SUBNATIONAL CLIMATE FUND

# LUXUN
# ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

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# Acknowledgements

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## Executive summary

The company Luxun activities entail the development, installation, commissioning and operation of photovoltaic systems under the distributed generation scheme (<500kW of capacity) in places such as self-service stores, warehouses, and industrial plants with an average installation (kWp) of 150 kWp. It currently has a total installed capacity of more than 3.5 MWp, and with the Subnational Climate Fund investment is expected to grow the platform to more than 100MW during the next five years. In order to scale the business faster, Luxun will partner with another Distribution Generation Company named Suneco to develop small photovoltaic projects below 500kW that will be acquired by Luxun.

As a result of the request made by Luxun Energy (hereinafter Luxun or the company), an assessment was carried out of the activities performed by the company to identify the environmental risks and related social impacts.

Its main objective is to highlight the most relevant environmental risks and social impacts, as well as the interactions of the environmental components, and the social factors according to the performance standards of the International Finance Corporation (IFC) and the Equator Principles (EqP).

The following was taken into consideration during the study:

-The information contained in the company's codes, plans, policies and programs.

-Federal, state, and municipal applicable legislation and best international practices from the IFC, World Bank and OECD.

-The EqP.

-Site visits carried out two projects in the operation of the company.

The study prepared covers the following sections: Executive summary; (1) References; (2) Definitions; (3) Description of the activities carried out by Luxun Energy; (4) Goals of the identification of risks and impacts; (5) Description of the process to identify risks and impacts; (6) Results of the process of identifying risks and environmental impacts; (6.1.1) The scope of the identification of risks and environmental impacts; (6.1.2) Guidelines for the identification of risks and environmental impacts; (6.1.3) Identifying risks and environmental impacts; (6.1.4) Identifying environmental components; (6.1.5) Interaction database; (6.1.6) Characterization of environmental impacts; (6.1.6.1) Definition of basic ratios; (6.1.6.2) Obtaining the basic and complementary ratios; (6.1.7) Obtaining the significance of the impact; (6.1.8) Assessment of adverse impacts; (6.1.8.1) Air; (6.1.8.2) Water (surface hydrology); (6.1.8.3) Soil; (6.1.8.4) Social; (6.1.9) Residual impacts; (6.1.10) Cumulative Impacts; (6.1.10.1) Identifying cumulative effects due to other works and activities within the environmental system; (6.1.10.2) Identifying cumulative impacts of the project; (6.1.11) Synergistic impacts; (6.1.11.1) Identifying interconnection impacts; (6.1.11.2) Identifying degrees of synergy; (6.1.11.3) Identifying the level of influence and synergistic sensitivity; (6.1.12) Conclusion; (6.2) Results of the process of identifying risks and social impacts; (6.2.1) The scope in the

identification of risks and social impacts; (6.2.2) Guidelines for the identification of risks and social impacts; (6.2.3) Criteria considered for the identification of social risks and impacts; (6.2.4) Identifying the main risk areas and possible negative impacts; (6.2.5) Assessment of social impacts; (6.2.6) Conclusion and; (7) Bibliography.

Under said introduction, the key findings that derive from the assessment performed are described below:

### (6.1) Results of the process of identifying risks and environmental impacts

#### (6.1.1) The scope in the identification of risks and environmental impacts

The identification of environmental impacts is a substantial part of the assessment process. Consequently, the methodology considers both the environmental conditions where the project is located, its characteristics, and its nature.

The general process and the method used to identify and assess the environmental impacts include: (i) identification of impacts, (ii) classification of impacts, (iii) valuation of impacts and (iv) other impacts considered.

#### (6.1.2) Guidelines for the identification of risks and environmental impacts

Identifying and classifying the potential environmental impacts, evaluating the magnitude and meaning of environmental impacts, describing the relevant environmental impacts and identifying the cumulative and residual environmental impacts.

#### (6.1.3) Identifying risks and environmental impacts

It is composed of the following section according to the different stages of the project such as site preparation, construction and installation, pre-commissioning and operation and maintenance: (A) Site preparation, (A.1.) Technical visit, (A.2.) Development of engineering, (A.3.) Logistics, (B) Construction and installation, (B.1) Structural installation, (B.2.) Electrical installation, (C) Pre-commissioning, (C.1.) General review of the project, (C.2) Proceedings with the UVIE, (C.3.) Approvals from the Federal Commission of Electricity, (D) Operation and Maintenance, (D.1.) Commissioning of the system, (D.2) UVIE management and (D.3) post-sale follow- up.

#### (6.1.4) Identifying environmental components

Is the stage where the variables and physicochemical process, biological, socioeconomic, cultural and landscape that might be affected are acknowledged. To this end, the baseline assessment of the site is considered versus the expected environmental transformations due to the activity. At this point, a recognition of the direct, indirect, and cumulative impacts over the environmental components is performed.

The following environmental components are reviewed: (1) soil, (1.1) erosion and physical characteristics, (1.2) permeability, (1.3) quality (chemical characteristics), (2) surface hydrology, (2.1) water quality, (2.2) runoff patterns, (3) underground hydrology, (3.1) water quality, (3.2) water

infiltration, (4) air, (4.1) noise emissions, (4.2) air quality, (5) flora, (5.1) abundance and diversity, (5.2) species under status, (5.3) forestry coverage, (6) fauna, (6.1) abundance and diversity, (6.2) species under status, (6.3) fauna habitat, (7) landscape, (7.1) perception, (8) social, (8.1) employment and (8.2) services.

Likewise, the environmental risk factors and potential environmental impacts are described based on the company's activities.

### (6.1.5) Interaction Database

For each activity of the project during its different stages, an analysis is made *vis à vis* each environmental component, which allows to recognize the presence of interaction and whether the impact of the project on the environment is positive or negative.

B + F identified 30 interactions, of which 18 were negative and 12 positive. The factor with more interaction was social, with 12 positive interactions, followed by 10 interactions with the air, all negative. Soil and surface hydrology had 8 interactions each (all negative), and lastly, the environmental components where no interactions were identified are underground hydrology, flora, fauna, and landscape. On the other hand, employment had 9 (all positive).

### (6.1.6) Characterization of environmental impacts

The characterization of the impacts was made using a modified technique of Bojórquez-Tapia *et al*. (1998) based on six indexes: (1) Extension, (2) Duration, (3) Intensity, (4) Accumulation, (5) Synergy and (6) Mitigation.

#### (6.1.6.1) Definition of basic ratios

The basic ratios are indispensable to define an interaction, while the complementary ratios are those that complete the description but can be absent in the definition of an interaction.

#### (6.1.6.2) Obtaining the basic and complementary ratios

The ratios were evaluated on an ordinary scale related to the effect of an activity over the environmental component variable. Once the said stage is completed, the environmental impacts are described, coding them according to the basic ratios of extension, duration, and intensity. In contrast, the complementary are coded based on the synergy, accumulation and mitigation.

### (6.1.7) Obtaining the significance of the impact

The significance of the impact (Gij) was determined using the following formula: Gij = (MI) [1-(M/3)]; Where: M = Mitigation, and the values are: (1) low, (2) moderate, (3) high, (4) very high.

### (6.1.8) Assessment of adverse impacts

#### (6.1.8.1) Air

During the assessment, 10 impacts were identified mainly during site preparation, construction, operation and maintenance and closure and abandonment of the facilities due to the contamination by emission of gasses from the use of machinery and vehicles, as well as sound discomfort from the same sources.

#### (6.1.8.2) Water (surface hydrology)

Water can be affected by the contamination of superficial bodies due to spillages of fuels or hydrocarbons of machinery and equipment or inadequate waste management during construction, operation, and maintenance.

#### (6.1.8.3) Soil

Soil could be exposed because of spillage of hazardous substances and materials and inadequate waste management during construction, operation, and maintenance.

#### (6.1.8.4) Social

The interactions are favorable due to the generation of direct and indirect jobs, the acquisition of materials and supplies required for the stages of site preparation, construction, pre-start-up, operation and maintenance, and the provision of electricity generation services for self-consumption by customers through the use of clean technologies such as solar panels.

### (6.1.9) Residual impacts

Residual impacts are associated with inadequate waste management or spillages of hazardous substances and materials that could cause residual contamination to the soil and, therefore, in a synergic way, could affect the superficial and underground water. Monitoring of fluids and migration of pollutants should be monitored.

### (6.1.10) Cumulative impacts

Article 3°, section VII of the REIA (Reglamento de Evaluación de Impacto Ambiental or Environmental Impact Evaluation Regulation) describes a cumulative environmental impact as the effect on the environment resulting from the increase in the impacts of particular actions caused by the interaction with others that took place in the past or are occurring in the present.

#### (6.1.10.1) Identifying cumulative effects due to other works and activities within the environmental system

The variables of cumulative impacts are other projects and human settlements.

#### (6.1.10.2) Identifying cumulative impacts of the project

All impacts that Luxun could cause are cumulative. However, none are significant and are low in magnitude. Therefore, these can be reduced or eliminated by implementing adequate prevention and mitigation measures.

### (6.1.11) Synergistic impacts

The synergic impact in Mexican legislation is produced by the presence of various simultaneous actions that have a more significant impact on the environment than the isolated presence. The synergic analysis was performed according to (a) identifying interconnection impacts, (b) identification of degrees of synergy, (c) identification of the level of influence and (d) standardization.

#### (6.1.11.1) Identifying impact interconnections

It is related to impacts of cause (impacts that cause other impacts) and impacts of consequence (impacts that are produced by other impacts).

#### (6.1.11.2) Identifying degrees of synergy

Two types of synergy were assessed according to (1) the degree of support to synergy and (2) the degree of reception to synergy.

#### (6.1.11.3) Identifying the level of influence and synergistic sensitivity

Level of influence of synergy: the addition of the values of the degree of support and the degree of reception shows the synergy influence, which affects other impacts. The greater the value of meaning, the more potential to produce impacts.

Level of sensitiveness of synergy: the difference between the values of support and the degree of reception expresses the sensitivity of an impact to be forced by others. The greater the value of the meaning of the impact is, the more impact tends to force others.

### (6.1.12) Conclusion

As a result of the analysis performed, the interaction matrix presents 30 of which 18 are negative and 12 positive. The factor with more interactions was social, with all positives.

From the impact evaluation matrix, it Is acknowledged that the identified negative impacts (10 air components, 4 soil and 4 surface hydrology) have a low significance category and can be mitigated, that is, the possibility of reducing the impacts through preventive, corrective, compensatory and/or mitigation measures.

It was identified that residual impacts are associated with improper waste management or spills of hazardous materials and wastes that can cause residual contamination in the soil and subsoil and, therefore, synergistically affect surface and groundwater, so they must be monitored to ensure that there are no leachates and migration of contaminants outside the temporary storage areas.

All environmental impacts that Luxun could generate are cumulative; however, no impact is significant but low, so they can be reduced or eliminated with proper prevention and mitigation measures.

Concerning the synergistic impacts, the impacts that present the highest levels of synergistic influence, that is, that can generate greater influence on other impacts, are the alteration of the quality of the soil. In contrast, those with the highest level of synergistic sensitivity are the impacts on hydrology (surface).

### (6.2) Findings of the process of identifying risks and social impacts

#### (6.2.1) Scope in the identification of risks and social impacts

For this identification process, the risks and potential negative impacts arising from the company's activities will be considered in their interaction with social factors such as labor and working conditions, community health and safety, land acquisition and involuntary resettlement, indigenous peoples and cultural heritage.

#### (6.2.2) Guidelines for the identification of risks and social impacts

(1) Integration of social considerations in the process of identifying social risks and impacts; (2) Evaluate the interactions of company-worker-community activities as a dialectic, dynamic and continuous process, identifying adverse effects before they occur; (3) Apply international best practices recognized for the industry in the process of identifying social risks and impacts of the company's activities.

#### (6.2.3) Criteria considered for the identification of social risks and impacts

The methodology for the identification of social risks and impacts considers: (1) the identification of the company's main risk areas and possible negative impacts; (2) the risks and possible negative impacts are identified according to the company's processes; then the impacts are classified according to their social significance; and (3) the probability of a risk occurring is assessed, considering the most significant social risks and impacts according to the company's activities.

#### (6.2.4) Identification of the main risk areas and possible negative impacts

The risks and their potential social impacts are concentrated in the following areas: i) labor and working conditions, and ii) community health and safety.

Regarding risks related to labor and working conditions, there is the possibility of negative impacts on the condition of workers working in companies that provide installation and maintenance services for solar panels, as these are suppliers that could employ temporary workers from other areas of the country. In terms of occupational health and safety, the company identified the possibility of negative impacts due to the effect of high noise levels during the anchoring of the structures that support the solar panels, as well as possible effects due to exposure to extreme temperatures, heat or cold, during extended hours, especially during the construction (installation) stage; In addition, there is the possibility of falls from heights, since installation and maintenance activities are concentrated on the roofs of the sites; likewise, there is the possibility of vehicular accidents during the construction stage, when there may be movement of cranes and trucks that transport installation personnel. Finally, exposure to hazardous products and materials was identified as a possible negative impact, considering that contact and exposure to solar panels damaged by natural phenomena, such as

strong winds, could imply a health risk for workers who work at the sites, who do not have PPE or safety training, and who could have their first contact with these materials.

In terms of health and safety risks to the community, there may be impacts from emissions, noise, and accidents due to the movement of equipment, especially during the construction (installation) stage. In addition, there may be impacts from exposure to substances, products or materials, such as damaged solar panels due to natural phenomena, such as strong winds, which could dislodge the panels from the structures and throw them into places where people in the community live and/or pass through. Finally, the community's exposure to workers from other parts of the country to perform installation and maintenance work at the sites represents a possible negative impact.

Thus, 10 risks related to work and working conditions were identified, with their corresponding possible negative impacts; 3 risks to health and safety in the community were identified. However, these are risks and potential impacts that can be reduced through mitigation measures, in addition to the improvement of prevention and mitigation measures already being developed by the company.

It was also identified that, given the nature of the activities, there are no risks or potential social impacts associated with land acquisition and involuntary resettlement, indigenous peoples, and cultural heritage.

The activities related to the installation and commissioning of photovoltaic systems on the roofs of buildings such as convenience stores, warehouses, and industrial plants, especially those located in urban areas, do not jeopardize the permanence of communities and people on their lands, nor do they endanger indigenous community cohesion; therefore, the company's activities cannot damage the physical and intangible expressions of cultural heritage existing in the locations where the photovoltaic projects are being developed.

