Fundación Energía sin Fronteras

# FOCUS ON SUSTAINABILITY

# Lessons from Lights to Learn (*Luces para Aprender*)

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# Lessons from Lights to Learn (*Luces para Aprender*)

Lights to Learn Programme (LtL), promoted by the Organization of Ibero-American States for Education, Science and Culture (OEI), constitutes an appealing example of how to define and apply the criteria and factors of sustainability to a real programme, promoted by a public institution. The Foundation Energía sin Fronteras (Energy without Borders, noted EsF) has been the Technical Assistance of the OEI General Secretariat (GS-EOI) during the definition and implementation of the Pilot Programme. The non-governmental organization Ondula and the expert Luis Miguel Uriarte supported the EOI-GS for connectivity and teacher training components.

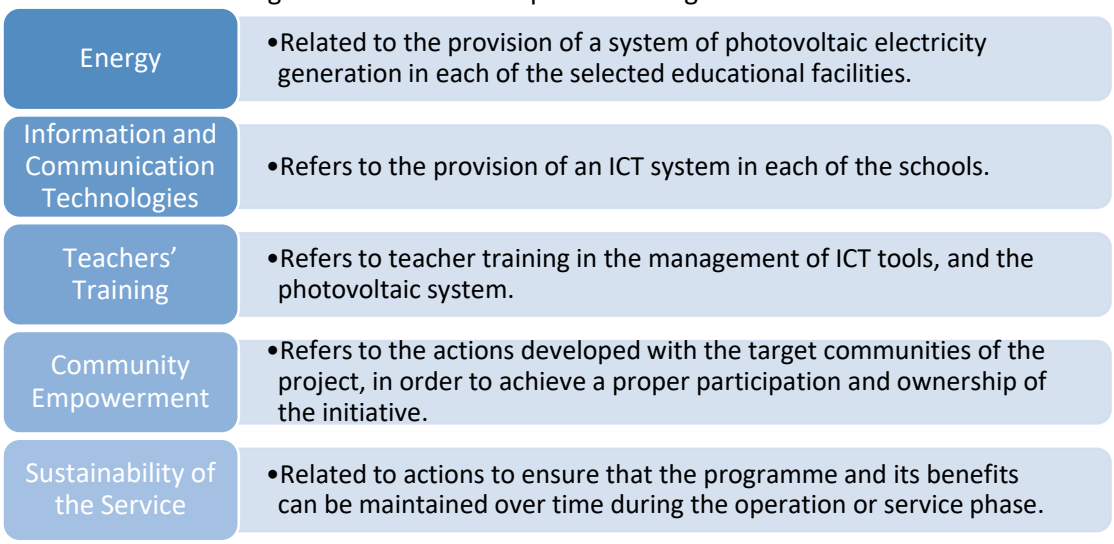
**Project description**

The LtL initiative promoted by the OEI was approved at the XXI Ibero-American Conference on Education, in Paraguay in September 2011), within the framework of the "*Education Goals 2021: the education we want for the generation of bicentenaries*". The goal of LtL is to provide access to high quality public education that offers better opportunities for girls and boys and enables them to cope with poverty and inequality.

In Latin America, it is estimated that more than 66,000 schools lack access to electricity. Most of them are located in rural and disadvantaged areas where access to the electricity grid presents enormous difficulties due to its high costs of installation, supply and distribution.
Aware that electric access is a fundamental factor in guaranteeing quality basic education, LtL aims to provide these facilities with access to electricity through the use of renewable energy, as well as equipping them with information and communication technologies (ICTs) and end the isolation of rural communities that have historically lagged behind technological advances, especially favouring indigenous and Afro-descendant populations, thus contributing to the development and well-being of the communities where they are located.

The project includes five main lines of action or main components (Figure 1).

Figure 1. Five main components of Lights to Learn




The project is divided into similar phases common to all projects: Design and Formulation/Study, Execution/Implementation, and Exploitation/Service. In this project, sustainability has been understood as "*the assurance of a sustainable service*" and has been

considered as an additional component to give it a special meaning, having been taken into account from the design phase of the project, as it has been explained in other units of the module. To avoid confusion, we will henceforth refer to this service as the Sustainability component.

## The Pilot Programme

The objective of the Pilot programme has been to implement and draw lessons learned that could serve as a reference for extending the pilot experience to other schools in each of the countries.

The pilot programme is currently being implemented in 13 countries: Argentina, Bolivia, Colombia, Costa Rica, Guatemala, Honduras, Nicaragua, El Salvador, Panama, Paraguay, Peru, the Dominican Republic, and Uruguay. It is in negotiation in two others: Brazil and Mexico. It has been implemented in 556 of the 36078 schools without electricity access of the corresponding countries (Figures 2 and 3).

