the survey will set a base line that will enable us to assess the success of the project in economic terms.

4. Power Use Survey (Page 21-23)
    - This is a house to house survey to determine the amount and type of power that is currently used in the village. This survey provides insight into energy demand and the acceptable rate structure in the community.

Technical Survey

This depends on the technology involved and will determine the potential supply of electricity. See separate Green Empowerment manuals dealing with technical issues or consult technical guides.

At this point the demand of the community should be determined from the power use survey and compared to the potential power from the resource in question. If the power potential is significantly less than of the demand, the project is not feasible from a supply perspective. If the supply and demand are within an acceptable range then the feasibility process should continue.

1. Complete a detailed survey of the site and community. This must be to a level that is acceptable for design purposes and will focus in the areas where infrastructure will be developed and where there are homes to be connected to the power facility.
2. Layout the transmission system with detail of where houses that will be connected are located and the size of consumer loads.
3. Site all Civil Structures and complete plans and drawings.
4. Make field observations including soil character and indication of instability in the land form where infrastructure will be constructed.
5. What are the available local building materials: wood, sand, and aggregate with the quality of those materials indicated.

After completing the community development and technical surveys, it is time to return to the office to compile the data and assess the feasibility of the site. The NGO must be careful at this point not to make promises to the community regarding a future project. Until the technical feasibility and the community feasibility are thoroughly investigated it is premature to assume that the project will continue forward.

Compiling the Data and Estimating Project Costs

In order to accurately determine project costs, detailed feasibility studies, engineering designs, and accurate cost estimates must be completed. These critical project components are often neglected due to the NGO's technical limitations and funding agencies reluctance to finance the work. NGOs in many cases move forward with project implementation after a very cursory pre-feasibility process and complete much of the design process in the field. This approach has the following negative consequences:

1. Incomplete feasibility studies result in inaccurate predictions of the potential energy available. This leads to, in most cases, an overestimation of the power output from the facility. This directly affects the communities' project related socio-economic development and the cost per Kw of installed capacity for funding purposes.

2. Sound engineering design is the foundation of the project's technical sustainability and are essential in predicting project costs. Poor designs result in

high operation and maintenance costs, system inefficiencies, and in the worst cases, system failures. They also result in numerous system modifications which delay project completion and further increase cost.

3. The cost estimates establish necessary project budget for funding purposes and for community contributions. Overruns in either case result in further funding efforts and unplanned additional community labor and contributions of cash and locally available materials.

It is generally necessary for NGOs to complete the pre-feasibility study before approaching funders for support for the specific project. These feasibility stage costs constitute approximately 10–15% of the total project cost. However, these costs for a properly completed feasibility study will easily be realized in savings through the construction period and throughout the life of the facility.

## Community Issues to Address

Project planners will need to consider and develop a plan for addressing the following issues:

**Is the community ready?**

- Does the community have the interest, organizational resources and determination necessary to complete the project and ensure its sustainability?

- What social projects, if any, has the community previously completed and what were the successes or failures in that effort?

- How much has the community worked with outside NGOs? What is the history of contact between the community and the NGO involved in this project?

- How much in-kind work, money or other resources are the community members ready and able to contribute to the project? What is the monetary worth of such contribution and how is that determined?

**Community Leadership**

- What organization currently exists in the community- leadership groups, churches, women's groups? Is there an existing committee to handle water or electricity concerns? How will one be created?

- Who are the community leaders and how are they chosen? The real leaders are not necessarily those who hold the positions of leadership.

- Are there individuals who will be able to step forward to take the roles of project management, technical operation and maintenance and financial management?

- How are women involved in the leadership of the community? How will their needs be addressed and their participation encouraged?

**Water and Electricity Demand**

- How is the community currently obtaining its electricity and water?

- What is the community demand for electricity and potable water for the home? To determine this, the organizers need to do a community survey interviewing all families and community members about their current

electricity and/or water use habits.(See Page 21) This community survey must also evaluate likely increases in population in the area.

- If the water or electricity is to be used for agricultural or light industry, the survey must also determine the typical family use of water for animals and for irrigation of family gardens.

- How will the energy system affect the local natural resources including rivers, fish, forests, underground water supplies, etc?

**Organization for the Project**

- How must the community be organized to own and manage the project?

- What community leadership structure is necessary to own, run, and maintain the project?

- How will this group function to mobilize community members at the survey, construction, and operational phases of the project?

- What is the proposed legal ownership structure of the project? If this is not done right at the start, there can be serious problems later on.

- How will the labor necessary to complete the project be mobilized equitably?

**Community Benefit**

- What benefits do community members expect from the project? This should be covered in the community survey.

- What social and environmental benefits do the organizers think might be achieved from this project?

- As the needs and wishes of women and children in the community are often not adequately considered, the organizers must ensure that women and children are interviewed and their needs addressed so that they are full participants in the project.

- Who will benefit from the project? And who will not?If some community members will not benefit from the project, what kind of community problems might this cause? How can negative effects be minimized?

**Training**

- What training will community members need to do the surveys and other preliminary work? What training in specific organizational skills will the

community need to run and maintain their project? What technical training will be necessary for the design and operation of the system?

- Who will provide this training, how will it be done, how long will it take and how much will it cost?

**Rate Structure and Project Income Generation**

- What is the community willing to charge itself for the service provided? This must be realistic and there must be firm commitment on the community's part to pay, or the project will not be sustainable! The community can compare a reasonable rate structure to what community members pay for nonessential items consumed in the community or what would be charged by a national electricity or water system.

- Are there any other methods of raising money from the project (such as agricultural processing, light industry, battery charging, etc.) in addition to a tariff on individual users or families?

- Is the rate structure for water/electricity or other income-generating uses of electricity sufficient to ensure the sustainability of the project?