**(6.2.4.1) Risk from land acquisition and involuntary resettlement**

As can be seen in the permits that Luxun usually obtains for the development of its projects, there is no indication of any procedure related to land acquisition; on the contrary, they are related to NOM-001-SEDE-2012 in accordance with the Solar Photovoltaic Systems.

In the same way, in the document "Identification of Human Rights and Corruption Risks, Luxun Group", the following has been verified: "100% of Luxun Group's facilities are on the roofs of our customers, all are on private property", so the possible impact on the acquisition of land and the displacement of people and goods is excluded.

Similarly, the possibility that Luxun's customers incur in situations of possible violations of human rights of people on access to land and their permanence on it is not applicable because Luxun conducts its operations on sites whose legal status is based on private property, in addition to this, the company has policies and codes in order to avoid business dealings with customers who incur in irregularities of any kind. This can be seen in Luxun Group documents: Code of Ethics, Policy and procedures for contracting services and purchases, Human Rights Policy, Communication and stakeholder participation plans, cited in section one, "references".

Regarding the list of risks and possible negative impacts by stage of the process and evaluation of the significance of the risks and potential impacts according to the incidence of the company's activities, priority was given to the possible negative impacts that are most likely to occur, as well as those that have a significant severity and lower detectability.

The risks and their possible negative social impacts of considerable significance were:

- Worker injuries due to the fact that we have not been able to identify all operations where the use of personal protective equipment (PPE) is required.

- In case of damaged equipment or components, communities may have health risks due to exposure to toxic substances (e.g., chemicals, heavy metals, asbestos, etc.).

**(6.2.5) Assessment of social impacts**

The assessment of risks and possible negative impacts on the health and safety of workers and people in the immediate surroundings of the sites allowed us to identify a specific circumstance and context of risk.

This circumstance and context were proposed in the visit to the Vinoteca Cancun site, where there was a detachment of solar panels due to the passage of Hurricane Delta; beyond considering this case as an isolated event, it is part of the identification and assessment of risks and social impacts due to external and internal phenomena that affect the activities of Luxun Energy.

Therefore, it can be considered as sites vulnerable to risk, those photovoltaic systems placed in regions or geographical areas exposed to hurricanes, meteorological phenomena or air masses that can detach the solar panels from the structures.

**(6.2.6) Conclusion**

In the social area, 15 potential negative impacts on labor and working conditions, community health and safety, land acquisition and involuntary resettlement, indigenous peoples, and cultural heritage were analyzed. It was determined that due to the nature of the company's activities, they cannot affect or damage property and/or land use; likewise, they cannot affect indigenous communities, nor can they damage physical or intangible expressions of cultural heritage; the justification is precise, because Luxun's activities are performed on the roofs of previously built and operating constructions.

Measures for managing the impacts identified during this process, the implementation schedule, roles and responsibilities, as well as reporting and monitoring requirements, will be provided through the corresponding Environmental and Social Management Plan (ESMP).

## 1. References

The following documents are taken as references for the identification of environmental and social risks and impacts of the activities carried out by Luxun:

- Luxun Group Code of Ethics.
- Luxun Group Code of Conduct for Security Personnel.
- Luxun Group Identification of Risks in Terms of Human Rights and Corruption.
- Luxun Group Emergency Response Plan.
- Luxun Group Communication Plans and Stakeholder Participation.
- Luxun Group Human Rights Policy.
- Luxun Group Employee Policy.
- Luxun Group Policy for the Prevention of Forced Labor and Child Labor Practices.
- Luxun Group Health and Safety Policy.
- Luxun Group Environmental Policy.
- Luxun Group Purchasing Policy and Procedures.
- Luxun Group Contracting Services Policy and Procedures.
- Luxun Group Corporate Social Responsibility Program.
- Luxun Group Waste Management Program.
- Luxun Group Protocol for Receiving Complaints and Reports.

And the following legal regulations and good international practices:

Electricity Industry Law, published in the DOF on August 11th, 2014.
Environmental and Social Management System. Implementation Manual of the International Finance Corporation (IFC) (2015 a).
Environmental and Social Management System. Tool kit. (IFC) (2015b).
Equator Principles (2020).
Evaluation and Management of Environmental and Social Risks and Impacts. Performance Standard 1 (IFC) (2012).
Federal Law on Archaeological, Artistic and Historical Monuments and Zones, published in the DOF on May 6th, 1972.
Federal Regulation on Safety and Health at Work, published in the DOF on November 13th, 2014.
General Administrative Provisions on the Social Impact Assessment in the Energy Sector of the Ministry of Energy (SENER), published in the DOF on June 1st, 2018.
General Guidelines on Environment, Health, and Safety (2007) from the World Bank.
General Law for the Prevention and Management of Waste published in the DOF on October 8th, 2003.
General Law of Ecological Balance and Environmental Protection published in the DOF on January 28, 1988.
General Law Regulation for the Prevention and Comprehensive Management of Waste, published in the Official Gazette of the Federation on November 30th, 2006.
Guidelines on Environment, Health, and Safety: Community Health and Safety (2007) from the World Bank.

Mexican Official Standard NOM-081-SEMARNAT-1994 establishes the maximum permissible noise emission limits from fixed sources and their measurement method.

OECD Guidelines for Multinational Enterprises (2011).

Official Mexican STANDARD NOM-041-SEMARNAT-2015, which establishes the maximum permissible limits for the emission of polluting gases from the exhaust of motor vehicles that uses gasoline as fuel.

Official Mexican STANDARD NOM-045-SEMARNAT-2017, Environmental Protection. Vehicles in circulation that use diesel as fuel. Maximum permissible limits of opacity, test procedure and technical characteristics of the measuring equipment.

Official Mexican STANDARD NOM-052-SEMARNAT-2005 establishes the characteristics, identification procedure, classification, and lists of hazardous waste.

Official Mexican STANDARD NOM-080-ECOL-1994, which establishes the maximum permissible limits of noise emission from the exhaust of motor vehicles, motorcycles and motorized tricycles in circulation and its measurement method.

Official Mexican STANDARD NOM-161-SEMARNAT-2011, which establishes the criteria for classifying Special Management Waste and determining which are subject to a Management Plan; the list of the same, the procedure for the inclusion or exclusion to said list; as well as the elements and procedures for the formulation of management plans.

Political Constitution of the United Mexican States of February 5, 1917. The last reform was published in the Federal Official Gazette (DOF) on October 17th, 2022.

Regulation of the Electricity Industry Law, published in the DOF on October 31st, 2014.

Regulation of the General Law of Ecological Balance and Environmental Protection in Matters of Environmental Impact Assessment, published in the DOF on May 30th, 2000.

Sustainability Performance Standards Environmental and Social (IFC) (2012).

## 2. Definitions

The definitions established in the legal regulations and good reference practices will be followed for identifying environmental and social risks and impacts, notably the Evaluation and management of environmental and social risks and impacts. Performance Standard 1 (CFI) (2012), General Law of Ecological Balance and Environmental Protection and its Regulations on Environmental Impact Assessment, the Electricity Industry Law and its Regulations, and the General Administrative Provisions on the Social Impact Assessment in the Energy Sector, of the Ministry of Energy, which are transcribed below:

**Hazardous waste storage:** the action of temporarily retaining hazardous waste in areas that meet the conditions established in the applicable provisions to prevent their release while they are processed for their use, a treatment is applied to them, they are transported, or they are finally disposed of.

**Gathering:** Action of collecting waste from one or different sources for management.

**Community**: Group of women and men, linked by characteristics or common interests settled in a geographical space.

**Pollution:** The presence in the environment of one or more pollutants or any combination causes ecological imbalance.

**Noise pollution:** Any sound generated by human activities that, due to its intensity, duration, or frequency, implies risk, annoyance, harm or damage to people, other living beings or the environment, or those that exceed the levels set by official Mexican standards.

**Pollutant:** All matter or energy in any of its physical states and forms, incorporated or acting in the atmosphere, water, soil, flora, fauna, or any natural element, alters or modifies its composition and natural condition.

**Ecological criteria:** The mandatory guidelines in this Law to guide the actions of preservation and restoration of the ecological balance, the sustainable use of natural resources and the protection of the environment, which will have the character of environmental policy instruments.

**Damage to ecosystems**: It is the result of one or more environmental impacts on one or several environmental elements or ecosystem processes that trigger an ecological imbalance.

**Environmental damage**: It is the one that occurs on some environmental element because of an adverse environmental impact.

**Severe damage to the ecosystem**: Causes the loss of one or several environmental elements that affect the structure or function or modify the ecosystem's evolutionary or successional tendencies.

**Severe ecological imbalance**: Significant alteration of the environmental conditions in which cumulative, synergistic, and residual impacts are expected to cause the destruction, isolation or fragmentation of ecosystems.

**Issue:** Release to the environment of any substance, in any of its physical states, or any energy, coming from a source.

**Species of difficult regeneration**: Species vulnerable to biological extinction due to the specificity of their habitat requirements and the conditions for their reproduction.

**Generation:** Action of producing waste through the development of production or consumption processes.

**Generator:** Natural or moral person that produces waste through the development of production or consumption processes.

**Cumulative environmental impact**: The effect on the environment that results from the increase in the impacts of individual actions caused by interaction with others that were carried out in the past or that are occurring in the present.

**Residual environmental impact**: The impact that persists after applying mitigation measures.

**Significant or relevant environmental impact**: It results from the action of man or nature, which causes alterations in ecosystems and their natural resources or health, hindering the existence and development of man and other living beings, as well as the continuity of natural processes.

**Synergistic environmental impact**: That which occurs when the combined effect of the simultaneous presence of several actions supposes an environmental incidence greater than the sum of the individual incidences contemplated in isolation.

**Social impact**: Are all the changes and consequences, positive or negative, resulting from the development of the Project, which can be experienced perceptually or physically, individually, and collectively and affect the way of life of the women and men who are members of a community, its culture, its cohesion, stability, fears and aspirations, services and facilities, its decision-making systems, its physical environment, its health and well-being, as well as its rights.

**Release of hazardous waste:** the action of unloading, injecting, inoculating, depositing, spilling, emitting, emptying, throwing, placing, spraying, abandoning, draining, dripping, escaping, burying, throwing, or dumping hazardous waste into natural elements.

**Manifest:** Document in which the hazardous waste management activities are recorded, which must be prepared and kept by the generators and, where appropriate, the management services providers for said waste.

**Statement of environmental impact:** The document through which the significant and potential environmental impact that a work or activity would generate is disclosed, based on studies, as well as how to avoid or mitigate it if it is negative.

**Material:** Substance, compound, or mixture of them, which is used as an input and is a component of consumer products, containers, packaging, packaging and the waste they generate.

**Hazardous Material:** Elements, substances, compounds, residues, or mixtures of them that, regardless of their physical state, represent a risk to the environment, health or natural resources due to their corrosive, reactive, explosive, toxic, flammable or biological-infectious characteristics.

**Prevention measures:** A set of actions that the promoter must execute to avoid foreseeable effects of deterioration of the environment.

**Mitigation measures:** A set of actions that the promoter must execute to mitigate the impacts and restore or compensate the existing environmental conditions before the disturbance caused by the execution of a project in any of its stages.

**People in a situation of vulnerability**: Refers to those who are unable or limited from work activity, either due to their academic condition, cultural or social development, are prevented from performing stable, lucrative activities or whose income does not satisfy the basic needs of social subsistence.

**Gender perspective**: Refers to the methodology and mechanisms that allow identifying, questioning, and assessing discrimination, inequality and exclusion of women, which is intended to be justified based on the biological differences between women and men, as well as the actions that must be

undertaken to act on gender factors and create the conditions for change that allow progress in the construction of gender equality.

**Harvest:** Action of collecting waste to transport or transfer it to other areas or facilities for comprehensive management

**Landfill:** Facility for the final disposal of urban solid waste and special handling.

**Waste:** Material or product whose owner or holder discards and which is in a solid or semi-solid state, or is a liquid or gas contained in containers or tanks, and which may be capable of being recovered or requires subject to treatment or final disposal following the provisions in this Law and other ordinances derived from it.

**Incompatible Waste:** When in contact or when mixed with water or other materials or residues, react producing heat, pressure, fire, particles, gases, or harmful vapors.

**Special Management Waste:** These are those generated in productive processes that do not meet the characteristics considered dangerous or urban solid waste or produced by large generators of urban solid waste.

**Dangerous waste:** those that have any of the characteristics of corrosiveness, reactivity, explosiveness, toxicity, flammability or that contain infectious agents that confer danger, as well as containers, containers, packaging and floors that have been contaminated when they are transferred to another site, and therefore, they represent a danger to the ecological balance or the environment.

**Urban Solid Waste:** Those generated in dwelling houses, which result from the elimination of the materials they use in their domestic activities, of the products they consume and of their containers, packaging or packaging; the waste that comes from any other activity within establishments or on public roads that generates waste with household characteristics, and those resulting from the cleaning of roads and public places, provided that this Law does not consider them as waste of another nature.

**Reuse:** The use of a previously used material or residue without a transformation process.

**Sustainability**: Refers to the capacity of a system (or an ecosystem) to maintain its state constant over time, a constancy that is achieved either by keeping the parameters of volume, exchange rates and circulation invariable or by fluctuating cyclically around values averages.

## 3. Description of the Luxun Energy activities

According to Performance Standard 1, Assessment and management of environmental and social risks and impacts: “the type, size and location of the project condition the scope and level of effort devoted to the process of identifying risks and impacts […] the process will be based on recent baseline data on environmental and social aspects, with an adequate level of detail” (IFC, 2012: 3).

The concept of "project" is taken up from the same Performance Standard 1, understood as "a defined series of commercial activities, including those in which the specific elements, aspects and physical facilities that could generate risks and impacts have not yet been identified." (ibid.: 2)

The Luxun activities, led by 22 employees and more than 98 suppliers, entail the development, installation, commissioning and operation of photovoltaic systems under the distributed generation scheme (<500kW of capacity) in places such as self-service stores, warehouses, and industrial plants with an average installation (kWp) of around 150 kWp. It currently has a total installed capacity of more than 3.5 MWp, and with the Subnational Climate Fund investment is expected to grow the platform to more than 100MW during the next five years. In order to scale the business faster, Luxun will partner with another Distribution Generation Company named Suneco to develop projects that will be acquired by Luxun.