Figure 2. Number of schools, students and teachers participating in the Pilot Programme

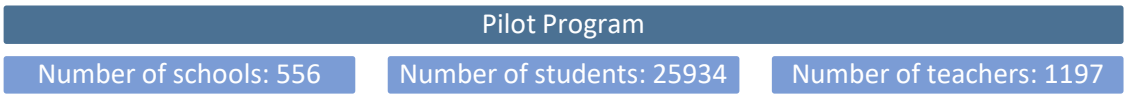
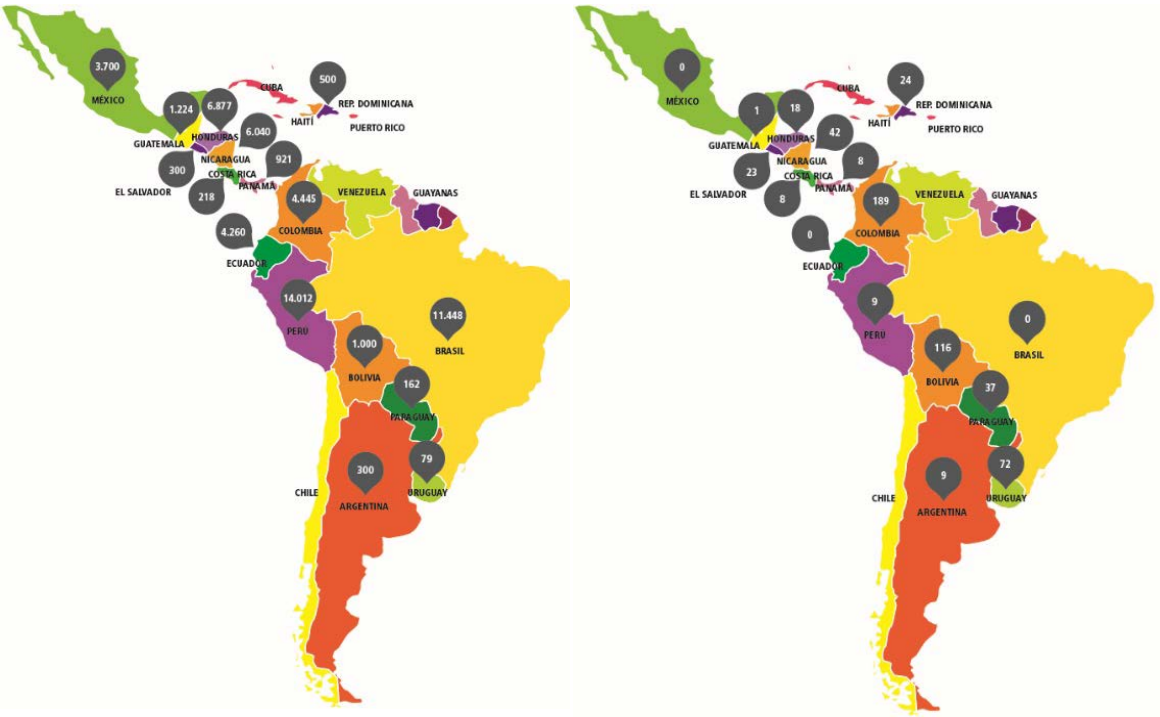



Figure 3. Schools without electricity in Latin American countries participating or interested in the Project (left) / participating in the Pilot programme (right).




Source: OEI General Secretariat

## Recommendations for the implementation of the Pilot programme: a special focus on sustainability

The recommendations offered by the GS-EOI, advised by its TA EsF Foundation, are recollected more exhaustively in the document "Intervention Model"[1]. They include reference information intended to facilitate the definition of all relevant aspects, identify different scenarios that can be given for the different components, and anticipate recommendations to be able to define and execute the programme with the greatest guarantees of success. They emphasize the importance of considering the exploitation phase (service), from the design/study phase and during the execution of the project, in order to guarantee the sustainability of the intervention. They offer the keys to ensure the success of the programme, and recommendations to minimize and mitigate the inherent risks.

It is important to clarify that LtL is a top-down program promoted from an international agency of a governmental nature. Although there is a direct link between the OEI and the Ministry of Education (MED) of the sovereign States that integrate it, in practice, these are different organizations, and the OEI National Offices (NOs) are the ultimate leaders in coordinating and implementing the Programme in their respective countries. In that sense, they should establish specific collaboration agreements with the MED of each country, as well as with other institutions considered relevant and necessary to carry out the implementation of the project.

Therefore, one of the first recommendations given by the GS-EOI was a guide for the preparation of the local "Organizational Model", where the National Commission implemented in each country was defined as an alliance of institutions, defining the roles and responsibilities of the different actors in the project, in order to help each NO identify its potential partners. In addition, given the limited technical training of most national offices, the Organizational Model included the incorporation in each country of a technical support unit (Technical Assistance) and the creation, from the beginning of the project, of a local Management in each community. Given the diversity of national contexts and resources available in the participating countries, the NOs adapted the recommendations provided in these general guidelines, in different ways and with different scope, to their specific idiosyncrasy.

In particular, GS-EOI provided general recommendations on the following aspects.

**TECHNOLOGY.** This section refers to both the energy and ICT components.

- For energy, the general design of solar photovoltaic systems has been proposed, with its respective reference documentation (for example, The General Specifications of Commercial and Technical Conditions).
- As regards to ICT, given the importance of local conditions in determining the optimum connectivity solution, the GS-EOI has provided general guidance and examples on how to address this component. The main connectivity systems can be: Rural ADSL, WiMAX, WiLD, satellite or mobile networks (3G or, in time, GPRS-GSM).

