CERTIFICATION AND FINANCING PROPOSAL

OREJANA SOLAR PARK PROJECT
IN THE MUNICIPALITY OF HERMOSILLO, SONORA

Revised: June 1, 2017
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EXECUTIVE SUMMARY

OREJANA SOLAR PARK PROJECT
IN THE MUNICIPALITY OF HERMOSILLO, SONORA

Project: The project consists of the design, construction and operation of a 158-MWdc solar park located in the municipality of Hermosillo, Sonora (the “Project”). The electricity and the Clean Energy Certificates (CEls) generated by the Project will be purchased by the Mexican federal electricity commission, Comision Federal de Electricidad (CFE), pursuant to a long-term power purchase agreement (PPA) executed with the special-purpose company created to carry out the Project.

Objective: The Project will increase installed capacity of renewable energy resources, which will reduce a proportionate amount of demand on traditional fossil fuel-based energy production and contribute to the displacement of greenhouse gas emissions and other pollutants from power generation by fossil fuels.

Expected Outcomes: The estimated environmental and human health outcomes resulting from the installation of 122.2 MWac of new renewable energy generation capacity at the point of interconnection are:

1) Generation of an average of 353.5 gigawatts-hours (GWh)/year of electricity during the 20 years of operation; and

2) An expected displacement of approximately 163,808 metric tons/year of carbon dioxide (CO₂), 0.707 metric tons/year of sulfur dioxide (SO₂) and 571 metric tons/year of nitrogen oxides (NOx).

Sponsor: Zuma Energía, S.A. de C.V.

Borrower: Fisterra Energy Orejana S.R.L. de C.V.

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1 MWdc stands for megawatts in direct current and MWac stands for MW in alternating current.
2 Information provided by the Sponsor.
3 BECC calculation of CO₂, SO₂ and NOx indicators, which reflect the potential emissions displaced as a result of reducing future demand on natural gas-based electricity through the use of solar energy generation equivalent to 353.5 GWh/year. Emission factors from a combined-cycle power plant located near the Project site were used for these calculations.
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1. ELIGIBILITY

**Project Type**
The Project falls into the category of clean and efficient energy.

**Project Location**
The Project is located in the municipality of Hermosillo, Sonora, approximately 246 km (153 miles) southwest of the U.S.-Mexico border.

**Project Sponsor and Legal Authority**
The private-sector sponsor is Zuma Energía, S.A. de C.V., (Zuma or the “Sponsor”), which will use a special-purpose vehicle, Fisterra Energy Orejana S.R.L. de C.V. (the “Project Company” or the “Borrower”) to implement the Project and contract financing for that purpose. The Project Company is a Mexican-based company established in 2016. Its contact representative is Adrian Katzew Corenstein.

The off-taker is the Mexican federal electricity utility, Comision Federal de Electricidad (CFE) through its subsidiary, CFE Suministrador de Servicios Básicos (the “Off-taker”). In accordance with the new Power Industry Law, the Project was selected on September 28, 2016, through Long-term Energy Auction No. SLP-1/2016 carried out by the National Center of Energy Control (CENACE) on behalf Mexican Government. The Project has a power purchase agreement for the energy generated, as well as a Clean Energy Certificate purchase agreement. Both agreements are between the Borrower and the Off-taker. Because of their symmetry, these agreements will be defined and treated as a single document (the “PPA”) for the purpose of this proposal.

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2. CERTIFICATION CRITERIA

2.1. TECHNICAL CRITERIA

2.1.1. Project Description

Geographic Location
The Project is located in the municipality of Hermosillo, Sonora, approximately 47 miles west of the Hermosillo urban area, at the following coordinates: Latitude: 29°10'59.94" N and Longitude: 111°43'16.75" W. The Project will be developed on approximately 500 hectares (1,236 acres). Figure 1 below shows the geographic location of the Project.

Figure 1
PROJECT MAP

General Community Profile
The Project is expected to benefit the municipality of Hermosillo and its metropolitan area in the state of Sonora. Project benefits include the generation of electricity equivalent to the annual consumption of 47,410 households.\(^5\) The construction of the Project will also benefit local communities by generating employment opportunities and additional taxes.

\(^5\) Estimation based on 2,015 kilowatt-hours of electricity consumption per capita in 2014 from Mexico’s Energy Information System (http://sia.energia.gob.mx/) and 3.7 persons per household in the state of Sonora as indicated by INEGI (http://www.beta.inegi.org.mx/app/areasgeograficas/?ag=26).
According to the Mexican National Institute of Statistics and Geography (INEGI), in 2015, the population of Sonora was 2,850,330, which represents 2.4% of the population of Mexico. Between 2012 and 2015, its annual growth rate declined from 1.5% to 1.4%, which is in line with the national average (1.4%). According to the most current economic information from INEGI, the state of Sonora contributed 2.9% to the gross domestic product (GDP) of Mexico in 2015.