- Do community members see the present or potential future use of the electricity to create jobs and businesses?

**Involvement of the NGO after completion of the project**

- Upon completion, how will the NGO evaluate the project against the goals and budget? Will this summary be provided to the community and other participants in the project?

- What possible needs might the community have for the NGO for technical or organizational help after completion of the project?

- Is the NGO prepared to provide such help? Can the NGO afford to provide such help?

**Budget for Community Development Component of the Project**

- How much should be budgeted for the community survey, organizational training, community benefits evaluation, training, rate structure, and post-completion work of the NGO?

- How should these costs be allocated within the budget?

- What potential sources of funding are there for the project?

## PROJECT PLANNING AND IMPACT

While geared toward electricity projects, this survey can be adapted for water projects.

| | |
|---|---|
| Province | |
| District | |
| Sub District | |
| Village | |
| Hamlet | |

### A. SUPPLY OF ELECTRIC ENERGY TO THE VILLAGE

1. Does electric supply currently
2. How many hours per day?
3. Is it reliable?
4. Is it available to the majority of the population?

*Notes:*

### B. WILLINGNESS TO CONNECT

**1. Number of households desiring to have electricity**

| | |
|---|---|
| | household |

**2. Average power demand desired by each household**

| | |
|---|---|
| | VA/household |

**3. Affordable initial connection fee per house**

| | |
|---|---|
| | $/household |

**4. Affordable monthly tariff per house**

| | |
|---|---|
| | $/household |

**5. Preferred periods of electricity service**

| | |
|---|---|
| Early morning | |
| Daytime | |
| Evening | |
| Night | |

**6. Number of villagers willing to contribute labor for construction works**

**7. Village interest in the management of the plant**

| | yes/no |
|---|---|
| only operations, maintenance and repair | |
| full operational and financial responsibility | |

*Notes:*

**C. ENHANCEMENT OF QUALITY OF LIFE**

1. Will electric energy be available for domestic appliances (iron, cookers, refrigerators), lighting or communication ?
2. Will electric energy be available for village infrastructure such as schools, clinics, community centers, public offices or stores?

*Notes:*

**Potential Energy Use-What is the expected demand for energy?**

| Activity | Volts/watts | per house | Village Total |
|---|---|---|---|
| Lights | | | |
| Power Tools | | | |
| TV | | | |
| Iron | | | |
| Radio | | | |
| Washing Machine | | | |
| Kitchen appliance | | | |
| Refigerator/freezer | | | |
| Other | | | |
| Total | | | |

**D. EMPLOYMENT DURING CONSTRUCTION**

1. How many construction workers will be employed? And for how long?
2. How many will be local?
3. Where will they stay ?
4. From where will they get their supplies?

*Notes:*

**E. POTENTIAL REVENUE-GENERATING USES OF NEW POWER**

1. What potential revenue-generating uses are being considered such as, agricultural processing, light industry, woodworking, battery charging or
2. What additional renevue could be generated from such uses?
3. How would such uses affect the overal demand for electricity and the effective utilization of the available electricity supply?
4. How many jobs could be created by the additional non-residential uses of electricity?

*Notes:*

**F. PERMANENT EMPLOYMENT FOR OPERATION AND MAINTENANCE**

1. How many people will be permanently involved with operation and maintenance?
2. How many of them will be local?
3. Are there staff of an existing (diesel) power station and distribution system?

*Notes:*

**G. EFFECT OF IMPROVED ACCESS TO PROJECT AREA**

1. Will access to the project area be permanently improved ?
2. Will existing roads or trails be affected by project features ?
3. Will access to nearby villagers or settlement be affected by project works ?
4. Will project features provide permanent river crossing ?

*Notes:*

**H. EFFECT OF PROJECT IMPLEMENTATION**

1. How will project implementation affect the region?
2. What positive affects are to be expected?
3. Will the area suffer any permanent disruption due to project implementation ?

*Notes:*

## BASELINE COMMUNITY SURVEY

This survey can be used as a baseline assesment to evaluate how the community changes with the new energy system, as well as for planning purposes.

| | |
|---|---|
| Province | |
| District | |
| Sub District | |
| Village | |
| Hamlet | |

**A. POPULATION**

**1. Number of inhabitants today**

| Age | male | female | Total |
|---|---|---|---|
| < 10 years | | | |
| 11-20 years | | | |
| 21-60 years | | | |
| > 60 years | | | |
| T o t a l | | | |

**2. Population growth**

| | inhabitants |
|---|---|
| Total population | |
| Population 10 years ago | |
| Population 20 years ago | |
| Anticipated Population in 10 and 20 years | |

| | |
|---|---|
| Average size of family | |

**3. Number of households**

| | |
|---|---|
| Number of households | |

**4. Education levels of adults**

| | Nr | % |
|---|---|---|
| No school at all | | |
| Elementary school, not finished | | |
| Elementary school, finished | | |
| Junior high school | | |
| Senior high school | | |
| College, university | | |
| Other ( training ) | | |
| T o t a l | | |

**5. Education of children**

| | Nr | % |
|---|---|---|
| Number of school aged children | | |
| Number in elementary school | | |
| Number in junior high school | | |
| Number in high school | | |
| Other | | |
| T o t a l | | |

**5. Employment situation of the head of family**

| | Nr. | % |
|---|---|---|
| Farmer | | |
| Informal Irreguar Employment | | |
| Trader, business man | | |
| Government Employee | | |
| Other | | |
| T o t a l | | |

**6. Average monthly income per household**

**7. Cost of living per household per day**

**B. PUBLIC INFRASTRUCTURE**

| | Nr |
|---|---|
| Public school | |
| Church | |
| Health post | |
| Government office | |
| Post office | |
| Cooperative - office | |
| NGO office | |
| Market with building | |
| Water supply system | |
| Other | |
| Grocery shops | |
| Handicraft center | |
| Other | |