The key aspects to consider are summarized in Box 1.

[1] The Intervention Model of the LtL programme refers to an interactive guide of 64 briefs, to which all the relevant documents elaborated during the four years of accompaniment are linked. It arises from the need to define a general intervention model that, recognizing the differences between the different countries, serves as a guide to implement successive projects within the LtL programme.

**Box 1. GENERAL RECOMMENDATIONS PROPOSED BY GS-EOI FOR THE ENERGY AND CONNECTIVITY COMPONENT**

**1. Design of the energy and ICT project**

***Aspects common to both components (energy and ICT)***

• Characterize the selected schools by gathering critical information for the design and preparation of the economic technical specifications.
• Define the technical specifications of the equipment according to the local market, taking into account the availability of equipment and professionals, as well as its price, guaranteeing the quality of the installation.
• Recommend that, regardless of the type of agreement established with the supplier, installer and / or maintainer, it is necessary to prepare the Technical Specifications, as it defines the quality conditions to be given in the supply, installation and maintenance.
• Include the training to be provided by the Installer to the local Technical Assistance, if any, and to the local Technical Support Committee in the Contract Terms and Conditions.
• Include the warranty period of the installation and the desired guarantee of each equipment in the short term (2 years), as well as a long term professional maintenance proposal (after 2 years) in the Contract Terms and Conditions.

***Specific aspects of the energy component***

Standard installation of the LtL Solar Photovoltaic Solar System:

| Electrical equipment | Number of units | Power per unit (W) | Number of hours per day | Energy (Wh/day) |
|---|---|---|---|---|
| Computer (*) | 1 | 60 | 8 | 480 |
| Projector or TV | 1 | 200 | 2 | 400 |
| Internal lights | 6 | 15 | 4 | 360 |
| External lights | 2 | 20 | 6 | 240 |
| Communications | 1 | 70 | 8 | 560 |
| Other consumptions (**) | 1 | 60 | 1 | 60 |
| TOTAL ENERGY | | | | 2100 Wh/day |

(*) Hours of recharge battery consumption, up to 3 recharges have been assumed for one day.
(**) Include the consumption of the equipment of the photovoltaic system in operation and the recharge of mobile phones, rechargeable batteries or some other small consumption.

***Specific aspects of the ICT component***

• The most suitable technical solution to facilitate connectivity (satellite connection, DSL, etc.) must be proposed by the system installer. It must be proposed taking into account a technical-economic analysis, being able to give the same country diverse solutions, depending on the local context.

**2. Acquire and equip the energy system and ICT, including the conditions of guarantee**

• Include the technical file together with its annexes as part of the Contract or Agreement for the supply, installation and maintenance, both for the energy system, the computer equipment and the connectivity system.
• In the valuation of offers, consider, in addition to the economic aspects (price), technical aspects (quality and guarantees of the supply, installation and maintenance), and if considered appropriate, other social aspects.
• Technical Assistance, (if it exists) together with the installer, should elaborate the protocols of acceptance and rectification of supplies and the protocol of supply acceptance, prior to

signing of the contract.
• In order to optimize transport and installation logistics of the equipment as well as their associated costs, the possibility of transporting the solar PV equipment and connectivity in one go can be studied.
• It is recommended to cover the internet fees during the first twenty-four (24) months, that is, 2 years from the commissioning of the project.

**3. Drafting documentation for the operation and maintenance of energy and IT facilities**
• Require in the Technical Specifications that the installer prepares the documentation for the operation and maintenance of the facilities.
• Promote the availability of photos and specifications of the installed equipment in schools. This premise can be included in the Contract or Terms and conditions.
• Prepare the documentation that corresponds with the equipment and the installations before installing the equipment and setting the installations into operation.
• Based on the general documentation provided by GS-EOI, adapt the existing manuals and procedures to the Local Management Committee and the community to the specific characteristics of the project in the country (e.g. adapt it to the local language).
• Distribute at least two copies of all documents per school.

**4. Provisional reception of facilities**
• Plan the installation of the ICT system, subsequent to the signing of the Provisional Acceptance Act of the Solar PV system.
• Prior to the signing of the contract, it is appropriate that the Installer, under the supervision of the Technical Assistance (if it exists), draws up the acceptance and rectification protocols for the installation and the provisional acceptance of the installation.
• Simplify protocols to the extent that they are effective and address critical issues for proper installation.

**TEACHING STRENGTHENING.** There have been no general recommendations on this component since countries face very different situations, both in terms of ICT teachers' knowledge, the official procedures currently available in each country, as well as the involvement of the respective Ministry of Education (MED) of each country in the project. On the other hand, the OEI has experience in what concerns teacher training, so the LtL project is an opportunity to put in value these institutional capacities of its mission. In this component, the focus has been on teachers to acquire minimum skills that allow them to incorporate ICTs in the classroom, where they can manage facilities and where the acquired skills do not dissolve over time.

**COMMUNITY STRENGTHENING.** Although in principle the communities are indirect beneficiaries of the project, in the vast majority of countries they play a key role both during the execution and during the service. Recommendations and reference material for community awareness, training of local stakeholders and the creation of Local Management Committees (LMCs) have been provided in this regard.