The company's mission is to promote businesses in a transition to the sector through clean energy at a better cost for the customers, reducing the carbon footprint and environmental impact and considering that distributed generation is the energy of the future.

This analysis identifies and evaluates environmental and social risks and impacts to address them adequately. The following elements are part of the analysis:

1. Studies and programs that Luxun has for its activities.
2. General characteristics of the tasks carried out by the company for the installation and commissioning of photovoltaic systems.
3. Technical information on the activities performed by the company for the installation of photovoltaic systems and their characteristics.
4. Site visit to verify *in situ* the physical and technical characteristics of the photovoltaic systems.

## 4. Objectives of the identification of risks and impacts

The identification of environmental and social risks and impacts has the general objective of determining all the possible risks and impacts related to the activities of Luxun, which will allow to:

- Methodologically determine the scope of the potential effects of the company's activities on the environmental components (soil, air, water, flora, and fauna) based on the interaction of the activities during their execution in their different stages.

- Determine the scope of the potential effects of the company's activities on the social environment factors.

- Adjust the management of environmental and social risks and impacts of the company according to the requirements established by the IFC Performance Standards and the EqP.

## 5. Description of the risk and impact identification process

This section summarizes the findings of evaluating the most relevant environmental and social risks and impacts of the activities carried out by Luxun. The analysis of each particular risk and impact.

The first subsection shows the findings obtained in the analysis of environmental impacts and, subsequently, the results found in social matters are listed.

# 6. Findings of the process of identifying risks and environmental and social impacts

## 6.1 Identification of risks and environmental impacts

### 6.1.1 Scope in the identification of risks and environmental impacts

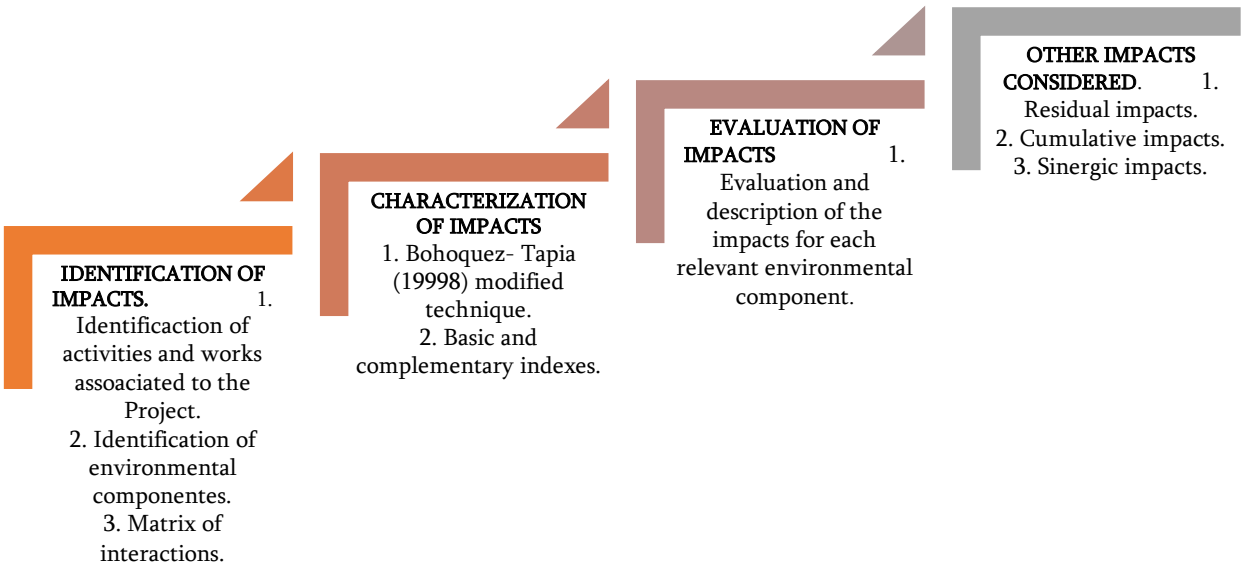
The environmental impact involves a modification to the environment. According to Espinoza (2001), an environmental impact is an alteration caused by human actions whose importance derives from territorial vulnerability according to the context and characteristics of each project. Technically, it can be understood that an environmental impact is not only a change but also an alteration of the environmental baseline that modifies environmental quality (Martín, 2002).

An environmental impact assessment process is expressed in a logical sequence of steps. These are key elements when applied to human actions that are of interest to be evaluated to safeguard compliance with environmental objectives.

Identifying environmental impacts is a substantial part of the evaluation process, so it will be addressed based on a methodological scheme that considers both the project's environmental setting and its characteristics and nature.

The general process and evaluation method used in the identification and evaluation of environmental impacts can be summarized in the scheme presented in Figure 1.

**Figure1. Methodological scheme for the identification, description, and evaluation of environmental impacts**



### 6.1.2 Guidelines for the identification of risks and environmental impacts

The identification of environmental risks and impacts identified during the development of the company's activities based on existing interactions under a recognized bibliographic methodology, obtains the following results:

- Identify and characterize potential environmental impacts.
- Assess the magnitude and significance of the environmental impacts.
- Determine significant environmental impacts.
- Identify cumulative and residual environmental impacts.

### 6.1.3 Identification of risks and environmental impacts

### A. Site Preparation

### A.1. Technical visit.

An on-site verification was carried out on two Luxun operating projects to obtain information on the rooftop spaces where the panels are usually installed, such as roof material, slope orientation, possible shadows, objects that may hinder the installation, such as refrigeration equipment or skylights, access for personnel and where all the material and equipment to be installed is uploaded, as well as the location of the load center and its electrical details, spaces for the channeling, whether or not it is necessary to drill, where the interconnection of the system is made, internet connection (if it will be by ethernet or Wi-Fi), etc.

**A.2. Engineering Development**

In this stage, the power and quantity of solar panels are determined, and their final distribution on the roof, both their location and the connections, as well as the model and power of the inverter. Additionally, the corresponding calculations are made to develop the calculation memory, plans, diagrams, and simulations.

**A.3. Logistics development**

Once the engineering development is finished and approved, the process of requisition of materials, purchase, supply, and maneuver is carried out. The purchase phase refers to requesting quotes for materials, equipment, and protections to be installed and to the payment and billing process.

After it, the supply includes shipping of materials, their reception, storage, and reception.

Finally, the maneuver refers to already having the materials on site and placing them where they will be installed, the roof, warehouses, machine rooms, electrical, etc. At this point is relevant to identify how these materials and equipment will be delivered and if the use of cranes, scaffolding, platforms,

ramps, forklifts, cargo skids or personnel handling heavy loads is needed. It is relevant to highlight the security protocol during these maneuvers.

**B. Construction and installation**

**B.1. Structural installation**

The entire structure begins to be installed by trained personnel supervised by a team of specialized engineers. Depending on the type of roof, it is the type of anchor used and, depending on the roof's material, it is the type of structure used. The materials used are top-quality aluminum, non-corrosive and resistant to high temperatures; some of the brands implemented are Aluminex and Everest.

**B.2. Electrical installation**

The entire channeling is assembled to subsequently wire and connect the entire system, including the protection and grounding elements. Materials must comply with applicable Mexican regulations and the team that performs the electrical installation has the necessary training and is always supervised by highly qualified engineering personnel from the company.

**C. Pre-commissioning stage**

**C.1. Project Overview**

At this stage of the project, an exploration of the entire system is performed, from the panels to the interconnection. The corresponding adjustments are made to the plans and diagrams.

**C.2. UVIE Management**

The Electrical Installation Verification Unit is an individual or legal entity whom performs verification of electrical installations to assess the degree of compliance with the Mexican Official Standard NOM-001-SEDE-2012, Electrical Installations (use).For the request of a Verification Unit of Electrical Installations (UVIES), a contact is made with an approved unit stipulated in the Directory of UVIES by the Federal Regulator.

After an economic analysis, the visit and procedure development with the Unit selected for the project is scheduled. In the case of having a previous unit recommendation by the Federal Commission on Electricity (CFE) it is considered. After the visit, if needed, the verifier provides the Non-Conformity Report detailing the possible adjustments to the Photovoltaic System. At the end of the possible adjustments, a second visit is scheduled to close the file where the verifier issues the document.

As annexes for the issuance of UVIE are included, such as the single-line diagram, calculation report, identification of the legal representative, deeds of incorporation of the owner of the service, tax id of the owner of the service, receipts, project coordinates, technical sheet of installed panels, certificate of installed panels, installed technical inverter sheet and installed inverter certificate.

**C.3. Management of interconnection procedures with the Federal Electricity Commission**

The first step is to submit annex 2 (Form provided by the Manual for the Interconnection of Power Plants Connection of Load Centers less than 0.5MW) to the corresponding branch of the CFE.

**CFE** attends to the request and generates a tracking number, the Official Letter where the project characteristics are specified, and a description of the specific works and equipment required at the interconnection point. In case of applying a charge for work of the measurement department, the payment is scheduled, and the corresponding invoicing is requested.

As soon as the UVIE issues the verification, said document and the official resolution are submitted again to the CFE so that they issue to the company the Interconnection and Consideration contracts. After contracts are delivered to be signed by the service's legal representative, they return to CFE to wait for the order number to change the bidirectional meter. Once the meter has been changed, the photovoltaic system is turned on. Still, the process (depending on the rate, for cases in GDMTH - High Demand Medium Voltage Hourly / GDMTO - High Demand Medium Voltage Ordinary) ends with the delivery of the Installation Inspection Unit electrical.

**D. Operation and maintenance**

**D.1. System commissioning**

Once the installation is finished, the cold commissioning (cold/off tests) is carried out, confirming that the voltages are correct as calculated, the first hot commissioning (test on) is carried out to ensure the correct operation of the system and the inverters have an indicator LED in the form of a tree leaf which will be off if the system is completely off, turns on the green if it is generating energy, red if it has a problem, this is when stage 5 is terminated, concluding the photovoltaic installation.

**D.2.UVIE management**

With the bidirectional meter changed, the photographic evidence is sent to the Inspector to schedule the final Inspection visit. For this stage, an UVIE is used once again. The Inspector requests a copy of the Official Letter, a photograph of the bidirectional meter, contact information of the person in charge of CFE who receives the Inspection Certificate.

**D.3. Post-Sale Follow-up**

After installing the system, the interconnection procedures with CFE are completed and the trial period is over, and the project is delivered to the client. Once delivered, the process of registering in the company’s system is completed, so from then on, the corresponding invoice for energy generation will be made monthly. Additionally, the monitoring system implemented by the company allows for monitoring the plant’s performance, detecting any failure or abnormal behavior that may occur, and from that to carry out the corresponding corrective maintenance, in the same way as the monitoring system itself. Provide the necessary information to schedule preventive maintenance in the optimal personalized periods of the installation.

### 6.1.4 Identification of environmental components

While the project activities are identified, it is necessary to have adequate environmental indicators to follow up or monitor them. Such indicators determine how an environmental component is modified and to what extent the observed changes signify a detriment to environmental quality.

It consists of recognizing which physicochemical, biological, socioeconomic, cultural and landscape variables and/or processes may be affected. To this end, in this stage, the previous environmental situation is analyzed, which represents the baseline of the environment contrasting it with the expected transformations. At this point, the direct, indirect, and cumulative impacts that could be generated on the environmental components are also foreseen.

To simplify the information on the project and the environment in which it is intended to be developed, lists of each component are used as a basis for the following stages of the environmental impact assessment process, as shown below.

**Table 1. Indicators of the environmental components in the area**

| Environmental components | Indicator | Comment |
|---|---|---|
| Soil | Erosion and physical characteristics | There are no adverse environmental impacts since the infrastructure to be installed is carried out on existent infrastructure, such as the roofs and flat roofs of the buildings. |
| | Permeability | |
| | Quality (chemical characteristics) | An alteration of the chemical characteristics of the soil may occur due to inadequate waste management that causes spills of hazardous materials and waste in the project stages or due to spill events in the event of a malfunction of machinery and equipment. |
| Surface hydrology | Water quality | An alteration of the chemical characteristics of the soil may occur due to inadequate waste management that causes spills of hazardous materials and waste in the stages of the Project or due to spill events in the event of a malfunction of machinery and equipment. |
| | Runoff pattern | There are no adverse environmental impacts since the infrastructure to be installed is existing out on existent infrastructure, such as the roofs and flat roofs of the buildings. |
| Groundwater hydrology | Water quality | There are no adverse environmental impacts since the infrastructure to be installed is carried out on existing infrastructure, such as the roofs and flat roofs of the buildings. |
| | Water infiltration | There are no adverse environmental impacts since the infrastructure to be installed is carried out on existing infrastructure, such as the roofs and flat roofs of the buildings. |
| Air | Noise emission | Noise levels and air quality may be altered given the use of machinery and equipment from the different stages of the project. |
| | Air quality | |
| Flora | Abundance and diversity | There are no adverse environmental impacts since the |

| Table 1. Indicators of the environmental components in the area | | |
|---|---|---|
| **Environmental components** | **Indicator** | **Comment** |
| | Status or endemic species | infrastructure to be installed is carried out on existing infrastructure, such as the roofs and flat roofs of the buildings. |
| | Forest cover | |
| Fauna | Abundance and diversity | There are no adverse environmental impacts since the infrastructure to be installed is carried out on existing infrastructure, such as the roofs and flat roofs of the buildings. |
| | Status or endemic species | |
| | Wildlife habitat | |
| Scenery | Appreciation | There are no adverse environmental impacts since the infrastructure to be installed is carried out on existing infrastructure, such as the roofs and flat roofs of the buildings. |
| Social | Employment | Generation of jobs in the localities or populations of the region. |
| | Services | Electric power supply services for customer self-sufficiency in their facilities through clean energy technologies, such as solar panels. |

**Figure 2. Project components installed on roofs or rooftops of buildings.**

**Facilities verified *in situ.***

**Facilities verified *in situ.***

**Waldo's Investors.**

**Facilities verified *in situ.***

**Wine cellar' investors.**

Additionally, and according to the IFC methodology, the following chart explains the environmental risk factors and the potential negative impacts considering the company's activities.