*Notes:*

## C. VILLAGE PRODUCTION

### 1. Agricultural production

a. Number of households engaged in agricultural production

b. Average size of agricultural land per household

| | hectare |
|---|---|
| Irrigated land | |
| Other crops (corn;potato; bean;cassava;coffee, etc) | |
| Vegetables | |
| T o t a l | |

*Notes:*

c. Fruit trees

Number of households engaged in plantation of fruit trees

Average number of fruit - trees per household

| Type | Nr. |
|---|---|
| | |
| | |
| | |
| | |
| | |

*Notes:*

d. Commercial plants

Number of households engaged in plantation of commercial plants

Average number of commercial plants per household

| Type | Nr. |
|---|---|
| | |
| | |
| | |
| | |

*Notes:*

**2. Animals (total number in the village)**

| Type | Nr. |
|---|---|
| | |
| | |
| | |
| | |
| | |

*Notes:*

**3. Machinery (number and total capacity)**

| | Nr. | Capacity |
|---|---|---|
| Rice mills | | |
| Ordinary mills | | |
| Diesel generators | | |
| Battery charger | | |
| Tractors | | |

**4. Non - agricultural production**

*Notes:*

**D. LOCAL ECONOMY**

**1. Prices of locally produced products**

| Product | Quality | Price |
|---|---|---|
| | | |
| | | |
| | | |
| | | |

**2. Prices of commonly consumed products**

| No. | Descriptions | Unit | Unit Price |
|---|---|---|---|
| 1 | Sugar | | |
| 2 | Salt | | |
| 3 | Rice | | |
| 4 | Other grain_____ | | |
| 5 | Coffee | | |
| 6 | Cigarettes | | |
| 7 | A can of beer | | |
| 8 | A can of soft drink | | |
| 9 | Vegetable:…….. | | |

| | | | |
|---|---|---|---|
| 10 | Cow | | |
| 11 | Agricultural Seed_____ | | |
| 12 | Goat | | |
| 13 | Pig | | |
| 14 | Chicken | | |
| 15 | Duck | | |
| 16 | Fish | | |

**3. Number of appliances and luxury goods**

(Total numbers of units existing in the village)

| | Nr |
|---|---|
| Ordinary kerosene lamps | |
| Radio sets | |
| Television sets | |
| Electric fans | |
| Motorbikes | |
| Gas stoves | |
| Cars | |
| Other | |

## E. ELECTRIFICATION

**Existing installations or plants to provide electricity**

| | Nr. And type |
|---|---|
| by private enterprise | |
| by community effort | |

## Power Use Survey

In order to determine the appropriate renewable energy system for your community, you must both consider the supply, the amount and quality of the resource you have (water, wind, sun, biomass, etc.), and the electricity needs of your community. This survey is to help you determine the community energy needs. The following is a list of questions or tasks to be completed to determine the electricity demand in your community and to develop an appropriate tariff rate structure.

1. Draw a map of your project area. The map should be to a reasonable scale and should include: the powerhouse location and its associated parts (i.e. intake structure and penstock for hydro power); major topographic features such as streams, mountains, and roads; all houses and buildings in the community; and any other sites that will have power supplied to them. Number all the houses and other sites that will receive power from the project.

2. Make a table like the one below to be used with your project map to conduct your community power use survey.

| House # | Diesel (gallons) | Diesel ($) | Petrol (gallons) | Petrol ($) | Kerosene (gallons) | Kerosene ($) | Light Tariff | Total ($) | notes: |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 25 | 100 | | 0 | 1 | 7 | | 107 | 5 KW Generator |
| 2 | | 0 | | 0 | | 0 | | 0 | |

Note: ($) in local currency.

3. Conduct a house to house survey using the project map and community survey table to determine how much each family is currently paying per month for power. Possible power sources include: Diesel fuel for lamps and/or generators, Kerosene lamps, petroleum generators, battery charging, and light tariffs where one family pays another family for power from a generator. Make note of the cost of fuels that are being used in the village and determine the amount that each family is paying on a monthly basis using a table like the one shown above.

   This process will enable you to determine the amount of money that your community is spending on power currently. From this information an appropriate rate structure can be approximated. It is important to note the variation in power consumption by your community. This will help to determine the type of light packages that should be provided.

   **For example:** if your community is only using kerosene for lamps and power usage is evenly distributed, an equal distribution of power may be appropriate for your community. On the other hand, if the community has members who have diesel

generators and others who have only kerosene lamps a light package structure based on consumptive use may be more appropriate. This will be discussed further below.

4. During the house to house survey, inventory the appliances that each family currently owns. On the back of the electrical appliance will be its voltage requirement in watts and its current requirement in amperes. The required frequency in Hertz will also be noted. Make a table similar to the one below:

| House # | Existing Appliances | Current (amps) | Voltage (watts) | Frequency (Hz) | Appliances to be connected? |
|---|---|---|---|---|---|
| 1 | Refrigerator | | 100 | 50 | yes |
| | TV | | 50 | 50 | no |

5. Compare the power potential of your renewable energy site to the potential demand of the community. It is wise to underestimate the existing power potential at this stage to avoid future disappointments. The supply side of the local power system is primarily determined by technical factors.

   Now that you have determined the amount of power available and the community demand, the next step is to set the tariff structure.

6. The community must pay for the power it receives in order to make the project sustainable. In order to set an appropriate tariff structure range the monthly costs of the scheme must be considered. Monthly costs include: loan payment, operator wages, and operation and maintenance costs and development of a revenue fund for future expansion, repairs and parts replacement.

7. In determining the amount of revenue the project needs to generate to be sustainable, the community should not only consider residential demand but any potential revenue-generating activity that could be supported by the renewable energy system: agricultural processing, refrigeration, battery-charging, small machine shops or light industry such as wood-working.