The key aspects to consider are summarized in Box 2.

**Box 2. GENERAL RECOMMENDATIONS PROPOSED BY THE GS-EOI FOR COMMUNITY STRENGTHENING**

**Awareness of communities**

• In order to encourage community ownership of the project, it is important to explain and involve the communities from the outset.
• Sensitize communities about the facilities provided by the project and the uses they can make of them.
• In any awareness or delivery of materials, communication should be promoted according to their socio-economic context, which communities can easily understand.

**Creation of Local Management Committees (LMC)**

• It is recommended to create a LMC in each community, with at least 4 members, and with the participation of teachers and community members.
• The main responsibilities of the LMC are the management of facilities (operation, local maintenance, management of uses and economic management, if the facilities generate small economic flows), interaction with other project actors (the MED or departmental representatives, National Office of the OEI), etc.

**Training of local maintainers** (in addition to teachers of schools, it is recommended to involve community members)

• The minimum duration of the training course for the first level management and maintenance of the facilities should be 20 hours.
• The most appropriate time to carry out the training is during the installation of the equipment.
• Whenever possible the training should be in the local language (when the majority language is not Spanish).
• Provide documentation and reference materials such as poster, training manual, operation and maintenance models, prepared according to the socioeconomic level of the communities.
• Encourage a participatory approach and a level playing-field, facilitating the participation of women in the local support group.
• Conduct an evaluation of the knowledge acquired by the local maintainers.
• Establish mechanisms for these maintainers to have support to resolve doubts or problems that may arise, through a professional maintenance service with greater technical capabilities (such as: through specific professional maintainers or existing technical maintenance structures overlaid on the organizational charts of official bodies such as Ministries or City Halls).
• Ensure that mechanisms are in place to maintain the capabilities needed to perform local maintenance over time.

**SERVICE SUSTAINABILITY.** Since the inception of the programme, this component has been given great importance in order to ensure that the scope of LtL is not limited to a correct implementation of the facilities, but also takes into account a series of measures that ensure that the services offered by the project remain during the service phase. Precise recommendations on technical, social and economic aspects have been collected in the Intervention Model to ensure that the positive impacts of the project are maintained over time, as summarized in Box 3.

**Box 3. GENERAL RECOMMENDATIONS OFFERED BY THE GS-EOI FOR THE SUSTAINABILITY OF THE SERVICE**

**1. Define the final owner and manager of the premises**

• It should be clear who will be the final owner and facility manager (if they are different figures) as this determines the responsibilities of each party. In general, the final owner of the facilities is the MED and the managers are the schools themselves, although this is very particular in each country.

**2. Define the professional maintenance of the facilities**

• The general model proposes that four preventive professional maintenance visits be made to the facilities during the first two years of operation. These visits can be included in the supply, installation and maintenance contract.

• It is necessary to guarantee long-term professional maintenance, either by establishing maintenance centers, by contracting these services to specialist companies or by providing these services through existing structures.

**3. Ensure that teaching capacities are maintained over time**

• The MED of each country should establish the specific systems to ensure that teachers maintain the skills necessary to make use of the facilities provided. This can be solved in different ways: from the inclusion of this training in curriculum development, through the holding of recall sessions or training meetings.

**4. Ensure that the capacities of local maintainers are maintained over time**

• In the short term (2 years from the installation), it can be done through remembrance sessions provided by professional maintainers when performing preventive maintenance.

• In the medium term different protocols can be established, depending on the solution adopted to deal with professional maintenance.

**5. Financial economic model for exploitation**

To help ensure that the impacts generated by the project are maintained over time:

• It is recommended to define operating costs (operation, maintenance and replacement of equipment as well as maintenance of teaching and community capacities).

• It is recommended to establish which institution will meet these costs and the available mechanisms to finance them.

Other transversal aspects of the project are the creation by the NOs of a specific local organization for the implementation of the project and of the monitoring and evaluation activities, all of which are integrated in the Model of Intervention. Monitoring and evaluation are extremely important in order to draw lessons learned for the extension phase of the Programme. A comprehensive solution was proposed to monitor the project during the execution and service phases, as well as a guide to carry out the final internal evaluation.

The cross-cutting aspects to be taken into account are summarized in Box 4.

**Box 4. GENERAL RECOMMENDATIONS OFFERED BY GS-EOI ON OTHER CROSS-CUTTING ASPECTS**

**1. Monitoring strategy during the execution phase**

• It is necessary to define the responsibilities and roles of each of the parties that make up the National Commission, according to the Organization Model.
• Establish control mechanisms so that each party assumes its responsibilities and these responsibilities are coordinated with the rest of the parties.
• Write timely follow-up reports and a final project report.

**2. Evaluation of the project**

• Conducting a final evaluation of the project can help you to better understand strengths and weaknesses, allowing you to take action to mitigate risks, while drawing lessons learned for future actions.
• It is recommended to carry out a final internal evaluation of the project in each of the participating countries, 6 months after commissioning.