Hermosillo is the capital of the state of Sonora and is adjacent to the municipalities of Pitiquito, Carbó, San Miguel de Horcasitas, Ures, Mazatán, La Colorada and Guaymas. The population of the municipality of Hermosillo was 884,273 residents in 2015. The main economic activities in the municipality of Hermosillo are private sector non-financial services employing 37.7% of the workforce, followed by commerce (27.8%), manufacturing (21.3%) and construction (7%).

**Local Energy Profile**

In 2014, the legal framework that governs Mexico’s National Power System (SEN) underwent a major reform aimed at facilitating investments to consolidate the diversification efforts, improve infrastructure and meet the growing demand for electricity. Under the new Power Industry Law, the federal government retained control of planning activities and the transmission and distribution infrastructure through CENACE, a decentralized federal agency created by the government to operate the SEN. It is now operating the national grid with more than 546,615 miles of transmission and distribution lines previously operated by CFE. Under the reform, CFE became a federally-owned for-profit enterprise. The Mexican Energy Regulatory Commission (CRE), which was created to regulate activities related to private investment in the power and natural gas sector, continues to be responsible for issuing permits to private entities for power generation and the transportation of natural gas.

To promote the use of renewable energy, the Mexican Government has enacted two laws in the past four years. In 2015, Mexico enacted the Energy Transition Law to regulate the sustainable use of energy and obligations regarding clean energy and the reduction of pollution from the power industry, while preserving the competitiveness of the productive sectors. The General Law of Climate Change was enacted in 2012 and amended in 2015. Both laws specify, among other provisions, that the Mexican Ministry of Energy (SENER), in coordination with CFE and CRE, must increase the use of clean technologies in power generation to at least 35% by 2024.

Since 1994, Mexico has undertaken efforts to increase the use of non-fossil fuel technologies in power generation. During the period of 2016-2030, Mexico plans to increase the use of clean energy by 35,532 MW, including wind, solar, geothermal and hydroelectric resources, among others. With respect to solar energy in particular, CFE began operating its first solar park with 1 megawatt (MW) of installed capacity in Baja California Sur in 2012. Since then, eight more solar plants have been developed in Mexico for a total installed capacity of 56 MW. The proposed Project fits within the priorities of the Mexican power sector.

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7 Source: Ibid.
Mexico’s energy portfolio includes combined-cycle, thermoelectric, geothermal, hydroelectric, coal-fired, solar photovoltaic, wind, turbogas, internal combustion, cogeneration and nuclear power plants. As reported in the 2016-2030 National Power System Development Program (PRODESEN), in 2015, Mexico had 68,044 MW of installed generation capacity, which represents an increase of 4.0% compared to 2014 (65,452 MW). The total power generation reached 309,553 gigawatt-hours (GWh), an increase of 2.7% compared to the electricity generated in 2014.

In 2015, the power plants operated by CFE supplied 55.2% of the electricity generated, independent producers contributed 28.8% and private entities provided 16.0% through self-supply schemes, cogeneration, small production, exports, distributed generation and rural systems. Figure 2 shows the participation of each technology to the power generation in Mexico.

For planning purposes, the Mexican power grid is divided into nine control zones, seven of which are interconnected and form the National Interconnected System (SIN). The remaining two zones are independent supply networks serving the areas of Baja California and Baja California Sur. The Project will be located in the Northwest Zone (NWZ), which includes the states of Sonora and Sinaloa as illustrated in Figure 3.

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Figure 2
ENERGY GENERATION BY TECHNOLOGY

![Energy Generation by Technology Diagram](image)

Source: SENER, PRODESEN, 2016-2030

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10 Source: SENER, PRODESEN, 2016-2030.
According to SENER, the generation capacity of Sonora was 2,710 MW, supplying 13,569 GWh of electricity in 2014. Figure 4 shows the technologies used for electricity generation in the state.

Source: Based on PRODESEN 2016-2030.
A detailed description of the technologies used to generate electricity in the state of Sonora for public service is presented in the following table.

Table 1
POWER GENERATED IN SONORA, 2015

<table>
<thead>
<tr>
<th>Technology</th>
<th>MW</th>
<th>Energy Generation (GWh)</th>
<th>% of Energy Generation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combined cycle</td>
<td>1,315</td>
<td>8,584</td>
<td>79.3%</td>
</tr>
<tr>
<td>Conventional thermoelectric</td>
<td>1,153</td>
<td>4,219</td>
<td>18.9%</td>
</tr>
<tr>
<td>Hydroelectric</td>
<td>164</td>
<td>705</td>
<td>1.2%</td>
</tr>
<tr>
<td>Turbogas</td>
<td>42</td>
<td>0</td>
<td>0.3%</td>
</tr>
<tr>
<td>Internal combustion</td>
<td>33</td>
<td>56</td>
<td>0.2%</td>
</tr>
<tr>
<td>Wind energy</td>
<td>2</td>
<td>4</td>
<td>0.015%</td>
</tr>
<tr>
<td>Photovoltaic</td>
<td>1</td>
<td>1</td>
<td>0.01%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>2,710</strong></td>
<td><strong>13,569</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Source: Based on PRODESEN, 2016-2030.

