



Fundación Energía sin Fronteras

FOCUS ON SUSTAINABILITY

Overview of the
sustainability criteria
and factors of solar
off-grid projects



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Overview of the sustainability criteria and factors of solar off-grid projects

For each of the 5 dimensions of the sustainability (technical, economic, social, institutional, environmental), specific criteria need to be considered in order to maximize the sustainability of a project. Each criterion is broken down in crucial factors to achieve the best outcome possible.

This report describes the most important sustainability criteria and factors, as identified by Esf and international developers in their projects.

TECHNICAL SUSTAINABILITY

Criterion T1. The most appropriate technology and technical design of the project has been selected.

Crucial factors

- Gather knowledge about the desires and needs which are considered a priority within the community before starting the project's design. Analyzing periodically whether these needs and desires remain the same or change over time is a necessity.
- Carry out an analysis of alternatives.
- Study the capacity to buy equipment and spare parts as well as maintenance in its local context.
- Know legal norms and national management programs.
- Consult the possible help of organisations offering the technologies concerned.
- Carry out risk and performance assessments in order to better prevent or mitigate error.

Criterion T2. An appropriate Plan to Operate, Maintain and Replace (POMR) is available, and it is adapted to the capacities of the new owner, the operators and local technicians.

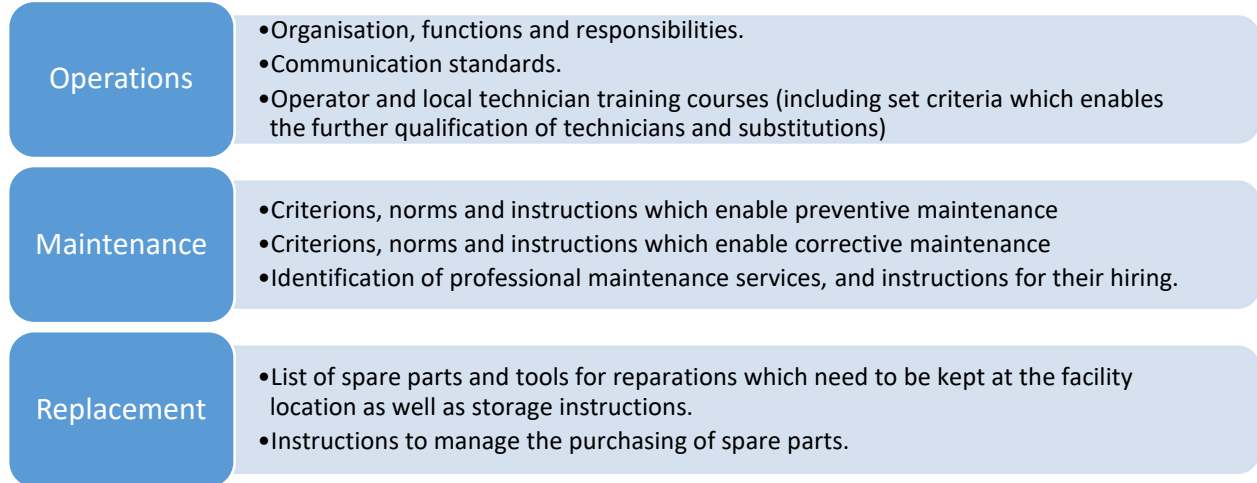
The POMR must cover operations, maintenance and replacement (Figure 1). Furthermore, the POMR needs to specify the instructions to keep record of incidents and the mechanisms which calculate the demand of the users. The POMR needs to be passed on to the owner and/or manager in the execution phase of the project and its content must be explained with practical examples.

Crucial factors

It is essential to guarantee that the owner and/or manager has the capacities required to manage the new facility. More specifically, the owner must be able to:

- Organise the training of local operators and local technicians.
- Elaborate a strategy to fill the gap if local resources are missing.
- Have the sufficient financial and technical capacities.
- Have a pre-organised and self-sufficient training scheme with the required frequency of formation.
- Have a clear understanding of what to do in the case of any incident.
- Have a clear understanding of how to manage the purchasing of spare parts. This is particularly important in case of imported spare parts.