**3. Tracking strategy during the service**

• According to the Organizational Model, it is recommended to define the following for the exploitation stage:
- Who will carry out the operation of the system and how will it be carried out (distinguish responsibilities of teachers and local communities in those occasions when the community makes use of the facilities).
- Who will carry out the local maintenance and how will it be carried out. Define the responsibilities of local maintainers and LMC.
- Who is going to manage the funds that the community collects via the use of the installations and how will these funds be managed.
- How will the failures of both power and IT installations be reported?
- Who will monitor performance at national level during the execution and exploitation stages and how will this monitoring be carried out?
• It is also advisable to capitalize the knowledge acquired, facilitate institutional strengthening, create and articulate alliances, as well as disseminate the project.

**INSTITUTIONAL SUSTAINABILITY.** The institutional sustainability criteria are implicitly related to the institutional origin of the initiative, and thus were taken into consideration from the outset when developing the recommendations for the creation of a National Commission, as well as in the search for additional funding, which is to be carried out by the NO. It is necessary to emphasize that given the top-down nature of the programme, the requirement that the project responds to a top priority need of the community has been considered only partially, which poses a risk. The project does indeed respond to a top priority need identified by the OEI and ratified by the MEDs in 2011. However, in order to guarantee the success of the programme it is indispensable to ensure that:

- The successive MEDs of each of the participating countries maintain the commitments acquired from the outset of the project
- The teachers, main beneficiaries of the programme, also understand the project as a priority, as it provides them with software tools to improve and facilitate their work.
- The communities must also consider this service as a necessary priority, especially in those communities in which the responsibility of the service lies with the communities themselves. In this sense, a series of recommendations to prioritize school – and by extension community - selection criteria, are given in the Intervention Model.

## Results of the LtL Pilot Programme by components

Generally, all countries have considered all programme components, although some tweaks have been required; particularly in relation to remote location connectivity for those areas in which a viable technical solution at a reasonable cost could not be provided. The number of benefited schools per country is variable, as well as the number of pupils in each of those schools – ranging from 20 to 100 pupils per school. The schools can be scattered throughout the country or they can be grouped in a single or in various regions.

***Energy and ICT components***

The electrification of the schools has been carried out using isolated Solar Photovoltaic Systems. The majority of the countries designed the solar PV system in accordance with the directives elaborated by the TA and provided by the GS-EOI. However, some countries managed to fully comply with sustainability criterion T1[2] by adjusting this general proposal to offer a system adapted to local conditions, namely schools' necessities (number of pupils and number of classrooms), existing technology, inclusion of other services (like school vegetable gardens), while at the same time complying with the requirements indicated by official institutions for sustainability criterion I3.

Most countries have considered a two-year warranty period, including preventive and corrective maintenance of the installation and equipment on top of the system supply and installation contract. As a result, part of sustainability criterion T5 has been met.

The ICT component has required particularly tailored solutions for each country, since the viable technical alternatives to facilitate connectivity are highly dependable on local context. In fact, two countries opted on not including Internet connection within the scope of the project, as the only viable solution was satellite connection, which raised costs considerably. Another country has considered this component only in some of the schools. Sustainability criterion T1 has hence been fulfilled. The hardware supplied by LtL met the general recommendations given by the GS-EOI in most countries, whereas a few countries carried out various specific modifications to the equipment, all in accordance with criterion T1. Hardware maintenance is generally covered under the equipment's warranty, which is generally of a year's duration and does not include maintenance visits by the supplier. As a result, part of sustainability criterion T5 is met for these systems.

***Teaching strengthening component***

Teaching strengthening has been considered in the wider majority of countries. Training has been supplemented by the supply of materials and knowledge assessments. Procedures and basic regulations for pedagogical management and technological resource administration are already in place in most countries. We are able to see that, in practice, the critical sustainability criterion associated with criterion S3 - which checks that stakeholders are capable of carrying out the task and have assumed it, and that responsibilities have been clearly defined – is fulfilled.

***Community strengthening component***

Various activities have been considered for community strengthening. On one hand, Local Management Committees have been put together. These have either been specifically created for the project or were already existing Community Committees, which have assumed LtL derived responsibilities. These committees are normally formed by representatives of school

[2] See a reminder of all criteria at the end of the document

teachers and community members. Their main objective is to ensure that the installations are properly used, operated and maintained. The members of the committee are therefore trained as local maintainers. The duration of this training has been variable. In addition, the communities have also been engaged to gain awareness of the benefits of the project. It is thus evident that recommendations given by the GS-EOI have been followed and that sustainability criteria S3, S4 and T4 have been met.

***Service sustainability component***

In most countries, the OEI local partner has been the Ministry of Education (MED), institution which has generally supported project deployment, and which will be, in the majority of the cases, the final owner of the installations. As a result, the responsibility of continued service lies with the various MED. It is evident that the final owner of the system has been identified; therefore sustainability criterion S3 has been fulfilled.

The area whose degree of implementation was lower than expected in most countries was that related with the "Availability of an operational plan, including the financial and economic model", which was only specifically developed in one country. Operational costs for sustainability were only analysed by one country, and the financial model for the operational phase of the project has not been developed in any of the countries, on the basis that the MED will assume this task. Although in most countries the final owner is responsible for assuming the costs to guarantee service sustainability, in 4 countries it is foreseen that communities will have the possibility to make financial contributions for the services they receive.