The Project will account for nearly 2.16% of electricity generation in Sonora.

In 2015, SENER published the first guidelines and a set of manuals that describe the design principles and operation of the wholesale electricity market. The new scheme includes long-term energy auctions allowing basic suppliers to enter into long-term product purchase agreements under competitive conditions to provide energy (MWh), power capacity (MW) and clean energy certificates (CEL) per CRE requirements.11

Under the new Power Industry Law in Mexico, a CEL is defined as the certificate issued by SENER to credit the production of a determined amount of energy from clean sources and can be purchased in the wholesale electricity market in Mexico by large electricity consumers, energy suppliers and qualified users in order to meet their renewable energy requirements. One CEL is equivalent to one MWh. The goal is for all participants to obtain at least 5% of their total electricity through CELs by 2018 and 5.8% by 2019.

On May 13, 2016, CENACE published the guidelines for the auction of long-term renewable energy contracts. With CFE as the off-taker, contracts for the purchase of capacity and renewable energy will be for 15 years and contracts for clean energy certificates will be for 20 years. In September 2016, CENACE selected a total of 23 winners out of a pool of 57 eligible bidders to build 2,871 MW of new renewable capacity worth US$4.0 billion. This Project is one of those selected in the auction.

11 Source: SENER, PRODESEN 2016-2030.
**Project Scope and Design**

The proposed Project consists of designing, constructing and operating a solar park with a maximum capacity of 158 MWdc on approximately 500 hectares (1,235.5 acres). Figure 5 shows the Project layout.

![PROJECT LAYOUT](image)

The Project components include the installation of approximately 487,440 solar modules mounted on single-axis tracker arrays and construction of a substation. The energy generated by the project will be collected through underground lines and delivered through a 230-kV switchyard to an existing CFE transmission line located 0.5 km (0.3 miles) from the Project site.

The Sponsor is considering two separate contracts for construction of the solar park: a solar panel supply contract and a Balance of System (BoS) agreement. NADB procurement policies require that private-sector borrowers use appropriate procurement methods to ensure a sound selection of goods, works and services at fair market prices and that their capital investments are made in a cost-effective manner. As part of its due-diligence process, NADB will review compliance with this policy.

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12 Source: CRE permit.
13 The EPC contract for the procurement and construction of a solar plant—including the equipment acquisition except for the panel supply, civil works, equipment installation, and plant testing and energizing—is typically known as the Balance of System agreement (BoS).
Notice to proceed is scheduled for June 2018, and the Commercial Operation Date (COD) is anticipated to occur no later than June 2019. Table 2 presents the status of key tasks for implementation of the Project.

Table 2
PROJECT MILESTONES

<table>
<thead>
<tr>
<th>Key Milestones</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land lease agreements for the Project site</td>
<td>Completed (April 2014)</td>
</tr>
<tr>
<td>Rights of way for transmission line</td>
<td>In process</td>
</tr>
<tr>
<td>CENACE indicative interconnection study</td>
<td>Completed (November 2015)</td>
</tr>
<tr>
<td>CENACE system impact study</td>
<td>Completed (May 2016)</td>
</tr>
<tr>
<td>CENACE facilities study</td>
<td>Completed (July 2016)</td>
</tr>
<tr>
<td>CENACE interconnection agreement</td>
<td>Completed (October 2016)</td>
</tr>
<tr>
<td>Access road and road crossing authorization from the Mexican Ministry of Communication and Transportation (SCT)</td>
<td>In process (expected April 2017)</td>
</tr>
<tr>
<td>CRE authorization for energy generation under new legislation</td>
<td>Completed (February 2017)</td>
</tr>
<tr>
<td>Archeological clearance by the National Institute of Anthropology and History (INAH)</td>
<td>Completed (November 2016)</td>
</tr>
<tr>
<td>SEMARNAT environmental authorization (MIA resolution) for the solar park</td>
<td>Completed (May 2016)</td>
</tr>
<tr>
<td>SEMARNAT authorization for project modifications</td>
<td>Completed (February 2017)</td>
</tr>
<tr>
<td>SEMARNAT environmental authorization (MIA resolution) for transmission line</td>
<td>Completed (May 2017)</td>
</tr>
<tr>
<td>Land use change authorization issued by SEMARNAT</td>
<td>In process (expected May 2017)</td>
</tr>
<tr>
<td>SENER social impact study</td>
<td>In process (expected May 2017)</td>
</tr>
<tr>
<td>Solar module supply agreement</td>
<td>In process (expected June 2017)</td>
</tr>
<tr>
<td>Power purchase agreements (energy and CELs)</td>
<td>Completed (January 2017)</td>
</tr>
<tr>
<td>Independent engineer final report</td>
<td>In process</td>
</tr>
<tr>
<td>Commercial operation date (COD)</td>
<td>June 2019</td>
</tr>
</tbody>
</table>