   Ideally the project tariff structure will be sufficient to cover the monthly costs and generate extra or discretionary funds which can be used for community projects.

**Power Use Survey Template**

This survey can be used to determine the KW need of the community, and to determine a reasonable rate structure.

Community Name: _____
Survey Completed by: _____
Date: _____

Diesel Cost: _____
Kerosene Cost: _____
Petrol Cost: _____
Other Costs: _____

Local Curency: _____
1 US $ = _____

| House # | Existing Appliances (Type & watts) | Total (watts) | Diesel (gallons) | Diesel ($) | Petrol (gallons) | Petrol ($) | Kerosene (gallons) | Kerosene ($) | Total ($) | Notes: |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | |
| 2 | | | | | | | | | | |
| 3 | | | | | | | | | | |
| 4 | | | | | | | | | | |
| 5 | | | | | | | | | | |
| 6 | | | | | | | | | | |
| 7 | | | | | | | | | | |
| 8 | | | | | | | | | | |
| 9 | | | | | | | | | | |
| 10 | | | | | | | | | | |
| 11 | | | | | | | | | | |
| 12 | | | | | | | | | | |
| 13 | | | | | | | | | | |
| 14 | | | | | | | | | | |
| 15 | | | | | | | | | | |
| 16 | | | | | | | | | | |
| 17 | | | | | | | | | | |
| 18 | | | | | | | | | | |
| 19 | | | | | | | | | | |
| 20 | | | | | | | | | | |
| 21 | | | | | | | | | | |
| 22 | | | | | | | | | | |
| 23 | | | | | | | | | | |
| 24 | | | | | | | | | | |
| 25 | | | | | | | | | | |
| 26 | | | | | | | | | | |
| 27 | | | | | | | | | | |
| 28 | | | | | | | | | | |
| 29 | | | | | | | | | | |
| 30 | | | | | | | | | | |
| 31 | | | | | | | | | | |
| 32 | | | | | | | | | | |

## Community Energy Management Systems

The focus of this section on Community Energy Management System is to develop a methodology for community use in creating management systems for a sustainable renewable energy system and a comprehensive environmental plan. To succeed in developing a strong community energy management system, the community must address at least the following issues.

**Ownership.** Who will own the renewable energy project when it is completed? Generally, it is best to have some legal entity that is recognized as a non-profit by the laws of the country in which the project is located; this can be the community itself if it has legal status, a new non-profit, an umbrella non-profit with which the community works, or some other appropriate form. This is equivalent to what we call a 501 (c) (3) public charity in the United States, named after the section of the Internal Revenue Code that sets it up. The community needs to consider how to ensure that ownership stays in the public domain permanently and how the community will be able to prove ownership, i.e. registered documentation. Dealing with ownership questions up front is very important to avoid divisiveness on this issue among community members or between the community and outside forces later.

**Management.** The project needs leadership accepted by the village and linked to traditional village leadership. This leadership must have the skills to supervise all aspects of the project. The management must represent all sections of the community and have the ability to mobilize the community to perform all necessary work during the design, construction, and operation of the system

The **Design Phase** involves determining site feasibility and conducting the community energy survey of potential residential, commercial, light industry, or agricultural processing electricity demand. Management must determine how much electricity each house can use based on total generation capacity and the possibilities for increased generation as demand increases. Conservation and efficiency are critical and the management must also consider ways of lowering demand while serving villagers needs- use of more efficient light bulbs, developing uses to equalize the demand for electricity throughout the day. This phase of work also includes the community capabilities to support the project during construction. What contribution the community will make to the project in volunteer labor time, money, and donated goods. Determining what skills community members will need to be trained in and who would be appropriate for the training.

**Revenue issues** are very important for the community to consider from the beginning. The community needs to develop a rate structure for electricity that the community buys into. The management committee has to plan a method for collecting payments for electricity. In order to charge fairly, the community must also consider how

to monitor household electricity usage- meters, flat rate per appliance or household, etc. Answering these financial questions ensure that the community can pay operators to run the system, create a maintenance and repair reserve fund, and ensure that the system generates sufficient revenue to be self-sustaining. Although analysis of all potential income-generating uses of the electricity is the critical part of economic viability of the project, there are many potential revenue sources that can be built around a new energy supply, limited only by imagination and certain technical constraints. The Energy Use Survey, on page 23, will help determine reasonable energy rates.

The management needs to be able to provide **operational leadership** once the system is constructed. This includes managing the energy system operators, ensuring physical maintenance of the system, maintaining a spare parts inventory, and determining a maintenance and repair schedule

Management must also consider the **environmental impacts** of the renewable energy system at all stages of the project. Watershed protection and rainforest preservation is an integral part of a sustainable energy system. A community's renewable energy system cannot survive while its environment and the natural systems that sustain it are destroyed. Management must consider the impact of the project on the environment as early as the design stage. To do this effectively, the management must lead the community in inventorying environmental condition of the area surrounding the energy system, developing plans for environmental protection, and developing plans for rehabilitation of the environment where it has already been degraded

The community should discuss early on who would best serve on the management committee. Generally, they will want individuals with some experience in management, the skills necessary to carry out the types of tasks discussed above, and who are well respected in the community.

See System Ownership Document on Pages 26-28
See System Agreement on Page 29
See System Rules on Page 30

**Ownership Agreement**

_____ (name of NGO), a non-profit charity located in _____ (City/Region) and recognized under the laws of _____(country), Federal ID #_____ hereby give and irrevocably cede to the _____(name of community ownership committee) all rights, responsibilities and ownership of all the equipment, materials, and structure for the _____(name of community) Hydro Power System in _____ (location), including, but not limited to the civil works, the power house, generating machinery, and transmission system as more specifically set forth in Schedule A, attached to and incorporated herein, for one dollar ($1.00) and other valuable consideration as is more specifically set forth below.