The "availability of mechanisms to sustain the local maintainers' skills overtime" was also considered partially (in fact, it was only considered fully in two countries), and the "availability of mechanisms to periodically update the teachers' skills", generally at the MED's expense, was only fully considered in two countries. Just two countries made themselves explicitly in charge of carrying out the necessary maintenance activities once the warranty period was finalized.

The difficulty that most countries face to implement sustainability criteria T2, T5, E1 and E2, which fall under the responsibility of the final owner of the system (the MED in most countries), has become apparent. This difficulty poses doubts over the real engagement of the MED in relation to the project, which is linked to criterion S2.

***Cross-cutting aspects***

Activities related to general and cross-cutting aspects are the only component which has been fully considered in all countries.

School selection criteria for the pilot project are diverse. These include aspects related to geographical isolation of the schools, lack of energy in the schools and lack of electrification plans in the short and medium term, social aspects, and alignment with policies and/or programmes, signal availability for connection to the Internet, various insights on school infrastructure, institutional aspects and technical service sustainability.

In all countries but one, the conception of the pilot programme has considered other uses of the installations supplied by LtL beyond those merely educational and aimed at student population, since the schools are a reference site for the community.

Complementary activities include leisure activities, training courses, training for adults, an energy hub (site where a range of energy services can be delivered, such as battery or mobile phone charging) or an ICT hub (site where a range of ICT services can be delivered, such as

Internet access or computer usage) in order to provide computer and communications services to the population in general. This evidences that most countries have taken into account the communities' priorities, favouring their buy-in into the project, and thus complying with sustainability criteria S2 and S4.

In many countries LtL has been incorporated into other programmes of public and/or private nature, which have, on the one hand, contributed to the achievement and enrichment of the objectives set by LtL, and on the other hand, made project conceptualization much more complex.

Synergies have been created with other programmes related to energy, connectivity, computer science, community training and improvement or provision of infrastructure. In this sense, the objectives set initially for sustainability criteria I1, I2, and I3 have been surpassed.

### Assessment by the National Offices of the key aspects of the Pilot Program

All aspects are considered of great importance to achieve of the project's objectives. Greater importance has been given to aspects of engagement, teaching and community strengthening, as well as service sustainability, rather than to more technical aspects (energy and ICT). It can thus be concluded that the awareness-raising work carried out by the GS-EOI to highlight importance of sustainability criteria to the NOs has been a success.

The implementation's success is a little bit more mitigate, what evidences the difficulties encountered to implement measures that are deemed important for the success of the Programme. The most successful implementation was related to teachers and communities' engagement, what demonstrates that the initial risk posed by the programme being Top-Down has been identified and properly managed in most of the countries.

### Final conclusions on the implementation of sustainability criteria

The analysis of the results highlights the diversity of local context, including human, technical and financial resources, as well as the different strategies followed to adapt the programme's general vision and its specific objective to the particular situations in each of the countries. This generates a plethora of situations, outlooks, and solutions, which exposes the need to take suitable measures in order to be able to adapt an initiative of multinational nature to a national level.

The leadership provided by the GS-EOI in accompanying the NOs by carrying out tasks such as raising awareness and providing recommendations for the implementation of sustainability criteria, as well as allowing countries to adapt them as seen convenient to their needs and circumstances, is very positively valued.

It is important to point out the great effort that has been put into the creation of alliances with other institutions and private organisations, as well as the generation of synergies with similar programmes. The inclusion into or alignment with other initiatives has been featured as a positive aspect of the project. As it has been mentioned earlier, the initial objectives related to institutional sustainability criteria have been achieved and exceeded.

The effort that NOs have put into adapting the project to engage with local communities and teachers is also worth noting. The risks of the programme being Top-Down and not responding

to local priorities have been mitigated in this way, while local community social and organisation-related sustainability criteria have been fulfilled.

However, it must be highlighted that most countries in which the pilot programme has finalised have not yet implemented all the activities included in all components, particularly measures related to service sustainability. This does not mean "per se" that the project will not be sustainable once the installation's warranty period is over, but the lack of specific service sustainability measures jeopardises the project's success, since there is no framework to govern the implementation of the activities that are necessary to achieve the sustainability of the project in the future. Service sustainability will be largely dependent on the capabilities of the installation's final owner along with those of the responsible manager, who shall assume the responsibilities derived from the project's operation phase. In this sense, difficulties have appeared to develop institutional project ownership. Further work is required to define the necessary actions to guarantee engagement of the project stakeholders, as well as to define their roles and responsibilities in the service phase of the project. It is crucial to have this in mind in the development of the Organisational Model.

It is noted that public institutions responsible of service delivery shall adequately and sustainably incorporate the commitments derived from the new installations into their management tools. Due to the isolation of the beneficiary communities, it is possible that regional and local institutions representing the MED will have to be reinforced in order to manage the new installations. On the contrary, the maintenance and operation of the electrification installations will fall under the community itself. Therefore it is essential that the responsible public institution plans to support the community and evaluates if the community has means to cover the maintenance and operation costs or else will need the institution's support.