| Table 2. Chart of risks and environmental impacts identified. | | |
|---|---|---|
| **Risk factor** | **The company has the following conditions (Yes, no, not applicable (N/A)** | **Possible negative impact (answering "Yes" implies a possible negative impact).** |
| The operations require high levels of power supply. | No | Emissions to the atmosphere. |
| The operations require the consumption of fuels (gas, diesel, etc.) for the operations. | Yes | Emissions to the atmosphere in very low quantities for ancillary activities. |
| Generation of waste to the local landfill. | Yes | Contamination to the soil, underground water (given to leaches) or shallow waters (given to run offs) for the inadequate management of waste. |
| Generation of solid waste or liquid or toxic hazardous waste such as chemical residues or wastewater treatment plant residues. | Yes | Contamination to the soil, underground water (given to leaches) or superficial waters (given to run offs) for the inadequate management of waste. |
| Large extensions of land. | No | Loss of biodiversity. Soil degradation. Loss of greenhouse gases capture. |
| Removal of vegetation during the execution of the Project. | No | Loss of biodiversity. Soil degradation. Loss of greenhouse gases capture. |

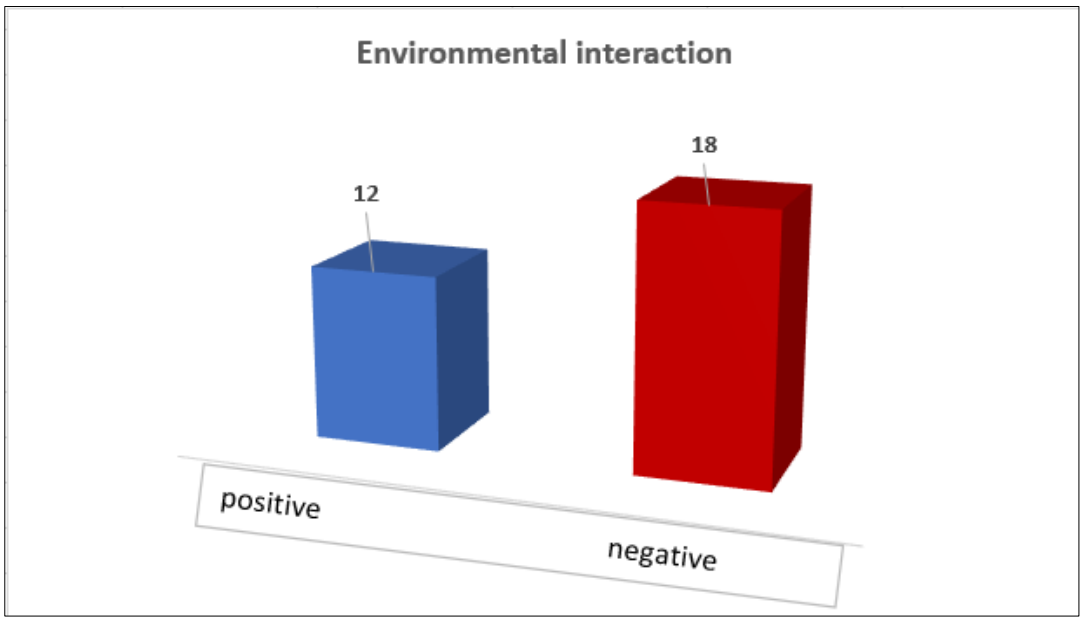
According to the risks shown and the three environmental impacts identified, below is presented a matrix of interactions where the referred impacts are reflected considering the activities and stages of the Project.

### 6.1.5 Interaction matrix

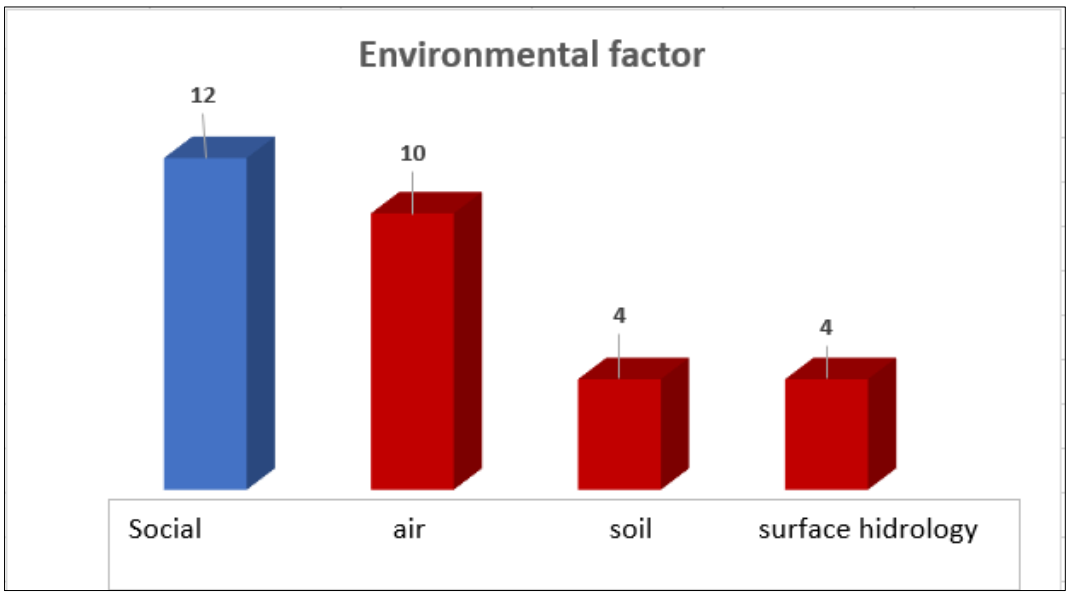
Once the works and activities performed by Luxun for the installation of the developed projects that can cause impacts (positive and negative), as well as the environmental components of possible affectation were identified, a matrix of interactions was elaborated. Said matrix has a double entry: for each activity performed in all stages of a project is analyzed the relationship with each environmental component.

This allows to recognize an interaction and describe the impact (positive or negative) that the project could have on the environment. 30 interactions were identified, 18 negative and 12 positive.

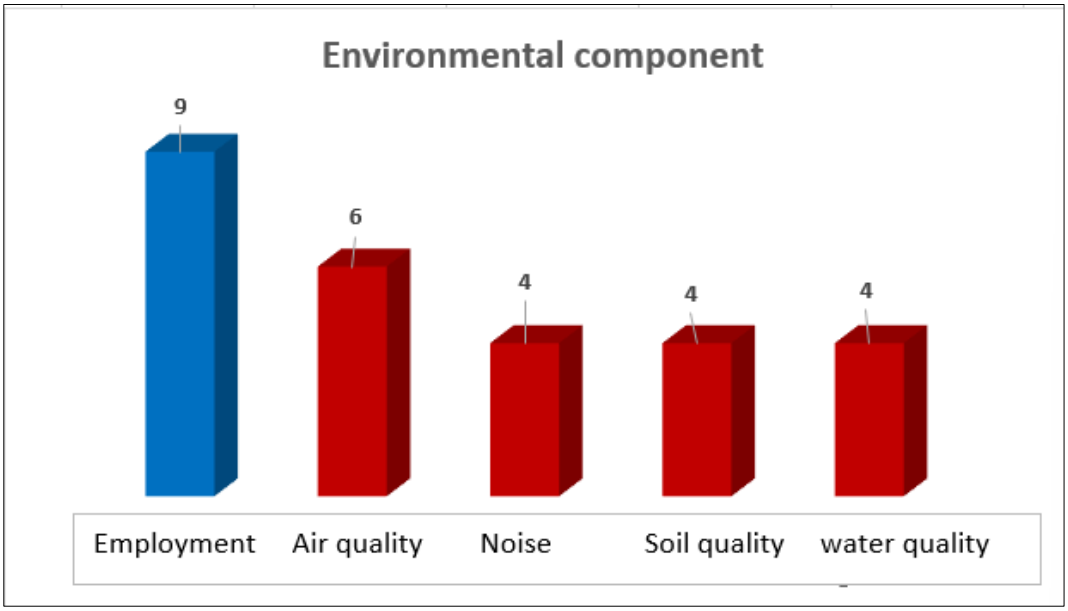
**Figure 3. Results of interactions of environmental impacts**




The factor that obtained the most interactions was social, with 12 positive interactions, followed by the air component, with 10 negative interactions, the soil and surface hydrology components had 8 negative interactions, and finally, the components of the environment without interactions according to the nature of the project are: groundwater hydrology, flora, fauna, and landscape.




The environmental components that presented the most interactions were employment with 9 (all positive), followed by air quality with 6 (all negative), noise emission with 4 (all negative), surface water quality and water quality, land with 4 interactions (all negative), services with 3 interactions (all positive). This information is presented graphically below.




Tables 3, 4, 5 and 6 describe the interaction identification matrix between the projects' activities with the potential to generate negative and positive environmental impacts, as well as the environmental factors that may be affected. In the first column, from left to right, the works or activities of the project are listed, and in the second, the different stages of development as described in the program of activities.

| **Table 3. Site Preparation Stage Interaction Identification Matrix.** | | | | |
|---|---|---|---|---|
| **Site Preparation (PDS)** | | | | |
| **Environmental elements and indicators** | | **Technical visit** | **Engineering Development** | **Logistic development** |
| Soil | Erosion and physical characteristics | - | - | - |
| | Permeability | - | - | - |
| | Quality (chemical characteristics) | - | - | - |
| Surface hydrology | Water quality | - | - | - |
| | Runoff pattern | - | - | - |
| Groundwater hydrology | Water quality | - | - | - |
| | Water infiltration | - | - | - |
| Air | Noise emission | X | - | X |
| | Air quality | X | - | X |
| Flora | Abundance and diversity | - | - | - |
| | Status or endemic species | - | - | - |
| | Forest coverage | - | - | - |
| Fauna | Abundance and diversity | - | - | - |
| | Status or endemic species | - | - | - |
| | Wildlife habitat | - | - | - |

| Table 3. Site Preparation Stage Interaction Identification Matrix. | | | | | |
|---|---|---|---|---|---|
| Site Preparation (PDS) | | | | | |
| Environmental elements and indicators | | | Technical visit | Engineering Development | Logistic development |
| Scenery | Appreciation | | | | |
| Social | Employment | | X | X | X |
| | Services | | | | |
| Adverse environmental impact | | X | 2 | 0 | 2 |
| Beneficial environmental impact | | X | 1 | 1 | 1 |

| Table 4. Construction stage interaction identification matrix. | | | | |
|---|---|---|---|---|
| Construction and Installation (CI) | | | | |
| Environmental elements and indicators | | Structure installation | Electrical installation | General Review |
| Soil | Erosion and physical characteristics | - | - | - |
| | Permeability | - | - | - |
| | Quality (chemical characteristics) | X | X | - |
| surface hydrology | Water quality | X | X | - |
| | Runoff pattern | - | - | - |
| underground hydrology | Water quality | - | - | - |
| | Water infiltration | - | - | - |
| Air | Noise emission | X | - | X |
| | Air quality | X | - | X |
| Flora | Abundance and diversity | - | - | - |
| | Status or endemic species | - | - | - |
| | Forest coverage | - | - | - |
| Fauna | Abundance and diversity | - | - | - |
| | Status or endemic species | - | - | - |
| | Wildlife habitat | - | - | - |
| Scenery | Appreciation | - | - | - |
| Social | Employment | X | X | X |
| | Services | | | |
| Adverse environmental impact | | X | 4 | 2 | 2 |
| Beneficial environmental impact | | X | 1 | 1 | 1 |

| Table 5. Interaction identification matrix of the commissioning stage. | | | | | |
|---|---|---|---|---|---|
| Site Preparation (PDS) | | | | | |
| Environmental elements and indicators | | | UVIE Management | Management of procedures | Interconnection with CFE |
| Soil | Erosion and physical characteristics | | - | - | - |
| | Permeability | | - | - | - |
| | Quality (chemical characteristics) | | - | - | - |
| surface hydrology | Water quality | | - | - | - |
| | Runoff pattern | | - | - | - |
| Underground hydrology | Water quality | | - | - | - |
| | Water infiltration | | - | - | - |
| Air | Noise emission | | | - | |
| | Air quality | | X | - | X |
| Flora | Abundance and diversity | | - | - | - |
| | Status or endemic species | | - | - | - |
| | Forest coverage | | - | - | - |
| Fauna | Abundance and diversity | | - | - | - |
| | Status or endemic species | | - | - | - |
| | Wildlife habitat | | - | - | - |
| Scenery | Appreciation | | | | |
| Social | Employment | | X | X | X |
| | Services | | | | |
| Adverse environmental impact | | X | 1 | 0 | 1 |
| Beneficial environmental impact | | X | 1 | 1 | 1 |

| Table 6. Interaction identification matrix for the operation and maintenance stage. | | | | |
|---|---|---|---|---|
| Construction and Installation (CI) | | | | |
| Environmental elements and indicators | | System commissioning | UIIE management | Post-sale follow-up |
| Soil | Erosion and physical characteristics | - | - | - |
| | Permeability | - | - | - |
| | Quality (chemical characteristics) | X | X | - |
| Surface hydrology | Water quality | X | X | - |
| | Runoff pattern | - | - | - |
| Underground hydrology | Water quality | - | - | - |
| | Water infiltration | - | - | - |
| Air | Noise emission | - | - | - |
| | Air quality | - | - | - |
| Flora | Abundance and diversity | - | - | - |

| Table 6. Interaction identification matrix for the operation and maintenance stage. | | | | | |
|---|---|---|---|---|---|
| Construction and Installation (CI) | | | | | |
| **Environmental elements and indicators** | | | **System commissioning** | **UIIE management** | **Post-sale follow-up** |
| | Status or endemic species | | - | - | - |
| | Forest coverage | | - | - | - |
| Fauna | abundance and diversity | | - | - | - |
| | Status or endemic species | | - | - | - |
| | wildlife habitat | | - | - | - |
| Scenery | Appreciation | | - | - | - |
| Social | Employment | | | | |
| | Services | | X | X | X |
| Adverse environmental impact | | X | 2 | 2 | 0 |
| Beneficial environmental impact | | X | 1 | 1 | 1 |

### 6.1.6 Characterization of environmental impacts

The characterization of environmental impacts is carried out in parallel with their description. The environmental impact as already mentioned, is an alteration of human activities, and its importance derives from the territorial vulnerability of the area where a project is to be developed. The diversity of facets of the environment in conjunction with the activities and works of the project can be characterized by the description of the impact identified through a series of impact characteristics.