The_____(community ownership committee) in consideration of the above described donation by _____(name of NGO) agree to the following principles of a Sustainable Renewable Energy System as set forth in Schedule B, attached hereto and incorporated herein. In further consideration, and as part of the total consideration given by the _____(community ownership committee) for the _____(name of community) Hydro Power System, the _____(community ownership committee) commits, promises and agrees to develop and implement a Community Environmental Plan in coordination and support of the _____(name of community) Hydro Power System, as set forth in Schedule C, attached hereto and incorporated herein.

_____(NGO) and _____(community ownership committee), the Parties herein, further agree to do all such further actions and execute all such further documents as are necessary to give effect to the above transfer of legal title to the _____ (community ownership committee) and all equipment, machinery and facilities appurtenant to it.

The Parties, or any one of them, may execute this Agreement in counterpart and the signatures may be transmitted by fax. When all Parties have signed the original document or counterpart, the agreement shall immediately be legally binding and have full legal effect as construed by the laws of _____(country).

Dated:_____

| | |
|---|---|
| _____(signature) | _____ (signature) |
| _____(name) | _____ (name) |
| For: _____(name of NGO) | For:(community ownership committee) |

## Ownership Agreement

## Schedule A

The following is a list of the facilities, structures, equipment, and machinery title to which will vest with signing of the Agreement in _____(community ownership committee).

- (itemized list of equipment)
- (itemized list of civil structures)

## Schedule B

The following comprise the Sustainable Renewable Energy System as part of the consideration for ownership vesting in _____(community ownership committee).

- An **Organization Plan** that describes who will own the project and how the ownership group will be structured and governed.

- A **Community Survey** that specifically sets forth all the anticipated demand for the Long Lawen electric system: residential, agricultural processing, small industry, and communal (such as schools or clinics).

- A **Training Plan** that sets up standards for training workers, such as line workers, in the construction of the system, operators once the system is commissioned and individuals responsible for the financial management of the system.

- An **Operational Plan** that sets forth who will operate the project once it is commissioned, what the criterion for operators will be, what their duties will be, how they will be chosen and/or replaced, and how they will be compensated.

- A **Financial Management Plan** that sets forth how the system will charge for electricity for residential, agricultural, small industry, and communal use.

- A **Maintenance and Reserve Plan** that sets forth a schedule for maintenance and a timeline and goals for development of a reserve fund to pay for maintenance, repair and replacement parts.

**Ownership Agreement**
**Schedule C**

The following comprises the Community Environmental Plan as part of the consideration for ownership of the _____(name of community) Hydro Power System vesting in _____(community ownership committee):

- A **Watershed Survey** that surveys and tabulates the condition of the watershed that supports the _____(community) Hydro Power System: how big is the area, how many people live in the area, how much of the watershed is primary and secondary forest.

- A **Reforestation Plan** that sets forth goals and plans for the community to rehabilitate and preserve the watershed with replanting: where will the seedlings come from, what varieties will be planted, where they will be planted and how they will be tended.

- A **Sustainable Environmental Use Plan** for the watershed: what uses and practices will be allowed and what prohibited in the watershed.

- A **Watershed Management Plan** that sets forth how the community will organized and manage the watershed survey, reforestation plan, and sustainable environmental use plan.

## Sample Power Use Agreement

I _____ from House No. _____request to use _____ (No. of bulbs) and _____ (No. of Plugs) in my home. I _____ agree to the terms of the (name of community) Power System Rules. I agree to pay $__ /15 watt bulb / month and $/ plug connected with a 2 amp MCB. Payment is due on the first day of each month. Late payment will result in the following penalties:

1 Month Late: $___ / Bulb & $__ / Socket
2 Months Late: $__/ bulb & $__ / Socket & Disconnection
Service will remain off until all fines are paid.

I _____ understand the terms of the (name of community) Power Use Agreement and agree to pay $____ / month.

Signature _____
Name _____
Date _____

## Sample Power System Rules

**Community_____**
**Date_____**

1. Only 15 watt light bulbs can be used.
2. $__ / month for each 15 watt bulb (in room), 6 max.
3. $__ / month for each 15 watt bulb (on porch), 6 max.
4. $__ / month for plug receptacle with 2 amp MCB.
5. All MCBs located on the porch where it can be inspected.
6. Plugs for day use only on phase line 2 (L2) accept for communal use at (name sites) (6:00 AM to 6:00 PM).
7. Light use at night (6:00 PM to 6:00 AM) from line 1 (L1).
8. No system changes without management approval.
9. $__ / day for operators of power house and transmission lines.
10. $__ / day for bill collectors and house wiring inspectors.
11. $__ / month for reserve O&M fund.
12. When someone can not pay late fees and disconnection policies apply.
13. All houses on system are recorded outside the door.
14. All lights and sockets connected with MCBs (Light: 0.5 amp, Socket: 2 amp).
15. Maximum # Sockets = 15 day use (15 x 500 watts = 7.5 KW)
16. Maximum # Lights = 400 night use (400 x 15 watts = 6.0 KW) plus the night time socket use (3 x 500 watts = 1.5 KW) (Total = 1.5 KW + 6.0 KW = 7.5 KW)
17. Light bulbs will be purchased by the users.
18. One month late payment: $__ / bulb, $__ / socket. Two month late results in disconnection and $__ / bulb and $__ / socket.
19. New homes can be connected to the system if the maximum # of bulbs and sockets is not exceeded. New consumers will pay for their own house wiring. Wiring will be the same as the rest of the system and will be installed and inspected by the system operators.
20. Bills will be given when payment is due and records will be maintained by the management committee.
21. All funds will be kept in the bank and balance reports will be made at community meetings.
22. Each consumer head of household will sign a power use agreement prior to connection.
23. System rules will be kept by the (name of community) management system.
24. The organization is named the _____and will be officially registered.