## References

Website of the project: http://lucesparaaprender.org/
Internal report (not public): Lights to Learn Pilot program: Achievements and Challenges 2011-2016.

**Special thanks to the Organization of Ibero-American States for Education, Science and Culture, for letting us use its documents and graphic materials.**

## Annex 1. List of sustainability criteria

### Technical sustainability

- Criterion T1. The most appropriate technology and technical design of the project has been selected.
- 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.
- 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.
- Criterion T4. The operators of the installation have been trained to operate the facilities properly and safely.
- Criterion T5. A monitoring and support plan is available to the community (needed when local technical capacities are considered poor).

### Economic sustainability

- Criterion E1. Costs derived from the operation, maintenance, replacement of equipment and management of the service, have been estimated.
- Criterion E2. A financial plan has been foreseen to cover these costs
- Criterion E3. The risks of failure of commitments have been estimated.
- Criterion E4. Bank accounts are available and measures are clearly identified to guarantee that they are handled in a secure and transparent manner

### Social and Organisational sustainability

- Criterion S1. The project team has sufficient knowledge of the local community, the area and the institutional context.
- Criterion S2. The project corresponds to a top priority need of the community.
- Criterion S3. All project stakeholders have been identified and their responsibilities defined and committed.
- Criterion S4. The community has correctly appropriated the project. Knows the benefits and accepts its responsibilities.

### Institutional sustainability

- Criterion I1. The analysis of the institutional context, at country level, has been carried out.
- Criterion I2. Local, national and international institutions involved in the project have been identified and their responsibilities and commitment have been agreed upon.
- 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.

### Environmental sustainability

- Criterion A1. The project team know well the environmental context of the area as well as any local or national environmental legislation which could apply to the project.
- Criterion A.2 An analysis of environmental impacts of the execution and operation of the project has been carried out.
- Criterion A3. A waste management plan has been established to safely treat or dispose of waste generated during the execution phase.
- Criterion A4. A waste management plan has been established for the installation phase (if appropriate)
- Criterion A5. The need to establish a plan of environmental emergencies has been taken into account

## Annex 2. Linkages between recommendation and key sustainable criteria

This annex describes the linkages between the recommendation made by the General Secretariat of the Organization of Ibero-American States for Education, Science and Culture, and the key criteria of the sustainability.

**TECHNOLOGY**

The proposed recommendations refer to the following technical criteria for sustainability:

- Criterion T1. The most appropriate technology and technical design for the sustainability of the project has been selected
- Criterion T3. Complete documentation is available on the site about the installation and management thereof, in a way that is comprehensible to the community
- Criterion T4. The operators of the installation have been trained to operate the facilities properly and safely.

Although not explicitly in these recommendations, in the models of Technical Specifications offered to NOs as annexes to the Model of Intervention, reference is made to the obligation of compliance with local environmental legislation by the installer, directly related to the environmental criterion of sustainability:

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

Due to the complexity of the multi-country programme, it was decided that other environmental criteria would be subject to the scope required by local environmental legislation.

**TEACHING STRENGTHENING**

The recommendations proposed refer to the following social and organizational criteria for sustainability:

- Criterion S3. All project stakeholders have been identified and their responsibilities defined and committed. Specifically the critical factor: It has been proven that the manager is qualified to perform his task and accepts it. Responsibilities have been well defined. This situation has been compromised through an agreement.

The recommendations proposed refer to the following social and organizational sustainability criteria:

- Criterion S3. All project stakeholders have been identified and their responsibilities defined and committed. Specifically with the following critical factor: If it is the community that must do the management, the Local Management Committee or equivalent unit has been set up. Advice and training have been provided for the establishment and functioning of this Committee (help to identify the members of the community that comprise it, collaboration in the drafting of its rules of operation, help in writing up its responsibilities, economic activities, how is the relationship with the owner, etc.).
- Criterion S4. The community has correctly appropriated the project. Knows the benefits and accepts its responsibilities.

**COMMUNITY STRENGTHENING**

Although not explicitly stated in these recommendations, in the Sustainability Plan and in various Annexes to the Intervention Model, guidelines have been provided to the NOs for the elaboration of management regulations for LMCs and the Operation, Maintenance and Replacement Plan (OMRP), and therefore the fulfilment of the technical criterion of sustainability:

- Criterion T2. An appropriate OMRP is available and it is adapted to the capacities of the new owner and the local operators and technicians.

**SERVICE SUSTAINABILITY**. The recommendations proposed refer to the following sustainability criteria:

- Criterion S3. All project stakeholders have been identified and their responsibilities defined and committed. Specifically with the following critical factor: The final property of the project has been defined. The owner knows and assumes the commitments derived from it. If the owner does not assume the management of the project, whoever has assumed responsibility is identified.
- Criterion T5. A monitoring and support plan is available to the community.
- Criterion E1. Costs derived from the operation, maintenance, replacement of equipment and management of the service have been estimated
- Criterion E2. The financial plan has been foreseen to cover these costs.