For the characterization of impacts, the technique of Bojórquez-Tapia et al. (1998) modified includes basic and complementary indexes to evaluate each impact using characteristics such as:

- **Extension.** The measure of the space that the impact occupies.

- **Duration.** The duration of an impact is the time that elapses between its beginning and end.

- **Intensity.** The intensity of an impact is the extent to which the environmental component considered departs from its previous state.

- **Accumulation.** According to SEMARNAT (2002), cumulative impacts are those that are due to the joint action on an environmental component of several similar efforts:

"A cumulative impact is the effect on the environment that results from the increased impacts of particular actions caused by interaction with others that were carried out in the past or are occurring in the present."

- **Synergy.** A synergistic impact occurs when several different actions can act on an environmental component causing a more significant effect than they would if they acted independently.

- **Mitigation.** The possibility of reducing impacts through preventive, corrective, compensatory and/or mitigation measures.

The technique is based on the characterization of six indexes (three basic and three complementary) measured on an ordinary scale.

The stages of the Bojórquez technique –Tapia et al. (1998) are the following:

a. Definition of the basic and complementary indexes.

b. Obtaining basic and complementary indexes (EDI and SA).

c. Calculation of the magnitude of the impact.

d. Obtaining the significance of the impact.

Each stage is briefly described below.

#### 6.1.6.1 Definition of basic rates

The basic indexes are essential to define an interaction, while the complementary indexes are those that complete the description but may be absent from the definition of an interaction.

The interactions in the matrix were evaluated using a set of basic and complementary indexes described below.

**Table 7. Project impact assessment indexes.**

| Basics | Complementary |
|---|---|
| E = Spatial extent | A = Cumulative |
| D = Duration | M = Mitigation |
| I = Intensity | S = Synergism |

#### 6.1.6.2 Obtaining the basic and complementary *rates*

The indexes were evaluated on an ordinal scale corresponding to expressions related to the effect of an activity on the indicator variable of the environmental component. It should be noted that the basic indexes cannot be valued as null since no impact can lack spatial extension, duration and/or intensity.

After the evaluation of each one of the indexes, the environmental impacts of the project are defined or described, the significance values are categorized according to the following.

**Table 8. Rating scale used for core indexes.**

| Scale | Effect Extension (E) | Impact Duration (D) | Impact intensity (I) |
|---|---|---|---|
| 3 | **Regional**: When it has an area of influence that significantly | **Permanent**: When the impacts persist after the | **High**: The environmental component completely loses the characteristics |

| Table 8. Rating scale used for core indexes. | | | |
|---|---|---|---|
| **Scale** | **Effect Extension (E)** | **Impact Duration (D)** | **Impact intensity (I)** |
| | exceeds those adjacent to the Project areas. | operation of the Project. | of its previous state by 75%. |
| 2 | **Local**: When it affects the areas adjacent to the Project area. | **Median**: When impacts occur during the operation and maintenance stage. | **Moderate**: The environmental component presents some changes in its previous state without losing them altogether, between 25 and 74%. |
| 1 | **Punctual**: When it is limited to an area less than the full extension of the Project. | **Short**: When impacts only occur during site preparation and construction. | **Minimum**: The environmental component remains very close to its previous state, less than 25%. |

| Table 9. Rating scale used for supplemental indexes. | | | |
|---|---|---|---|
| **Scale** | **Synergy(S)** | **Accumulation (A)** | **Mitigation (M)** |
| 3 | **Strong**: When the effect produced by the sum of the interactions (simple effects) doubles or exceeds them. | **High**: When there are additive effects between four or more actions on the same factor. | **High**: If the mitigation measure reduces the impact by 75% or more. |
| 2 | **Moderate**: When the effect produced by the sum of the interactions (simple effects) does not exceed twice these. | **Half**: When there are additive effects between three actions on the same factor. | **Half**: If the mitigation measure decreases between 25 and 74%. |
| 1 | **Light**: When the effect produced by the sum of the interactions (simple effects) is slightly greater than the same. | **Little**: When there are additive effects between two actions on the same environmental factor. | **Short**: When the mitigation measure reduces the impact by up to 25%. |
| 0 | **Null**: When there are no interactions between impacts. | **Null**: When there are no additive effects between impacts. | **Null**: There are no mitigation measures. |

When there is uncertainty in determining the value of an index, the highest value is assigned. This rule is consistent with the precautionary principle for environmental conflicts; that is, it reduces the opportunity to underestimate an impact, which minimizes public risk.

The basic and complementary indexes were obtained by describing the effects of variable j (project activity) on variable i (environmental component) through the following models:

**Formula 1. EDIij = 1/9 (Eij + Dij + Iij)**

**Formula 2. SAij = 1/6 (Sij + Aij)**

Where:

**Basic indexes**

E = Extension of the effect
D = Duration of impact

I = Impact intensity
S = Synergy
**Complementary indexes.**
A = Accumulation

Since basic indexes cannot be null, the minimum value assigned to them is one. Therefore, the ranges of these indexes are as follows:

$$(1/3) \leq EDI \leq 1$$

$$0 \leq SA \leq 1$$

As already mentioned, the models presented for the evaluation of the project were modified from the technique of Bojórquez-Tapia et al. (1998), considering the basic indexes and considering that the assigned values for each index were reduced and that the controversy was omitted in the complementary ones.

**6.2.4.3 Calculation of the magnitude of the impact.**

The magnitude of the impact (MI) was obtained from the following formula:

$$MIij = (EDIij)*(1-SA)$$

The magnitude of the impact shall be equal to the EDI index if the value of the SA index is zero; while the magnitude of the impact is greater than EDI when SA is greater than zero.

**6.1.7 Obtaining the significance of the impact.**

Additionally, the significance of the impact (Gij) was calculated as follows:

$$Gij = (MI)\ [1-(M/3)]$$

Where:
M = Mitigation

Mitigation measures are evaluated on an ordinal scale as a complementary index.
Since the basic indexes cannot be valued as null, then the range of values of the significance of the interaction is as follows:

$$3/9 \leq Significance \leq 1$$

Finally, the significance values were categorized as shown in the following table.

**Table 10. Environmental impact assessment scale.**

| Impact assessment scale | |
|---|---|
| Bass | 0-0.25 |
| Moderate | 0.26-0.49 |
| Tall | 0.50-0.74 |
| Very high | 0.75-1.00 |

To characterize and evaluate the identified environmental impacts, the modified technique of Bojórquez-Tapia et al. (1998). It is important to remember that, as mentioned above, this technique evaluates the impacts by calculating the basic and complementary indexes, so the impacts were characterized according to the following:

- Due to its character as adverse.
- Due to its intrinsic properties: extension, duration, and intensity.
- And for its extrinsic properties: mitigable, cumulative, and synergistic.

Next, the evaluation of the identified impacts and their characterization is presented, where:

| | |
|---|---|
| E=extension, | S=synergy, |
| D=duration, | A=accumulation, |
| I=intensity, | M=mitigation. |

| Table 11. Evaluation Matrix | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **ID** | **Impact** | **E** | **D** | **I** | **A** | **S** | **EDI** | **SA** | **1-SA** | **Magnitude** | **M** | **Significance** | **significance category** |
| AIR1 | Impact on air quality due to the generation of polluting gases from the use of vehicles and equipment during the site preparation, construction, pre-commissioning, operation and maintenance stages of the Project. | 2 | 1 | 1 | 1 | 1 | 0.44 | 0.33 | 0.67 | 0.30 | 2 | 0.10 | Low |
| AIR2 | Modification of the noise level due to the use of vehicles and equipment in the construction, pre-commissioning and operation and maintenance stages of the Project. | 2 | 1 | 2 | 1 | 1 | 0.56 | 0.33 | 0.67 | 0.37 | 2 | 0.12 | Low |
| SUE1 | Impact on the quality (chemical characteristics) of the soil (contamination) due to spillage or improper handling of hazardous materials and waste during the project's construction, operation and maintenance stages. | 2 | 1 | 2 | 1 | 1 | 0.56 | 0.33 | 0.67 | 0.37 | 2 | 0.12 | Low |
| HSUP1 | Impact on the physicochemical characteristics (quality) of surface water due to a spill or improper handling of hazardous materials or waste during the project's construction, operation and maintenance stages. | 2 | 1 | 2 | 1 | 1 | 0.56 | 0.33 | 0.67 | 0.37 | 2 | 0.12 | Low |

Below is an assessment of the impacts of environmental components.

### 6.1.8 Assessment of adverse impacts.

#### 6.1.8.1 Air

With respect to this element, 10 impacts were identified that would take place mainly during the stages of site preparation, construction, operation and maintenance, and closure and abandonment of the project. Directly the project can directly affect the air with pollution due to smoke emission, and polluting gases due to the use of machinery and equipment related to its activities. Likewise, there may also be an impact on sound comfort, due to the generation of noise from machinery and equipment.

#### 6.1.8.2 Water (surface hydrology).

The negative interactions that were identified for this environmental factor will occur mainly during the construction, operation, and maintenance stage; as an indirect impact, the water can be affected by the contamination of nearby surface water bodies due to fuel spills and/or or hydrocarbons used in machinery and equipment, or from inadequate waste management.

#### 6.1.8.3 Soil

In evaluating this resource, it was observed that the project activities that will generate negative impacts can cause a contamination event due to material spills and poor waste management in the construction, operation, and maintenance stages.

#### 6.1.8.4 Social

The interactions are positive due to the generation of direct and indirect jobs and the acquisition of materials and supplies required for the stages of site preparation, construction, pre-commissioning, operation, and maintenance. Likewise, the provision of electricity generation services for self-consumption by customers is generated using clean technologies such as solar panels.

### 6.1.9 Residual impacts.

With the application of prevention and mitigation measures, it is feasible that an environmental impact that can alter the functioning of a certain ecosystem component or process within the project area will reduce its significance. However, there are invariably impacts whose effects persist even with the application of measures, called residual. Also, the Regulation of the General Law of Ecological Balance and Environmental Protection in Matters of Environmental Impact Assessment (REIA), in its Article 3, section X, describes a residual impact as the impact that persists after the application of mitigation measures.

The identification and assessment of this type of environmental impact are fundamental since ultimately, they represent the inevitable and permanent effect of the project on the environment.

In the case of the project, the identification of the residual impacts was carried out based on the attribute of recoverability (MC) and that they have been qualified with a maximum value (5); that is,

the factors will not be able to return to their original state even with the application of measures. The project will generate the following residual environmental impacts derived from the above.

| Table 12. Residual impacts identified for the Project | |
|---|---|
| **Residual Impact** | **Recovery Attribute (MC)** |
| Impact on the quality (chemical characteristics) of the soil (contamination) due to spills or improper handling of hazardous materials and waste during the project's construction, operation and maintenance stages. | 5 |
| Impact on surface water's physicochemical characteristics (quality) due to a spill or improper handling of hazardous materials or waste during the project's construction, operation and maintenance stages. | 5 |

Due to the nature of the projects, the residual impacts identified are associated with inadequate waste management or spills of hazardous materials and waste that can cause residual contamination in the soil and subsoil and, therefore, synergistically affect surface water and underground, so they must be monitored to ensure that there are no leachates and migration of contaminants outside the temporary storage areas.

### 6.1.10 Cumulative impacts.

Article 3, section VII of the REIA describes a cumulative environmental impact as the effect on the environment that results from the increase in the impacts of actions caused by interaction with others that were carried out in the past or that are occurring in the present. To determine the cumulative environmental impacts, defined in the REIA, the analysis of the environmental impacts must be based on the determination of the deviations from the “baseline” caused by additive effects. For the above, it is not enough to assess the environmental impacts of the projects as if they were the only source of change in the Environmental System (AS).

#### 6.1.10.1 Identification of cumulative effects due to other works and activities within the environmental system.

As mentioned, there are other activities within the SA that contribute to adverse environmental impacts with cumulative effects. In this case, the impact on the change in land use has already been made, so that, for the stage of site preparation, construction, operation, maintenance, closure, and abandonment, it does not have an accumulation effect. Still, there are the following variables with cumulative impacts:

- **Other projects:** Within this category, it is considered that, within the same project area, there are only commercial activities. These activities share infrastructure because the projects are located on the roofs of the buildings where they are housed.

- **Human settlements:** Within this category, all the works carried out for an urban center are presented, such as housing, roads, infrastructure, and equipment. In this sense, the following cumulative impacts have been identified:

- Impact on air quality and increase in the noise level due to the use of vehicles traveling on the region's highways, which add to the impact generated on the same environmental component because of the activities or projects carried out by Luxun.

- In turn, the alteration to the quality of the soil due to the generation of waste and the rudeness of urban infrastructure in the surroundings of the chosen sites is observed. This is added to the effects derived from project activities, which involve the use of machinery, implementation of civil works and waste generation.

The following matrix was made to determine the components previously affected within the SA. The indicators related to existing works and activities and those that could cause the activities carried out by Luxun are identified.

**Table 13. Interaction matrix between indicators and environmental components in relation to previous activities.**

| Environmental component | Indicator | Other projects | urban settlements | Luxun Projects |
|---|---|---|---|---|
| Soil | Erosion and physical characteristics | X | X | |
| | Permeability | X | X | |
| | Quality (chemical characteristics and contamination) | X | X | X |
| Surface hydrology | Water quality | X | X | X |
| | Runoff pattern | X | X | |
| Groundwater hydrology | Water quality | X | X | |
| | Water infiltration | X | X | |
| Air | Noise emission | X | X | X |
| | Air quality | X | X | X |
| Flora | Abundance and diversity | X | X | |
| | Status or endemic species | X | X | |
| | Forest coverage | X | X | |
| Fauna | Abundance and diversity | X | X | |
| | Status or endemic species | X | X | |
| | Wildlife habitat | X | X | |
| Scenery | Appreciation | X | X | |
| Social | Employment | X | X | X |
| | Services | X | X | X |

### 6.1.10.2 Identification of cumulative impacts of the project.

Derived from the impact identification matrix for previous works and activities, it is identified that all the environmental impacts that Luxun could generate are cumulative (see the following table), so that in the Accumulation Attribute (AC) of the evaluation matrix of the importance and magnitude of environmental impacts is evaluated with the highest value (5).

| Table 14. Cumulative Project Impacts. | | |
|---|---|---|
| **ID** | **Impact** | **Accumulation Attribute (AC)** |
| AIR1 | Impact on air quality due to the generation of polluting gases from the use of vehicles and equipment during the site preparation, construction, pre-commissioning and operation and maintenance stages of the Project. | 5 |
| AIR2 | Modification of the noise level due to the use of vehicles and equipment in the construction, pre-commissioning and operation and maintenance stages of the Project. | 5 |
| SUE1 | Impact on the soil's quality (chemical characteristics) (contamination) due to spillage or improper handling of hazardous materials and wastes during the project's construction, operation and maintenance stages. | 5 |
| HSUP1 | Impact on the physicochemical characteristics (quality) of surface water due to a spill or improper handling of hazardous materials or waste during the project's construction, operation and maintenance stages. | 5 |

However, no impact is significant as low, so they can be reduced or eliminated with the proper implementation of prevention and mitigation measures.