# Organizational Relationships

Green Empowerment's development model can be used as an example of how community-based renewable energy projects can be implemented through partnerships between the community, a local NGO and a foreign facilitating NGO.

**Green Empowerment's Development Model**

Green Empowerment is an international development organization that provides technical, organizational, media, public relations, and financial support to non-governmental organizations (NGOs) in less developed countries to successfully construct community-based renewable energy systems associated with residential electricity, economic development, potable water, and watershed protection.

Our development model is based on the working relationship between Green Empowerment, a local technical NGO and the community benefiting from the project – very much like the three legs of a stool. Each entity has their respective and important roles that complement, harmonize and support one another and lead to the ultimate success and sustainability of the renewable energy projects.

When considering a new project, Green Empowerment first determines whether or not there is a strong technical NGO involved and if the community is organized, prepared and committed to the project. It is important that our values are compatible with one another. We proceed carefully at this stage of our relationship, so that everyone's time and resources are considered and used effectively. We work to establish long-term relationships based on mutual respect and trust and take our commitments very seriously.

Dialogue is a crucial part of our development model. We strive for clear, open and honest communication. We want our partners to understand exactly what we can and cannot do and we want to fully comprehend the needs and aspirations of those with whom we work. We take the time necessary to learn about potential partners, their abilities, values and track record, and encourage them to make a similar evaluation of Green Empowerment.

We believe in raising the capacity of our NGO partners, helping them build organizations that are strong, stable, independent and sustainable. We believe in the community's ability and right to create, manage and possess their own renewable energy systems. We believe that with appropriate assistance, communities will generate economic opportunity locally and develop their natural resources wisely.

Our development model is not an abstraction. It is a concrete manifestation of our values - social justice, local leadership and sustainability - and our experience.

**The Role of Green Empowerment**

The role of Green Empowerment is to work with local NGO and community partners to develop renewable energy projects, which promote social justice, local leadership, and sustainability. The support we provide involves the following technical, organizational, media, public relations, and financial components:

1) To build communication, cooperation and alliances between different international development organizations working in the same region. Cooperation among organizations with similar missions and skills will allow us to serve more communities. Cooperation with organizations with different missions, such as medical care, education, and land rights, will allow us to address a broader array of community needs.

2) To provide technical and organizational advice and support to the NGO - - such as helping to solve problems like voltage regulation, assisting in the creation of a project business plan or determining the best source from which to buy project equipment. Green Empowerment encourages the sharing of technical expertise and technology transfers among its partner NGOs.

3) To coordinate and facilitate trainings for the NGO to increase their technical and organizational abilities. These trainings include community surveys of power demand and potential usage, site selection, the budget process, choice of appropriate technology, environmental assessments, feasibility studies, civil design, operational & fiscal management, micro-enterprise development, long term planning, and grant writing.

4) To provide seed money and matching grants that can initiate and leverage the efforts of the NGO to raise the money needed for a project and/or provide capacity grants which help to build their organizational capacity.

5) To popularize NGO achievements in developing sustainable energy systems and related environmental protection plans through the media, the internet, and other written and visual sources. By publicizing these projects, Green Empowerment will help develop support for more community-based renewable energy projects internationally and give greater visibility and credibility to the NGOs that are featured.

The role of Green Empowerment is to support the NGO and to ensure the highest degree of project success and long-term NGO viability. Green Empowerment will assist the NGO in obtaining the technical abilities and financial support to implement economically and environmentally sound community-based renewable energy projects in their countries and the organizational capacity needed to become sustainable.

**The Role of the NGO**

Our NGO partners are local and regional organizations with legal non-profit status within their countries and core values compatible with those of Green Empowerment. These NGOs have strong ties to local communities and extensive community development experience. They have the desire to assist the community with renewable energy project

implementation and the technical capacity to see projects through to successful completion.

The NGO will have the ability or the capacity to learn to:

1) Evaluate whether a community has the interest, organizational resources and determination necessary for long-term sustainability of the project and to encourage the community to mobilize all its members- men, women and children.

2) Work with the community to conduct a detailed and accurate community survey of residential, commercial, light industrial, agricultural, and other community uses of and demand for the electricity.

3) Help the community develop the leadership for ownership & management of its renewable energy system and related watershed/environmental plans.

4) Complete design specifications for all aspects of the plan, including present and future electrical demand, rate structure, construction budget, financial management, and necessary technical training.

5) Mobilize the community in creating a plan for the overall project that addresses not only the electrification goals of the project, but also how their renewable energy system will improve social conditions within the community and the local environment.

6) Conduct equipment and materials procurement efficiently and effectively.

7) Supervise and participate in all project development work. This includes feasibility studies, design, cost estimates, proposal preparation, financing, project management, community mobilization, construction, training, operation, maintenance, and business development.

8) Train community members in all necessary skills both during the feasibility and construction stages and for operation and maintenance afterwards to ensure project viability

At the feasibility and construction stages of a project, the NGO will have the leadership role, progressively transferring system responsibilities and ownership to the community. After the project is operational, the community will be in control of its renewable energy system and the NGO's role should be one of assistance and monitoring.

**The Role of the Community**

The communities we work with are very organized and often have previous experience in completing local social projects. Sometimes they have worked with our partner NGOs for

a number of years. The community will work together with the NGO through all stages of project development. They will determine their own needs, desires and priorities in regards to the renewable energy project. The community will contribute the unskilled and semi-skilled labor needed, locally available material such as wood, sand, and gravel, and financial assistance to the extent possible. Community members will be trained in all the skills necessary to operate, maintain and repair their system. After project completion, the community will assume ownership and management of the energy facility.