**INSTITUTIONAL SUSTAINABILITY.** The institutional sustainability criteria are implicitly related to the institutional origin of the initiative, and thus were taken into consideration from the outset when developing the recommendations for the creation of a National Commission, as well as in the search for additional funding, which is to be carried out by the NO:

- Criterion I1. A country level analysis has been carried out at institutional level
- Criterion I2. National and international institutions involved in the project have been identified, defined, and have committed to their responsibilities
- Criterion I3. In the cases where there are institutional financial backers, service provider and/or service user requirements have been identified and assumed

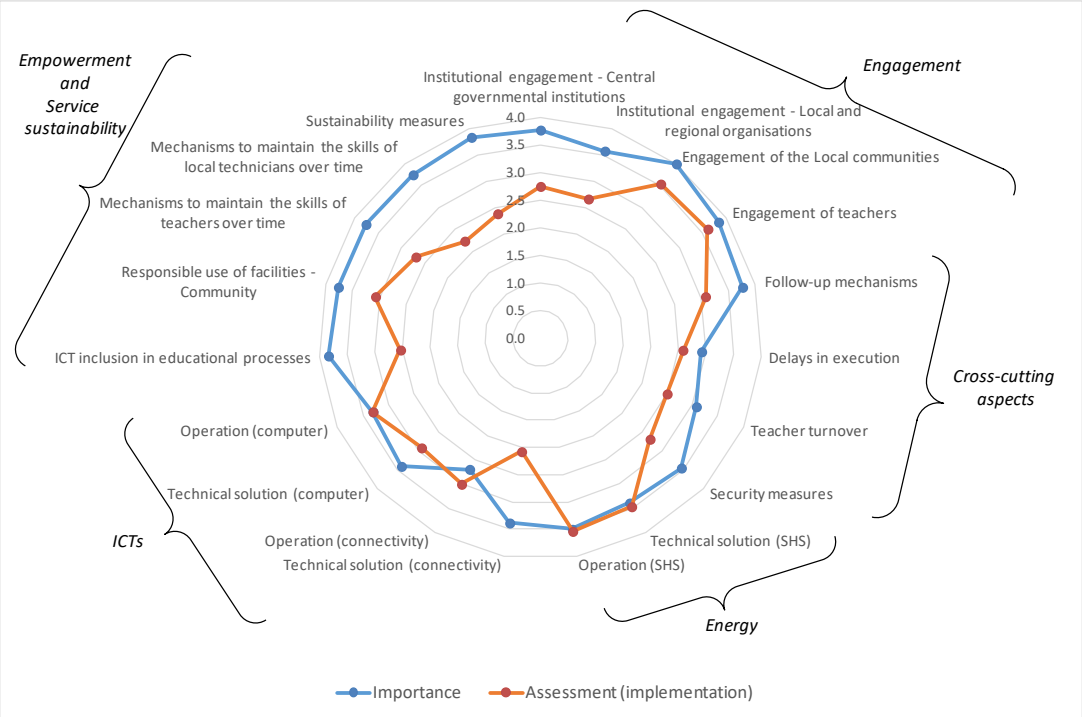
Likewise, the following social and organizational sustainability criteria were considered in the recommendations given for the creation of a National Commission:

- Criterion S1. The project team has sufficient knowledge of the community, the area and the institutional environment in which the project will be carried out
- Criterion S3. All project stakeholders have been identified, defined and have committed to their responsibilities. Particularly, the critical factor is: Other possible stakeholders (local or regional institutions, partners, maintenance centres, training centres, etc.) have been identified. Responsibilities of each of these stakeholders have been defined and assumed. The appropriate agreements have been signed.

## Annex 3. Assessment by the National Offices of the key aspects of the Pilot Program

This annexe illustrates the assessment by the National Offices of both the importance of the implementation of the Pilot Programme's key aspects and the implementation success of those key aspects.

Figure. Assessment of the importance and success of the project's key aspects implementation




Note: "Importance" measures the relevance that NOs allocate to each of the aspects. Scoring ranges from 1 (low or no importance) to 4 (greater importance). "Assessment" measures the implementation success of a particular aspect as per the NOs' feedback. Scoring ranges from 1 (implementation of an aspect has been poor or detrimental for the project) to 4 (the implementation of that aspect has been high and/or positive).

All aspects have great importance (global mean is 3,5 points) to achieve of the project's objectives. Nonetheless, the assessment of their implementation's success reveals a lower score of 2,9 points. This result evidences the difficulties encountered to implement measures that are deemed important for the success of the Programme.

It is worth noting that greater importance has been given to aspects of engagement, teaching and community strengthening, as well as service sustainability, rather than to more technical aspects (energy and ICT). It can thus be concluded that the awareness-raising work carried out by the GS-EOI to highlight importance of sustainability criteria to the NOs has been a success.

The most positive implementation mark was obtained for the parameters related to teachers and communities' engagement. These parameters are directly related to sustainability criteria S2 and S4. The positive result demonstrates that the initial risk posed by the programme being Top-Down has been identified and properly managed. However, an effort by 4 of the countries is still necessary given their low results in the implementation of ICTs in pedagogic processes. This is essential to achieve the ultimate goal of LtL, which is to improve quality and equality in education through the use of these tools.

It is important to emphasize that project weaknesses, represented by lower scores in project implementation aspects, are related to central organisations buy-in and service sustainability.