### 6.1.11 Synergic impacts.

Article 3, section VIII of the REIA describes a synergistic impact as one that occurs when the combined effect of the simultaneous presence of several actions has a greater environmental impact than the sum of the individual impacts considered in isolation. Gómez Orea (2013) also describes a synergistic impact as one of the attributes that have greater repercussions in environmental management.

For this reason, the synergy analysis of the environmental impacts produced by the projects was carried out using Gómez Orea's methodology, modified to adapt it to such projects.

a) **Identification of interconnections of impacts.** Impacts that cause another impact and impacts that are a consequence of other impacts are identified.
b) **Identification of degrees of synergy**. The degree of synergy that an impact brings to other impacts and the degree of synergy that an impact receives from other impacts are identified.
c) **Identification of level of influence and synergistic sensitivity**. It is identified as the synergic influence that an impact has with the set of other impacts and the synergistic sensitivity of an impact to be reinforced by the other impacts.
d) **Standardization.** A series of simple mathematical operations are performed to standardize the values from 1 to 5 corresponding to the indexes used for the assessment of the synergy attribute in the environmental impact characterization matrix.

#### 6.1.11.1 Identification of impact interconnections.

To identify the interconnections of the impacts, a matrix is created where the impacts of cause (impacts that cause other impacts) and the impacts of consequence (impacts that are produced by other impacts) are related.

**Figure 4 Diagram of cause-consequence impacts.**


To create the interaction matrix of synergistic impacts, the environmental impacts that the projects will produce are placed in the column and row. The column represents the hits they cause while the row represents the hits they receive (consequence). Then, with the help of diagrams (see the following figure), the environmental impacts produced by each impact are analyzed to mark the interaction later in the created matrix.

**Figure 5. Interconnection diagram of cause-consequence impacts.**

| IMPACTS OF CAUSE | | IMPACTS OF CONSEQUENCE |
|---|---|---|
| SOIL EROSION | → | SOIL EROSION |
| LOSS OF CHEMICAL PROPERTIES OF THE SOIL | → | LOSS OF SOIL |
| | → | REDUCTION OF WATER CAPTURE |
| | | LOSS OF LANDSCAPE VALUE |
| SOIL QUALITY | → | - |
| AIR QUALITY | → | - |
| SOUND CONFORT | → | FAUNA DISPALCEMENT |
| WATER QUALITY | → | LOSS OF FAUNA |
| INFILTRATION OF WATER | → | - |
| LOSS OF FLORA' INDIVIDUALS | → | LOSS OF SOIL |
| | | ALTERATION OF SOIL QAULITY |
| | | REDUCTION OF WATER INFILTRATION |
| | | FAUNA DISPALCEMENT |
| DAMAGE TO FAUNA' INDIVIDUALS | → | - |
| NON-DESIRE RISK EVENTS | → | INJURIES OR DEATH OF PERSONNEL |
| | → | INJURIES OR DEATH OF POPULATION |
| | | DAMAGE TO THE ENVIRONMENT |
| | | DAMAGE TO EQUIPMENT AND INFRAS. |

**6.1**

Aft
degrees of synergy were identified.

- **Degree of synergy contribution:** the sum per row reflects the degree of synergy that an impact brings to the rest of the other impacts.

The higher the value means that the impact causes more impacts; otherwise, the lower the value means that the impact causes few impacts.

- **Degree of receiving synergy:** the column sum reflects the degree of synergy it receives from the rest of the hits.

The higher the value means that the hit is caused by multiple hits; otherwise, the lower the value means that few impacts cause the impact.

#### 6.1.11.3 Identification of influence level and synergistic sensitivity

After identifying the degree of contribution and reception of synergy of each environmental impact, each impact's level of influence and sensitivity is obtained.

- **Synergistic Influence Level:** the sum of the values of the degree of contribution and the degree of reception shows the synergistic influence that an impact has with the set of other impacts. The higher the value means that the impact has more influence to produce impacts.

- **Synergistic sensitivity level:** the difference between the values of the degree of contribution and the degree of reception expresses the sensitivity of an impact to be reinforced by others. The higher the value means that the other hits reinforce the hit.

Next, the matrix of synergistic impacts is presented, where the impact-cause and impact-consequence interactions are recorded, as well as the degree of contribution and receiving synergy. Likewise, the impact's level of influence and synergistic sensitivity is shown.

**Table 15. Matrix of interactions of synergistic impacts.**

| Impacts they receive / Impacts they cause | Air pollution | Alteration to sound comfort | Alteration in soil quality | Alteration in groundwater quality | Degree of synergy it provides |
|---|---|---|---|---|---|
| Air pollution | | | | | 1 |
| Alteration to sound comfort | | | | | 1 |
| Alteration in soil quality | | | | 1 | 2 |
| Alteration in the quality of surface water | | | 1 | 1 | 2 |
| Alteration in groundwater quality | | | 1 | | 1 |
| Unwanted risk events | 1 | 1 | | | 2 |
| **Degree of synergy you receive** | 1 | 1 | 2 | 2 | 9 |

**Table 16. Level of influence and synergistic sensitivity of impacts.**

| Impact | Synergistic influence level | Synergistic sensitivity level |
|---|---|---|
| Air pollution | 2 | 0 |
| Alteration to sound comfort | 2 | 0 |
| Alteration in soil quality | 4 | 0 |
| Alteration in the quality of surface water | 3 | 1 |
| Alteration in groundwater quality | 3 | 3 |

Regarding the level of influence and synergistic sensitivity, as can be seen in the previous table, the impacts that present the highest levels of synergistic influence, that is, that can generate greater influence over other impacts, are the alteration of soil quality. In contrast, those with the highest level of synergistic sensitivity are the impacts on (surface) hydrology.

### 6.1.12 Conclusion

From the analysis carried out, 30 interactions are identified from the interaction matrix, of which 18 are negative and 12 positive. The factor that obtained the most interactions was: social with 12 interactions, all of which were positive, followed by the air component with 10 interactions, all of which were negative, the soil and surface hydrology components with 4 interactions each (8 in total) (all negative) and, finally, the environmental components where there are no interactions according to the nature of the project are: underground hydrology, flora, fauna and landscape.

From the impact evaluation matrix, it Is acknowledged that the identified negative impacts (10 air component, 4 soil and 4 surface hydrology) have a low significance category and can be mitigated, that is, the possibility of reducing the impacts through preventive, corrective, compensatory and/or mitigation measures.

Regarding the identification and assessment of residual impacts, it was identified that they are associated with the inadequate management of waste or spills of hazardous materials and debris that can cause residual contamination in the soil and subsoil and therefore, synergistically affect the water surface and underground, so they must be monitored for leachate's absence and contaminants' migration outside the temporary storage areas.

Regarding the cumulative impacts, it was found that all the environmental impacts that Luxun could generate are cumulative, so in the Accumulation Attribute (AC) of the evaluation matrix of the importance and magnitude of environmental impacts, it is evaluated with the highest value. high (5); however, no impact is significant, but low so that they can be reduced or eliminated with the proper implementation of prevention and mitigation measures.

Concerning the synergistic impacts, the impacts that present the highest levels of synergistic influence, that is, that can generate greater influence on other impacts, are the alteration of the quality of the soil, while those with the highest level of synergistic sensitivity are the impacts on hydrology (surface).

As to the methodology of the impacts and environmental risks applied to the activities of the project according to the IFC guidelines, the only performance standard relevant to the 3 impacts identified (soil contamination, water contamination and air contamination) is standard number 3: Efficiency of resources and pollution prevention. Said impacts and environmental risks are of a small magnitude, punctual, and reversible through the prevention and mitigation measures described in the Environmental and Social Management Plan (ESMP).

On the other hand, pursuant to performance standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources, this is not applicable at any point to the project given the fact that the projects will only be installed on rooftops of existent constructions. Consequently, no biodiversity or habitats could be affected by Luxun activities.

## 6.2 Identification of risks and social impacts

### 6.2.1 Scope in the identification of risks and social impacts

The scope of identifying risks and social impacts is in accordance with the company's activities in its different processes, as well as with good international and national practices in the sector.

For this identification process, the risks and possible negative impacts arising from the company's activities will be considered, in their interaction with social factors such as work and working conditions, health and safety in the community, land acquisition and involuntary resettlement: indigenous people and cultural heritage.

The social environment that impacts the company with its activities, can be comprised of workers, social actors involved, and the community.

### 6.2.2 Guidelines for the identification of risks and social impacts

The management of environmental and social impacts is recognized as a dynamic and continuous process, which implies collaboration between the company, its workers, the communities, and the social actors. In this sense, identifying social and environmental impacts promotes the best financial, environmental, and social results for the company's activities.

To achieve these results, in accordance with the type, scale and nature of Luxun's activities, the social impacts are identified and characterized by the following guidelines:

i) Integration of social considerations in the process of identifying risks and social impacts.

ii) Evaluate the interactions of the activities of the company-workers-community as a dialectical, dynamic, and continuous process, identifying the adverse effects before they occur.

iii) Apply international best practices recognized for the industry in identifying risks and social impacts of the company's activities.

### 6.2.3 Criteria considered for the identification of social risks and impacts

The methodology for the identification of risks and social impacts is based on element 1 "Identification of risks and impacts" of the Environmental and Social Management System, Implementation Manual (CFI, 2015 a) and the Environmental and Social Management System, Toolkit (IFC, 2015 b).

First, the identification of the main risk areas of the company and the possible negative impacts; second, the risks and possible negative impacts are identified according to the company's processes; subsequently, the impacts are classified according to social significance. Finally, the probability of a risk occurring is assessed, considering the most significant social risks and impacts according to the company's activities.

### 6.2.4 Identification of the main risk areas and possible negative impacts

Based on the Risk Form of the International Finance Corporation (IFC, 2015 b), this instrument will indicate whether there is a presence or absence of risk in any of the social areas to determine if they are likely to have a negative impact.

The risks and possible social impacts are concentrated in the areas of i) work and working conditions, and ii) community health and safety.

To respond to each risk and the possibility of a negative impact, the documents provided by Luxun referred to in section 1 were considered. Likewise, the information gathered from the site visits performed to Waldo's Uman and Vinoteca' Cancun were assessed to arrive at these results.

**Table 17. Risks related to work and working conditions.**

| Risk factor's | The company has the following conditions | Possible negative impact (answering "Yes" implies that there is a possible negative impact). |
|---|---|---|
| There is a difference in nationality, race or religion between workers and managers | No | Discrimination. Abuse in discriminatory practices and harassment. Human trafficking or forced labor. |
| Our managers and supervisors are not aware of the rights of workers that are established in national labor laws or collective agreements | No | Inadequate wages, benefits, and contracts. Excess overtime. Discrimination. Abuse in disciplinary practices and harassment. |
| We have an apprentice program that offers training and experience to young workers | No | Forced labor, child labor |
| Children accompany their parents during work or leisure | No | Child labor. Exposure of children to workplace hazards |
| Most of the workforce is made up of women, while most managers and security staff members are men | No | Discrimination. Abuse in disciplinary practices and (sexual) harassment |
| We do not have a system to record the time of entry and exit of workers | No | Excess work hours. Failure to pay overtime. |
| Some of the workers are paid based on tasks performed (minimum output), rather than hours worked | No | Health and safety risks. Payment of inadequate wages. Excess work hours. |
| The wages paid do not always reach the legal minimum wage or the level necessary to meet the basic needs of the family | No | Malnutrition, child labor. Excess overtime. Exhaustion. |
| We routinely use recruitment agencies and contract workers | Yes | Inadequate wages, benefits and contracts. Forced labor. |
| We usually use workers who work at home or contractors who use them | No | Inadequate wages, benefits and contracts. Forced labor. Child labor. |
| We usually use temporary or seasonal workers | Yes | Inadequate wages, benefits and contracts. Excess overtime. |

| Table 17. Risks related to work and working conditions. | | |
|---|---|---|
| **Risk factor's** | **The company has the following conditions** | **Possible negative impact (answering "Yes" implies that there is a possible negative impact).** |
| Some workers are migrants from another area | Yes | Forced labor. Discrimination. |
| Migrant or seasonal workers are employed to perform the most dangerous jobs | No | Discrimination |
| We provide dormitories for all or some employees | N/A | Lack of freedom of movement. Lack of sufficient clean space. Excessive charges for the use of the bedroom. |
| Dormitories are not regularly inspected for cleanliness, hygienic conditions, availability of sufficient space, or provision of drinking water and sanitation | N/A | Lack of freedom of movement. Illnesses or health risks due to lack of sanitation or access to clean drinking water supply. |
| In our company there is a security guard | No | Lack of freedom of movement. Bullying. |
| The company is in a free trade zone | No | Inadequate wages, benefits and contracts |
| There are large fluctuations in working hours, depending on the demand | N/A | Excess overtime. Overtime is not paid due to hours being averaged. Layoffs. |
| There is a labor shortage in the area | N/A | Child labor |
| In our region, there is no firmly established structure | No | Discrimination, restriction of freedom of association and collective bargaining. |
| In our company, there is no history of collective bargaining, unions, or other forms of worker representation. | No | Lack of freedom of association |
| Union members and worker representatives do not receive the same benefits as other workers | N/A | Lack of freedom of association. Discrimination |
| Hiring, compensation and promotion of workers are not based on job requirements and skills of workers | No | Discrimination |
| There is no procedure for workers to express their claims (grievance mechanism) | Yes | Discrimination. Abuse of disciplinary practices and harassment. Worker injuries and chronic illnesses. |
| The organization has executed a collective dismissal in the past or may be vulnerable to a collective dismissal due to financial difficulties or technical reasons | No | Discrimination |
| We do not verify the age of workers at the time of hiring | No | child labor. Recruitment of young workers. Exposure of young workers to hazardous work |
| Workers must deposit money or deliver their original documents as a condition of employment | No | Forced labor. Bullying |
| We retain workers' one month's salary as a security deposit | No | Forced labor |
| Our workers do not have access to separate and clean areas to eat and | No | Worker illnesses |