The Community, either independently or in cooperation with the NGO, will:

1) Create an organization of community members that will work with the NGO to build the renewable energy system.

2) Assist the NGO with the community survey, the site feasibility study, project design, and construction.

3) Conduct the community survey to determine potential community power demand and allocation that includes residential use, small industry, commercial enterprises and agricultural processing possibilities.

4) Manage the community financial and labor contributions to the project.

5) Develop a long-term operational and management structure plan that is financially self-sustaining.

6) Determine the sustainable rate structure for the electric system and identify community revenue-generating activities that can be initiated with the renewable power.

7) Identify or create the community entity that will have legal ownership of the project and how that ownership will be recognized.

8) Identify who in the community will need training for long-term care and operation of the energy system.

9) Create and manage the operation and maintenance fund.

10) Participate in the watershed mapping process and develop a plan for protecting, conserving and restoring the local environment.

## Partnership Roles

This simple chart can be used to outline the roles, contributions and responsibilities of all of the partners in the project, such as the community input, the NGO, local government, foreign NGOs, funders, etc. It is essential to establish clear roles from the inception of the project to avoid miscommunications once the project has begun.

| Partners | Roles, Contributions and Responsibilities |
|---|---|
| | |
| | |
| | |
| | |
| | |

## The Budget Process

The budget process is critical at all stages of the project. Underestimating or overestimating the costs, or worse forgetting some necessary costs, can have a significant effect on the project's viability. Generally, we do better at budgeting for the technical aspects and equipment of a project and less well in considering and planning for the organizational and financial issues involved in successfully building a community-based renewable energy project.

If the feasibility stage does not adequately prepare the base for evaluating and creating a budget for the non-technical issues, they either will not get done or will be done in a rushed and incomplete fashion. Frequently as these costs are not considered, it means that the local NGO ends up bearing many of these costs as an invisible demand on their limited internal resources.

If these costs are not evaluated, often the true cost of a project is understated. The community contribution in sweat equity and NGO feasibility preparation necessary to achieve funding is also often overlooked.

The purpose of this guide is to make us look more clearly at these non-technical costs and then budget for them in detail.

Once the budget has been prepared, it can be submitted as part of a proposal to potential funders of the project.

| **Sample Budget** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Date** | | | | | | | | |
| **Items** | **NGO** | **Local Government Entity** | **National Government Entity** | **Community** | **International Donor** | **Green Empowerment** | **Requested** | **Total** |
| **NGO Office- Capacity for Project** | | | | | | | | |
| Rent ($/month x _months) | | | | | | | | |
| Office Supplies ($/month x _months) | | | | | | | | |
| Phone ($/month x_months) | | | | | | | | |
| Internet ($/month x _months) | | | | | | | | |
| | | | | | | | | |
| **Feasibility** | | | | | | | | |
| Initial Work with Community | | | | | | | | |
| Assessing Energy Resources | | | | | | | | |
| Assessing Energy Demand | | | | | | | | |
| Site Selection | | | | | | | | |
| Environmental Evaluation | | | | | | | | |
| Prepare Initial Written Feasibility Report | | | | | | | | |
| | | | | | | | | |
| **Community Plan- Required Visits** | | | | | | | | |
| Determine Local Contribution ($/visit x _ visits) | | | | | | | | |
| Local Management Structure ($/visit x __visits) | | | | | | | | |
| Develop Power Use Agreement and Community Sytem Rules | | | | | | | | |
| Revenue Determination: Residential Rate Structure/Income Generating End Uses ($/visit x __ visits) | | | | | | | | |
| Additional Community Mobilization ($/visit x __ visits) | | | | | | | | |
| Rental of vehicle ($ x __ visits) | | | | | | | | |
| Fuel | | | | | | | | |
| Lodging ($/night x __ visits) | | | | | | | | |
| Meals | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Design Stage** | | | | | | | | |
| Civil Design | | | | | | | | |
| Distribution System | | | | | | | | |
| Electro-Mechanical Design | | | | | | | | |
| Cost Estimating-Contacting manufacturers | | | | | | | | |
| | | | | | | | | |
| **Funding Stage** | | | | | | | | |
| Fundraising Research | | | | | | | | |
| Fundraising and grant writing Training | | | | | | | | |
| Funding Solicitation- Letters of Inquiry, Applications | | | | | | | | |
| | | | | | | | | |
| **Pre-Construction** | | | | | | | | |
| Construction Timeline (___hrs at $/hour) | | | | | | | | |
| Obtaining Legal Status for community organization | | | | | | | | |
| | | | | | | | | |
| **Construction** | | | | | | | | |
| Ground Breaking Ceremony | | | | | | | | |
| Project Management ($/month x __months) | | | | | | | | |
| Non-specialized labor from community (how many hours/what rate) | | | | | | | | |
| Skilled labor (how many hours/what rate) | | | | | | | | |
| Equipment Design and Procurement | | | | | | | | |
| Technical Advice-Consultants | | | | | | | | |
| NGO Staff Support ($/month x __ months ) | | | | | | | | |
| | | | | | | | | |
| **Commissioning** | | | | | | | | |
| Completion of Power Management System | | | | | | | | |
| Opening Ceremony | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Post-Commissioning** | | | | | | | | |
| Follow-up ($/visit x _visits) | | | | | | | | |
| Project Review and Evaluation- 1 Year | | | | | | | | |
| | | | | | | | | |
| **Training** | | | | | | | | |
| NGO Staff Training* | | | | | | | | |
| Installation Training** | | | | | | | | |
| Community Training | | | | | | | | |
| | | | | | | | | |
| **Other** | | | | | | | | |
| Wire Fees | | | | | | | | |
| Telephone and Mailing | | | | | | | | |
| | | | | | | | | |
| **TOTAL** | | | | | | | | |
| Contingency for Equipment Price and Currency Fluctuation 5% | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| ***Staff Training Detail** | | | | | | | | |
| Airfare | | | | | | | | |
| Lodging (_ people, _ days @ $$) | | | | | | | | |
| Training Space Rental | | | | | | | | |
| Materials | | | | | | | | |
| Salary at training | | | | | | | | |
| Travel to Community | | | | | | | | |
| Subtotal | | | | | | | | |
| | | | | | | | | |
| ****Installation Detail** | | | | | | | | |
| Airfare | | | | | | | | |
| Lodging (_ days x _ people) | | | | | | | | |
| Materials | | | | | | | | |
| Salaries during installation | | | | | | | | |
| Travel to Community | | | | | | | | |
| Subtotal | | | | | | | | |