Figure 1. Basic elements of a Plan to Operate, Maintain and Replace (POMR)



Criterion T3. Complete documentation is available on the site about the installation and management of the facilities is available, in a way that is comprehensible to the local population.

Crucial factors

- All the documents referring to the facility need to be deposited at the facility. This includes the documents which have been provided by the supplier as well as the documents developed during the execution of the project. This also concerns documentation of warranty services.
- The instruction books, paperwork and guidance need to be written in languages which will be easily understood by the local technicians and managers.
- The documents need to be kept in an adequate location; they need to be easily accessible when needed as well as being in the right hands.

Criterion T4. The operators have been trained to operate the facilities properly and safely.

Crucial factors

- The managers have to be explained the functioning of the concerned technology and be familiar with the possible risks which may occur.
- Didactic information is to be provided as well as the instruction books.
- They need to have been formed on how to act in the case of an accident.
- They need to be fully aware of how to dispose of waste.
- They need to be aware of the measures to prevent robbery and sabotage.

Criterion T5. A monitoring and support plan is available to the community (needed when local technical capacities are considered poor).

Crucial factors

The monitoring plan must identify:

- Parameters to monitor.
- Long distance communication systems.
- Procedures to communicate incidents.
- Trustworthy contact.
- Local help in case of the occurrence of problems.
- Suppliers and managers in charge of ensuring professional maintenance.
- Paperwork from the associate or local partner.

ECONOMIC SUSTAINABILITY

Criterion E1. Costs derived from the operation, maintenance, replacement of equipment and management of the service, have been estimated.

Crucial factors

The following costs must have been determined:

- The maintenance, replacement of equipment and operational costs for the estimated lifetime of the facilities.
- Community strengthening, including the formation of managers and local technicians to insure the correct usage of the facilities. These formations need to be maintained in order to guaranty local technical capacities.
- The administration of the services (management of consumption, storage, finances, ect.)

Criterion E2. A financial plan has been foreseen to cover these costs

Critical factors

- The subsidies offered by local institutions have been identified and the potential agreements have been contracted.
- The distributions of responsibilities for the paying of operational costs between the different parties involved, designing a mechanism which insures that these costs will be covered.
- The calculation of the rate to be paid by users of the service.
- It has been established that this rate is affordable for the local community.

Criterion E3. The risks of failure of commitments have been estimated.

Crucial factors

- The capacity and willingness of the community to pay for the service that have been identified.
- If local communities are unable to pay, an alternative solution has been established.
- The capacity and willingness of the institutions to comply with the engagements which have been undertaken.
- Other solutions have been identified in the case of noncompliance.

Criterion E4. Bank accounts are available and measures are clearly identified to guarantee that they are handled in a secure and transparent manner

Crucial factors

- Bank accounts and deposits have been established for the economic management of the system.
- Those responsible for their management have been designated.
- They have been given the necessary training and have the required knowledge and skills
- They have been given measures to comply with to insure its transparent management.

SOCIAL AND ORGANISATIONAL SUSTAINABILITY

Criterion S1. The project team has sufficient knowledge of the local community, the area and the institutional context.

Crucial factors

- The counterparty or local partner has been analysed and deserves trust.
- A study identifying social, cultural and economic aspects of the zone and its surroundings has been prepared
- Excursions have been carried out on terrain to better understand and analyse these aspects.
- The processes of participation with adequate spaces is important, dialogue between community and other contributors of the project needs to be promoted.
- The results of participation through these processes give an idea of the demands and needs of the users.

Criterion S2. The project corresponds to a top priority need of the community.

Crucial factors

- It has been proven, through processes of participation, that the project satisfies the expectations of the community and allows a sustainable and equal access to both men and women.
- Women have been consulted in this process.
- Local institutions have been consulted and they have taken part in the decision making.

Criterion S3. All project stakeholders have been identified and their responsibilities defined and committed.

Critical factors

- The final ownership of the project has been identified. The owner knows and endorses in the compromises which derive from his ownership. If he can't take on the management of the project, another person has been identified to take on such a responsibility.