| Table 17. Risks related to work and working conditions. | | |
|---|---|---|
| **Risk factor's** | **The company has the following conditions** | **Possible negative impact (answering "Yes" implies that there is a possible negative impact).** |
| change clothes | | |
| Sanitary and cleaning facilities are not regularly inspected | No | Worker conditions due to contagious diseases |
| Production activities involve lifting and moving heavy loads or repetitive movements | No | Worker Injuries and Chronic Illnesses |
| Large machines are used in operations | N/A | Worker Injuries and Chronic Illnesses |
| Equipment, machines, and tools are not regularly inspected and maintained | No | Worker injuries such as lacerations, or loss of limbs or fingers |
| Production activities involve regular interaction of workers with machines | N/A | Worker Injuries and Chronic Illnesses |
| There are dust emissions or high noise levels due to certain activities | Yes | Risks for the respiratory system. Noise-induced hearing loss. |
| Workers carry out their tasks for long hours in areas with exposure to sunlight, ultraviolet radiation or excess heat | Yes | Heat and sun-induced dermatitis. Melanoma. Lip cancer. dehydration |
| Workers must work at dangerous levels and heights. | Yes | Injuries caused by falls. Head injuries from falling objects. |
| Our tools are not well maintained, or their design is inadequate for the job | No | Fatigue. Physical injuries, such as cuts and lacerations. |
| Roads and paths are narrow, restricting the movements of vehicles or personnel | N/A | Worker injury or death from hazards related to frontal impacts between vehicles or rollovers on the side of the road |
| The electrical equipment used is not regularly inspected and maintained | No | Worker exposure to severe electrical shock, burns, or electrocution |
| Enclosed spaces are not yet identified, and workers are not adequately trained in safe operating practices | No | Exposure of workers to toxic gases (hydrogen sulfide, methane, ammonia, carbon monoxide, carbon dioxide). Oxygen deficiency and suffocation. |
| We use open trucks to move workers from one place to another | Yes | Physical injuries. Fatalities due to collisions between vehicles and workers or other accidents. |
| Production activities include hazardous materials or processes that can cause fires or explosions | No | Worker injury or death |
| Some hazardous materials are not identified or labeled, and some workers may not have been trained in safely handling chemicals or other hazardous substances. | Yes | Worker illnesses. Exposure to dangerous chemicals. |
| We have not identified all operations where the use of personal protective equipment (PPE) is required. | Yes | Worker injuries. Exposure to hazardous materials and chronic diseases. |
| Not all workers are aware of workplace | No | Worker injuries. Exposure to hazardous |

| Table 17. Risks related to work and working conditions. | | |
|---|---|---|
| **Risk factor's** | **The company has the following conditions** | **Possible negative impact (answering "Yes" implies that there is a possible negative impact).** |
| hazards and how to use the corresponding PPE | | materials and chronic diseases. |
| Our workers don't know what to do in an emergency. Emergency routes and exits are generally blocked and closed. | No | Injuries and loss of life |
| Companies in our supply chain are likely to answer yes to most of the questions above. | No | All of the above |
| Note: elaboration based on the Risk Identification Form (IFC, 2015) | | |

According to the results shown, it was observed the possibility of a negative impact on the workers part of the companies that provide services of installation and maintenance of solar panels due to the temporary conditions of employment and the part of the country where they are mobilized. Considering health and safety, the possibility of negative impacts was noted given the high noise levels while placing the anchors and exposure to high temperatures, cold or hot for long periods, primarily during construction. Also, potential risks of falls while the installation takes place or maintenance since all installations are on rooftop. Another impact that can be placed is a traffic accident with the cranes and vehicles used for installation. Lastly, the exposure to hazardous materials and products was identified, given the contact and exposure of solar panels damaged by strong weather conditions that could pose risk to workers with EPP equipment and training.

The following table identifies the incidence of the company's activities in risks and possible negative impacts on the health and safety of the community.

| Table 18. Community health and safety risks. | | |
|---|---|---|
| **Risk factor's** | **The company has the following conditions** | **Possible negative impact (answering "yes" implies that there is a possible negative impact)** |
| Operations include air emissions, sewage discharge, solid waste disposal, chemical or gas leaks, etc., which may pass into the surrounding community | No | Air, water, or land pollution that can affect the health and livelihoods of local communities |
| In our operations we use certain prohibited or restricted chemicals, pesticides, or herbicides | N/A | Community exposure to hazardous substances or prohibited chemicals, directly or through contaminated water and soil impact on wildlife |
| We plan to develop new infrastructure, buildings, equipment and other facilities | Yes | Exposure of communities to emissions into the atmosphere, noise and accidents due to the movement of equipment and vehicles. Impact on wildlife, biodiversity and local livelihoods due to conversion of natural habitat. |
| We plan to dismantle and remove old infrastructure, buildings, equipment and other facilities | Yes | Health risks to communities due to exposure to toxic substances (for example, chemicals, heavy metals, asbestos, etc.) as well as air emissions and noise due to the movement of equipment and vehicles. |
| There is a significant movement of vehicles within the facilities and in the surroundings due to operations | No | Exposure of communities to emissions in the atmosphere, noise and accidents due to the movement of vehicles |
| We store hazardous chemicals or hazardous waste at our facilities | N/A | Health risks to communities and negative impacts on wildlife and biodiversity due to the intentional or unintentional release (spill) of hazardous or toxic substances that pollute the air, land or water. |
| We discharge water from operations, which may impact surrounding water bodies (for example, wastewater from worker residential facilities, other production facilities, etc.) | N/A | Negative impacts on local food security and income generation due to contamination of aquatic life. |
| We hire temporary and migrant workers | Yes | Communicable diseases caused or spread by worker inflows |
| We hire private security personnel | No | Conflicts with communities |
| Sometimes we receive complaints from the local community | No | Conflicts with communities |
| Large amounts of fresh water are used in our operations | N/A | Possible negative effects for fishing. |
| Operations carry a high risk of fire and explosion. Our building is not suitable or does not have authorization for the operations that are carried out | No | Building collapse. Fires and explosions can affect nearby buildings, injuries and loss of life. |
| Note: elaboration based on the Risk Identification Form (CDFI, 2015) | | |

The potential negative impacts related to health and safety in the community where the projects are located can be produced by the emission of pollutants, noise, and accidents due to the maneuvers

of the equipment, mainly during construction. Additionally, there can be affectations because of the exposition to products substances or materials that can be damaged by extreme weather conditions damaging the solar panels, such as strong winds that could tear apart the structures in the direction of the neighboring community or workers of the retail stores. Lastly, another possible negative impact is the cultural interaction between workers from other parts of the country for the installation or maintenance of the facility.

As seen in the previous tables, 10 risks related to work and working conditions were identified, with their corresponding possible negative impacts. In comparison, 3 community health and safety risks were identified. However, these risks and potential impacts can be reduced through mitigation and the continuous improvement of certain policies developed by Luxun.

Below are the risks and potential social impacts not identified in the previous chart due to the nature of the company's activities. Therefore, a fourth column has been added to the table to account for the non-application of these risks.

| Table 19. Land acquisition and involuntary resettlement risks; indigenous peoples and cultural heritage. | | | |
|---|---|---|---|
| **Risk factor's** | **The company has these conditions (Yes, no, N/A not applicable)** | **Possible negative impact (answering "yes" implies there is a possible negative impact)** | **Explanation** |
| Company activities involve land acquisition and involuntary resettlement. | N/A | Restrictions on land use and physical and economic displacement of affected people and/or communities | The company's activities do not consider the rental or purchase of land since its activities are carried out on the roofs of existing constructions. |
| Company activities may increase the vulnerability and marginalization of indigenous communities and peoples | N/A | Loss of identity, culture, and livelihoods dependent on natural resources, exposure to impoverishment and disease. | In general, the company's activities are carried out in large cities, and urban locations, so the presence of indigenous communities is low. Additionally, the company incorporates within its social responsibility policy the development of activities for the benefit of indigenous communities in the Sierra Norte region of Puebla. |
| Company activities may damage and/or remove cultural heritage | N/A | Negative impacts on the protection and conservation of tangible and intangible cultural heritage | The company's activities cannot damage the cultural heritage, because the activities and photovoltaic systems are installed and work on the roofs of existing constructions. |

As described, the activities carried out by Luxun are on rooftops of existent constructions related such as self-service stores, warehouses, and industrial plants, located in urban locations which at no point will entail displacement of communities or affecting its land or costumes.

Furthermore, the following section was prepared to expand on the potential risks and impacts related to land acquisition and involuntary resettlement.

#### 6.2.4.1. Risk due to land acquisition and involuntary settlement

Performance Standard 5 acknowledges that land acquisition and restriction over land use due to the development of a project might have adverse impacts on the community and people using said land (IFC, 20120). Due to the nature of Luxun activities, it is clearly identified that no land acquisition is needed to install the solar panels. The permits and regulations applicable to Luxun, such as NOM-001-SEDE-2012 on Photovoltaic Systems confirm such assertions.

Similarly, document Grupo Luxun, Human Resources and corruption state that 100% of the installations are rooftops in private property; consequently, land rights and involuntary displacement I secured.

Lastly, should any potential client perform activities against performance standard 5, Luxun performs due diligence to avoid the said situation and has an Ethics Code and a Human Rights Policy as listed in section 1.

In the following chart, based on the documents provided by Luxun the identification of possible negative impacts will be related to the stages of the installation and pre-commissioning process of the photovoltaic systems in the established sites. Additionally, possible negative impacts were added that B + F observed during the on-site verification (visit to the Waldo's Umán and Vinoteca Cancún sites), operated by Luxun

| Inputs | Process steps | Outputs | OHS Hazards and Potential Negative Impacts on Workers | Risks and possible negative impacts on the environment and the community | Opportunity for r waste reduction/energy and water savings |
|---|---|---|---|---|---|
| Water, energy, raw materials, chemicals, labor, etc. | Operational activity | Waste, emissions, by-products | Injuries, illnesses, chronic | Environmental pollution, shortage of resources | Improved process, reuse, and recycling |
| What supplies are needed to carry out the activity? | What is the activity about? | What waste does the activity produce? | What type of negative impact can this activity have on workers? | What type of negative impact can this activity have on the environment and the surrounding community? | How can the activity be improved to prevent these negative impacts from occurring? |
| Luxun Staff | Site preparation | none | none | none | N/A |
| Luxun Staff<br>Suppliers: engineers for installation<br>aluminum structure | Construction and structural installation | Generation of polluting gases using vehicles and machinery.<br>-Dust release by roof slotting<br>-Packaging covering the aluminum structure | -Risks for the respiratory system. Noise-induced hearing loss when slotting and anchoring the aluminum structure to the ceiling<br>-Dermatitis induced by heat and sun. | -Vehicle traffic at the time of unloading the aluminum structure<br>-Exposure of the communities to emissions in the atmosphere, noise, and | -Management of the use of communication routes with municipal traffic authorities and/or with administrations of shopping malls, warehouses, or industrial plants. Use of signage on public roads.<br>-Management and disposal of solid waste (packaging, wrapping)<br>-Execution of security protocol<br>-Adequate and supervised use of Personal Protective Equipment (PPE) |

| Inputs | Process steps | Outputs | OHS Hazards and Potential Negative Impacts on Workers | Risks and possible negative impacts on the environment and the community | Opportunity for r waste reduction/energy and water savings |
|---|---|---|---|---|---|
| | | | Melanoma. Lip cancer. dehydration<br>-Hypothermia (cold stress)<br>-Injuries caused by falls. Head injuries from falling objects | accidents due to the movement of equipment and vehicles. | -Slot and anchor at socially appropriate times<br>-Emergency plan |
| -Luxun Staff<br>-Suppliers: engineers for installation<br>-Solar panels<br>-Investors<br>-Cables and ducts-gutters<br>-Cabinets | Construction and electrical installation | -Generation of polluting gases using vehicles<br>-Packaging that wrapped the components (cables, inverters, panels) | -Dermatitis induced by heat and sun. Melanoma. Lip cancer. dehydration<br>-Hypothermia (cold stress)<br>-Injuries caused by falls. Head injuries from falling objects<br>-Injuries or loss of life of workers due to electrocution | -Vehicle traffic at the time of discharge of the solar panels<br>-Exposure of communities to emissions in the atmosphere, noise and accidents due to the movement of equipment and vehicles | -Management of communication routes with municipal traffic authorities and/or administrations of shopping malls, warehouses or industrial plants. Use of signage on public roads.<br>-Management and disposal of solid waste (packaging, wrapping)<br>-Execution of security protocol<br>-Adequate and supervised use of Personal Protective Equipment (PPE)<br>-Emergency plan |
| -Luxun Staff<br>-Supplier: Engineers | pre-commissioning: exploration of the entire photovoltaic system, UVIE management and interconnection procedures with CFE | none | none | none | -Adherence to the Power Plant Interconnection Manual<br>-Attachment to NOM-001-SEDE-2012 |

| Inputs | Process steps | Outputs | OHS Hazards and Potential Negative Impacts on Workers | Risks and possible negative impacts on the environment and the community | Opportunity for r waste reduction/energy and water savings |
|---|---|---|---|---|---|
| -Luxun Staff<br>-Supplier: Engineers | Operation and maintenance | -Solid waste due to changes of components of the photovoltaic system<br>-Solar panels damaged by strong winds | -Dermatitis induced by heat and sun. Melanoma. Lip cancer. dehydration<br>-Hypothermia (cold stress)<br>-Injuries caused by falls. Head injuries from falling objects<br>-Injuries or loss of life of workers due to electrocution | -Detachment of solar panels due to strong winds | -Management and disposal of solid waste (damaged honeycombs, change of components)<br>-Execution of security protocol<br>-Adequate and supervised use of Personal Protective Equipment (PPE)<br>-Emergency plan |
| -Luxun Staff<br>-Supplier: Engineers | Installation removal | -Photovoltaic system | -Dermatitis induced by heat and sun. Melanoma. Lip cancer. dehydration<br>-Hypothermia (cold stress)<br>-Injuries caused by falls. Head injuries from falling objects<br>-Injuries or loss of life of workers due to electrocution | -Vehicle traffic at the time of discharge of the solar panels<br>-Exposure of communities to emissions in the atmosphere, noise and accidents due to the movement of equipment and vehicles | -Execution of security protocol<br>-Adequate and supervised use of Personal Protective Equipment (PPE)<br>-Emergency plan<br>-Integral management of residues |

| Inputs | F |
|---|---|
| | |
| Note: elaboration based on the Process Mapping Tool (IFC, 2015). | |

In the previous table, the possible negative impacts derived from the identified risks were considered, in the social areas of work and working conditions, as well as health and safety in the community. Based on the observation and information gathered during the Waldo's Umán and Vinoteca Cancún site visits, possible negative impacts were added: electrocution injuries, hypothermia, and damage caused by the detachment of solar panels due to strong winds.