**Sample Monthly Operational Budget**

This sample budget shows how revenue from the community contributions for electricity use can not only provide for the maintenace and operation of the system, but can also create a reserve fund for system repairs, upgrades or other community projects.

| **Maintenance and Operation Expenses** | | |
|---|---|---|
| Number of Power House Operators | Salary/Month | Total |
| 3 | $40 | $120 |
| Number of Bill Collectors and House Wiring Inspectors | Salary/Month | |
| 2 | $40 | $80 |
| | | |
| Maintenance of Energy System (minor repairs, replacements and cleaning) | | $75 |
| | | |
| | Total: | $275 |
| | | |
| **Operation Revenue** | | |
| Number of Households | Average Monthly Payment | Total |
| 75 | $5 | $375 |
| | | |
| | Balance for Reserve Fund: | $100 |

## LOCAL RESOURCES ASSESMENT

In addition to planning purposes, use estimates for calculating in-kind contributions of community. It is important to show the value of the community contributions to other cash funders.

### Human Resources

| Item | Cost/Unit | Total Units Needed for Project | Total Value |
|---|---|---|---|
| Unskilled labor wage per day per person | | | |
| Mason wage per day per person | | | |
| Carpenter wage per day per person | | | |
| **Civil Work Resources Item** | | | |
| Stone, if locally available | | | |
| Stone, if has to be from outside | | | |
| Sand, if locally available | | | |
| Sand, if has to be from outside | | | |
| Aggregate, if locally available | | | |
| Aggregate, if has to be from outside | | | |
| Wooden plank, if locally available | | | |
| Wooden plank, if has to be from outside | | | |
| Wooden bulk, if locally available | | | |
| Wooden bulk, if has to be from outside | | | |
| Cement | | | |
| Corrugated zinc roof | | | |
| Diesel oil | | | |
| Transport to the nearest city per person | | | |
| Transport to the nearest city per kg of goods | | | |

## Proposal Template

If you can answer these questions, you have the information you'll need to write a proposal for funding. While each foundation and granting agency has their own unique requrirements, most include this basic outline.

- Briefly describe the project, as if talking to someone who didn't know anything about it.

- Who will this project serve and where will it be located?

- What problems or needs does this project address?

- What are the project conceptual goals?

- What are the project objectives? These are the measurable outcomes – they are tangible, specific and concrete.

- How will this project be implemented and by whom?

- What is the timetable for the project?

- What is the project budget? Estimate all resources required for completion including: time, space, staff, consultants, volunteers, equipment, travel, shipping, postage, phone, supplies, etc. Provide the total projected project budget, matching funds, in-kind contributions and money still needed (to be requested or raised). Provide a budget narrative that will explain budget line items.

- How will this project be sustainable?

- Who are the project partners? Use the provided roles and responsibilities form to list all partners and their contributions to the project.

- Describe your organization in a brief statement that includes: name, history, purpose, activities, expertise and ability to carry out the project.

# Project Evaluation

A community that builds a renewable energy system encounters incredible foreseen and unforeseen changes. It is essential that the NGO learn from the completed project both as it is completed and in following years to build on their experience in the future..

Community renewable energy projects can be evaluated in various ways. While some of the markers of a successful project are quantifiable (e.g. number of households which have lights), other impacts are more subtle. Here are some real life examples of secondary results:

- An unforeseen result of a micro hydro project in an isolated Guatemalan village was that fresh fruits and vegetables became available in local markets since the improved road to the community meant shorter transportation time to regional markets where vegetables were sold.
- In a Honduran town, one woman noted that marital relationships had changed since men stayed out past sundown more often.
- In Borneo, a community that completed their own micro hydro system "feel more united and strong in their struggle for rights and self-determination."

Baseline Community Study (pages 16-20) can be used to evaluate how the community has changed economically and socially.

**Some questions to consider when evaluating the impact of a community renewable energy system:**

**Technical**

How many people have access to electricity, in their home and public places?

Is the system operating smoothly? Are there necessary repairs, upgrades or improvements in operation?

**Economy**

What do they use the electricity for?

Have revenue-generating uses been developed?

Do people spend less on their energy need? If so, what do they use the savings for?

How has the local economy changed? Have new businesses opened? Are more products made at home, such as handicrafts? Do farmers get a higher price for agricultural products that may now be milled?

**Society**

How has the general "community spirit" changed? Are they more united, or have tensions arisen?

Do people gather in public places more or do people stay in their own homes more often?

Has the population grown due to people migrating to the village with its improved infrastructure?

How has access to electricity changed the community's relationship with other surrounding communities that may not have electricity? Is there more contact due to improved road access?

How have gender relationships been affected? How have women, men and children been affected differently by the change?

Has a community fund been developed? What is the fund used for? How has it affected how people think of saving and generating income?

Do people read and write at night? Watch TV? Do chores later?

**Organizational**

Have the power regulations, rate structure and management systems been functioning well?

How have the organizational relationships between the community, community committee, the local NGO, international NGO and other non-governmental and governmental entities developed?

What plans do they have for future development?