- It has been established that the manager has the capacity to carry out his task and fully endorses in it. His responsibilities have been clearly specified. The status and responsibilities have been pledged through an agreement.
- If it's the local community who is going to be in charge, a local Management Committee or an equivalent has been set up. Advice and formation has been provided for the construction and functioning of this said community (help in identifying members forming the community, collaboration in formulating its rules and functioning, help in the drafting of responsibilities, the way in which economic activity should be managed, what the relation of the owner is, etc.).
- The transfer of knowledge and responsibilities to renew the management committee has been guaranteed.
- Other possible actors have been identified (local and regional institutions, collaborators, maintenance centres, formation centers, etc.). The different responsibilities of each one of them have been defined and their possible contributions have been agreed upon. The relevant agreements have been signed.

Criterion S4. The community has correctly appropriated the project. Knows the benefits and accepts its responsibilities.

Crucial factors

The community has been informed about the usage of the facilities as well as the potential risks which are involved, more particularly about:

- Precautions during routine operation.
- How to act in the case of an emergency.
- How to minimize waste and the general environmental impact.
- Precautions to avoid accidents.
- Prevention of burglaries and sabotage.

The community has participated in the decision making. During the execution of the project, the community has accepted certain responsibilities and tasks. More particularly, it has been established that the community:

- Possesses the minimum knowledge which enables a good understanding of the technologies characteristics and their necessities.
- They know and value the benefits provided by the project as well as understanding and accepting the commitments involved.
- They have the knowledge required in order to carry out the tasks which concern them.

The community has been informed (if relevant to the service) about long term support.

INSTITUTIONAL SUSTAINABILITY

Criterion I1. The analysis of the institutional context, at country level, has been carried out.

This analysis looks at:

- Policies of the public sector.
- Development plans which could impact the project, for example: If there are any development projects, infrastructure or energy services in the area designated for the project, etc.
- Aid provision strategies or priority activities defined by administration.
- Possible aid in the local context of the project.

Criterion I2. Local, national and international institutions involved in the project have been identified and their responsibilities and commitment have been agreed upon.

Potential actors aside the local ones have been identified (national institutions, collaborators, maintenance centres, formation centres, etc.). The responsibilities have been clearly defined and have been accepted. The adequate agreements have been signed.

Criterion I3. If external funders are involved, the corresponding requirements to be met by the service and/or users have been defined and agreed upon.

Crucial factors

- The service meets the criteria demanded by the financial institution.
- The users have been informed about and accept that they need to meet the set criteria.
- The responsibilities have been clearly set out and have been accepted. The relevant agreements have been signed.

ENVIRONMENTAL SUSTAINABILITY

Criterion A1. The project team knows well the environmental context of the area as well as any local or national environmental law which could apply to the project.

Critical factors

- It has been identified that the concerned area is a natural reserve, a protected site etc. And the implications have been taken into account.
- Research regarding potential environmental legislation has been carried out, if any apply, an Environmental Impact Study has been handed in to the local authorities or the relevant financial institution.

Criterion A2. An analysis of environmental impacts of the execution and operation of the project has been carried out.

Critical factors

- The effects on the natural surroundings (landscape, fauna, flora, vegetable species and cultural/natural heritage).
- The consumption of water, combustibles and/or chemicals.
- Emissions of dust, noise and vibrations.
- The release of contamination into rivers, lakes, reservoirs or the sea.
- The risk of environmental accidents and the measures taken to prevent them.

Criterion A3. A waste management plan has been established to safely treat or dispose of waste generated during the execution phase.

Crucial factors

A plan taking the following points into account has been prepared:

- Plant-based waste.
- Excavation, construction and demolition waste.
- Industrial waste (electrical, urban, metallic, packaging and contaminated dust, concrete, chemical substances, etc.).
- Contaminated soil, sanitary waste.
- Environmental aspects associated with transport and supply of equipments, materials and dangerous merchandise as well as chemical substances).

Criterion A4. A waste management plan has been established for the installation phase (if appropriate)

Crucial factors

- The plan of waste management takes into account the agreement of the partnership with the local team.
- Documentation exists and the operators have been trained to manage waste (ex. panels, batteries and other waste.)

Criterion A5. The need to establish a plan of environmental emergencies has been taken into account

The possible situations of environmental incidents or emergencies have been studied (ex. fires). The necessity to establish a plan of action in order to avoid and/or reduce the environmental risks derived from said situations or incidents has been studied.