Once the risks and possible social impacts have been identified, the importance of the risks and possible impacts will be assessed according to the incidence of the company's activities that we have analyzed.

### 6.2.5 Assessment of social impacts

The assessment of social impacts is based on the following conceptual criteria:

| **Table 21. Social impact evaluation criteria. Probability.** | | |
|---|---|---|
| **Probability** | | |
| 1 | Very unlikely | There is only mention without records of an isolated event in a single social nucleus. |
| 2 | Unlikely | There are mentions that have been spread as rumors with very little or almost no documentary evidence. |
| 3 | Probable | It is a commonly mentioned event, at least limited to a locality or a pressure group. |
| 4 | Frequent | There are mentions and records that events like this have happened at least 3 times in the last 4 years (not always involving the same group). |
| 5 | Very Frequent | In addition to frequent, it is very likely that there are multiple records and anecdotal mentions that events like this have been repeated in the last five years. |

| **Table 22. Social impact evaluation criteria. Severity.** | | |
|---|---|---|
| **Severity** | | |
| 1 | Harmless (Minimum Severity) | Risk of pronouncements or rumors limited to a single person or group, without these ending with any affectation. |
| 2 | Low impact | Rumors and pronouncements that escalate beyond the group where they originated, cause discomfort without incurring costs or material damage. |
| 3 | Medium | Risk that scales beyond differences between groups; potential material losses appear. |
| 4 | Severe | Social differences have caused severe material losses with no injuries or loss of human life reported. |
| 5 | Very severe | It is the most severe impact of the scale, when, due to the social differences, human life is in imminent danger and significant material losses have already been incurred. |

| Table 23. Social impact evaluation criteria. Detectability | | |
|---|---|---|
| **Detectability** | | |
| 1 | Evident | The risk, its causes and channels are perceived even through documentary evidence before the incidence of risk occurs; There are already installed mechanisms to detect and deal with this type of risk in advance. |
| 2 | Traceable | The risk and its causes can be traced back to their origin before an incident; there is clear local and regional evidence allows it to be detected. |
| 3 | Appreciable | Not all risk causes are visible or detectable with the existing information. |
| 4 | Very difficult to detect | We depend on direct observation to try to infer the risk channels and there are no specific mechanisms for on-site detection of this type of incident. |
| 5 | Undetectable | Neither the existing information mechanisms nor the on-site presence could detect the incidence of risk before it happened; risk is only visible after there is an incident. |

**Methodological note**: Impacts can be negative or positive, and it should then be considered that, in the case of negative impacts (-), the criteria must be analyzed based on the risk, while for positive impacts (+), these must be analyzed in terms of risk and function of benefits.

For the impacts identified in tables 17 and 18, a classification system was developed based on an assessment of their social significance based on the criteria of probability of occurrence of the impact, its severity and detectability.

The valuation of the criteria was driven by the documents provided by Luxun applicable to the risk's identification and potential negative impacts in addition to the site visits carried out by B + F to Waldo's Uman and Vinoteca' Cancun locations.

| Table 24. Classification of impacts according to the classification system of their social significance. | | | | | | | |
|---|---|---|---|---|---|---|---|
| **IMPACT CHARACTERIZATION** | | **INCIDENCE** | | | | | |
| IMPACT DESCRIPTION | TYPE OF IMPACT | PROBABILITY | JUSTIFICATION | SEVERITY | JUSTIFICATION | DETECTABILITY | JUSTIFICATION |
| Inadequate wages, benefits and contracts. Forced labor. | - | 1 | Due to the contracting of maintenance services with suppliers, they employ engineers | 1 | There has been no problem with providers | 1 | Luxun has policies for contracting personnel and services with suppliers that allow minimizing the possible negative impact (see: Annex 5)[1] |
| Inadequate wages, benefits and contracts. excess overtime | - | 1 | No case has been documented. However, engineers from maintenance service providers are hired on a temporary basis. | 1 | There has been no problem with providers | 1 | Luxun has policies for contracting personnel and services with suppliers that allow minimizing the possible negative impact (see Annex 5) |
| Forced labor. Discrimination | - | 1 | No case has been documented. However, the engineers of the maintenance service providers come from other localities or states. | 1 | There has been no problem with the providers | 1 | Luxun has policies for contracting personnel and services with suppliers that allow minimizing the possible negative impact (See Annex 5) |
| Discrimination. Abuse of disciplinary practices and harassment. Worker Injuries and Chronic | - | 1 | The company has a protocol for dealing with worker complaints. | 1 | There has not been a problem with the suppliers, nor in the company | 1 | *Luxun has a protocol for receiving complaints and reports (See Annex 4), which can be applied to employees.* |

[1] The following Luxun Group policies can be consulted in Annex 5: Policy for the prevention of forced labor and child labor practices. Policies and procedures for contracting services and purchases. Human rights policy..

| Table 24. Classification of impacts according to the classification system of their social significance. | | | | | | | |
|---|---|---|---|---|---|---|---|
| **IMPACT CHARACTERIZATION** | | **INCIDENCE** | | | | | |
| IMPACT DESCRIPTION | TYPE OF IMPACT | PROBABILITY | JUSTIFICATION | SEVERITY | JUSTIFICATION | DETECTABILITY | JUSTIFICATION |
| Illnesses | | | | | | | |
| Risks for the respiratory system. Noise-induced hearing loss. | - | 1 | No case has been documented. | 1 | Noise production and dust release due to installation activities are recognized | 1 | Luxun has an occupational health and safety policy (See annex 6).<br>Proper use of PPE |
| Heat and sun-induced dermatitis. Melanoma. Lip cancer, dehydration Hypothermia. | - | 1 | They have been identified as potential health effects during installation and maintenance activities. | 2 | Extreme temperatures produce negative effects on the performance of workers | 1 | Luxun has an occupational health and safety policy (See Annex 6).<br>Proper use of PPE |
| Injuries caused by falls. Head injuries from falling objects | - | 1 | No event has been registered | 1 | No such events have occurred | 1 | Luxun has an occupational health and safety policy (See Annex 6).<br>Proper use of PPE |
| Physical injuries. Fatalities due to collisions between vehicles and workers or other accidents. | - | 1 | No event has been registered | 1 | No such events have occurred | 1 | Luxun has an occupational health and safety policy.<br>Proper use of PPE |
| Worker illnesses. Exposure to dangerous chemicals. | - | 1 | No event has been recorded. But contact with damaged solar | 1 | No such events have occurred | 1 | It can be detected with waste management. |

| Table 24. Classification of impacts according to the classification system of their social significance. | | | | | | | |
|---|---|---|---|---|---|---|---|
| **IMPACT CHARACTERIZATION** | | **INCIDENCE** | | | | | |
| IMPACT DESCRIPTION | TYPE OF IMPACT | PROBABILITY | JUSTIFICATION | SEVERITY | JUSTIFICATION | DETECTABILITY | JUSTIFICATION |
| | | | panels can be considered. | | | | |
| We have not identified all operations where the use of personal protective equipment (PPE) is required. | - | 3 | Proper use of PPE for recovery and disposal of damaged solar panels has not been identified | 3 | The potential material loss of solar panels appears | 4 | Specific mechanisms for intervention have not yet been identified. |
| Exposure of communities to emissions into the atmosphere, noise, and accidents due to the movement of equipment and vehicles. Impact on wildlife, biodiversity, and local livelihoods due to conversion of natural habitat | - | 3 | Possible presence of vehicular traffic at the installation stage<br>Possible affectation due to noise in installation maneuvers | 1 | So far, no damage has been reported. | 1 | security protocols<br>Management of permits with municipal transit<br>Slotting and anchoring activities at socially acceptable times |

| Table 24. Classification of impacts according to the classification system of their social significance. | | | | | | | |
|---|---|---|---|---|---|---|---|
| **IMPACT CHARACTERIZATION** | | **INCIDENCE** | | | | | |
| IMPACT DESCRIPTION | TYPE OF IMPACT | PROBABILITY | JUSTIFICATION | SEVERITY | JUSTIFICATION | DETECTABILITY | JUSTIFICATION |
| Health risks to communities because of exposure to toxic substances (for example, chemicals, heavy metals, asbestos, etc.) as well as air emissions and noise due to the movement of equipment and vehicles | - | 3 | Possible health risk from contact with damaged solar panels due to detachment caused by strong winds | 3 | Material losses have been recorded: solar panels and equipment located on the roof of the site | 4 | There are no mechanisms for the early detection of strong winds and their possible impact on the photovoltaic system.<br>There is an emergency plan. |

From the assessment of social impacts, the prioritization of possible negative impacts that are more likely to occur and have a significant severity and less detectability is derived.

The risks and their possible negative social impacts of considerable significance were:

- Worker injuries because we have not identified all operations where the use of personal protective equipment (PPE) is required.

- In the presence of damaged equipment, components, health risks to communities because of exposure to toxic substances (for example, chemicals, heavy metals, asbestos, etc.).

Which are associated with specific risk circumstances and contexts where the solar panels are located on the roofs of the sites, whether they are self-service stores, warehouses, or industrial plants, they are vulnerable to detachment, because of strong winds, due to meteorological phenomena, or by the same movement of air masses. This circumstance makes it possible for the solar panels to detach from the structures, which can increase the risk to the health of the workers, as well as of the people who are in the immediate environment of the photovoltaic system; when exposed to damaged solar panels, during and after their detachment from the installation.

From the above, it is assessed as a medium level risk due to its medium probability, medium severity, and high detectability. Therefore, the company's activity must consider this risk and its possible negative impacts on its policies and protocols.

Considering the most relevant social negative impacts and to specify this assessment, the following matrix is considered on the probability of the risk occurring and the severity of the possible negative impacts.

**Table 25. Probability of the risk occurring.**

| **Risk** | **probability of occurrence (Low=1, Medium=2, High=3, Extreme=4)** | **Severity if it occurs (Low=1, Medium=2, High=3, Extreme 4)** | **Risk prioritization (low, medium, critical)** | **Grades** |
|---|---|---|---|---|
| *What is the risk that has been identified?* | *What is the probability that the risk will occur and create negative impacts?* | *How severe would the potential impacts be if the hazard were to occur?* | *What are the highest priority risks, based on the likelihood of occurrence and severity of impact?* | *Additional notes* |
| We have not identified all operations where the use of personal protective equipment (PPE) is required. | 2 | 1 | Medium | The potential negative impact on workers' health from exposure to damaged solar panels; that were blown away by strong winds. |

| Table 25. Probability of the risk occurring. | | | | |
|---|---|---|---|---|
| **Risk** | **probability of occurrence (Low=1, Medium=2, High=3, Extreme=4)** | **Severity if it occurs (Low=1, Medium=2, High=3, Extreme 4)** | **Risk prioritization (low, medium, critical)** | **Grades** |
| Detachment of solar panels from structures in strong winds | 2 | 1 | Medium | The possible negative impact on the health and safety of people in the immediate environment, during and after the detachment of solar panels due to strong winds. |

The assessment of the risks and the possible negative impacts on the health and safety of the workers and the people in the immediate surroundings of the sites allowed us to identify a specific risk circumstance and context.

This circumstance and context were raised during the visit to the Vinoteca Cancun site, where solar panels were detached due to the passage of hurricane Delta; beyond considering this case as an isolated event, it is part of the identification and assessment of risks and social impacts due to external and internal phenomena that affect Luxun Energy's activities.

Therefore, photovoltaic systems located in regions or geographic zones exposed to hurricanes, meteorological phenomena or air masses that can detach the solar panels from the structures can be considered sites vulnerable to risk.

### 6.2.6 Conclusion

In social matters, 15 potential negative impacts on labor and working conditions, community health and safety, land acquisition and involuntary resettlement, indigenous peoples and cultural heritage were analyzed. It was determined that due to the nature of the company's activities, they cannot affect or damage property and/or land use; likewise, they cannot affect indigenous communities, nor can they damage physical or intangible expressions of cultural heritage; the explanation is precise, because Luxun's activities are carried out on the roofs of previously built and operating constructions.

On the other hand, 4 negative impacts were determined with some level of occurrence: two of the impacts were identified during the site preparation and construction stage, being injuries to workers due to heat stroke and/or hypothermia, as well as the possibility of vehicular traffic accidents or falling equipment and materials, potentially affecting people in the community, in the social environment immediately surrounding the site where the company carries out its activities; While two impacts related to the operation and maintenance stage were assessed with a higher level of severity, being impacts related to health and safety risks to workers and the community, due to exposure and contact

with damaged solar panels, during and after their detachment from their structures, as a result of strong winds.

In general, the potential environmental and social impacts will affect the conditions of the sites where the company's activities take place during the site preparation and construction stages, as well as during maintenance and operation. Therefore, following safety protocols, integrated waste management, and preventive measures for the protection and safety of workers and the surrounding population will be vital to minimizing the likelihood of risks and avoiding possible negative impacts on environmental and social factors. Measures for managing the impacts identified during this process, the implementation schedule, roles and responsibilities, as well as reporting and monitoring requirements, will be provided through the corresponding Environmental and Social Management Plan (ESMP).

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