2.1.2. Technical Feasibility

Selected Technology

The Sponsor is evaluating solar modules from different suppliers in order to select the equipment best suited to the characteristics of the Project site and solar resource. The process for technology evaluation considers elements such as technical performance, commercial offering and warranties. Additionally, the Project will be evaluated for viability based on the use of bankable technologies. The independent engineer will confirm the suitability of the technology and expected performance. The current technical description of the Project is based on the preliminary engineering report presented for the Environmental Impact Assessment (MIA) and is subject to change once the design is finalized.
Below is a description of the main components of the Project.

- **Modules**: Approximately 487,440 photovoltaic modules will be installed and mounted on single-axis tracking arrays. The parallel arrays will be spaced apart to minimize inter-row shading by the sun. The panel providers will be selected from a short list of top-tier global providers.

- **Inverters**: The inverters selected for the Project will maximize energy production. The Sponsor is currently evaluating equipment specifications based on industry standards, performance efficiency, warranties and prices.

- **Interconnection**: One 23/230-kV substation will be constructed to collect the energy through underground lines. The collector substation will step up the energy to 230-kV and will deliver it to the switchyard through a new overhead transmission line extending 0.5 km (1,640 ft.). The Project will be interconnected to the CFE national grid through the Puerto Libertad-Hermosillo Aeropuerto Transmission Line, which has sufficient capacity to convey the energy generated by this Project.

- **Monitoring and Control System**: A SCADA system will be used to monitor, operate and track the plant remotely, as well as document the performance of the PV system relative to its predicted output.

- **Roads**: Access roads will be constructed to allow for the delivery and installation of the components, machinery, equipment and materials required for construction of the modules, substation and switchyard, as well as for operation and maintenance of the facilities. The roads will be designed for low-volume traffic.

- **Operation and Maintenance (O&M) Facilities**: A permanent O&M facility will be built with administrative space, as well as for the maintenance and storage of equipment during construction and operation.

**Solar Resource Assessment**

The Project will be built in the municipality of Hermosillo in the state of Sonora, where optimum solar potential has been reported. As shown in the map of the electrical research institute, Instituto de Investigaciones Eléctricas (IIE), solar resource at the Project site is approximately 6 Wh/m²-day (Figure 6).

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14 Source: Sponsor.
According to the 2016-2021 state development plan, Sonora has a high potential for renewable energy development. Solar resources in the state are estimated at 2,600 GWh/year, which is equivalent to 8.39% of national solar potential. Solar irradiation in the state is 45% higher than the national average, mainly in the northern area of the state. The State Government promotes the use of renewable energy resources to create new jobs, foster innovation and reduce the release of harmful emissions into the environment.

The Sponsor is currently evaluating module technology that is expected to be mounted on single-axis trackers and will update the electricity generation models as soon as the technology is confirmed. This information will be evaluated during the independent engineer review, in coordination with NADB.

2.1.3. Land Acquisition and Right-of-way Requirements

The Project will be developed in the municipality of Hermosillo in a site categorized as semi-arid with sparse vegetation. The land has been used for livestock grazing.  

The Project will be developed on 500 hectares (1,235.5 acres), which the Sponsor secured through a 20-year lease agreement with the private landowner in April 2014. Documentation related to the lease agreement has been provided by the Sponsor. A lease agreement to secure the right-of-

15 Source: MIA.
way required for the Project transmission line is in process with the private landowner. The agreements allow the Project Sponsor to develop the solar park, which includes the rights of ways to use the land to construct the transmission lines, access roads, collector substation and the switchyard to interconnect the Project to the national grid.

Authorization from the Mexican Ministry of Environment and Natural Resources (SEMARNAT) to change land use will be required for construction of the Project. The Sponsor has already submitted a formal land use change request. The MIA resolution was issued in May 2016 and authorization for the land use change is expected to be approved by SEMARNAT in June 2017. More information is provided in Section 2.2.

Municipal permits for construction will be obtained prior to initiating construction. Obtaining the appropriate permits and authorizations as Project construction advances will be a requirement for loan disbursement.

**2.1.4. Management and Operations**

The Project Sponsor, Zuma Energía S.A. de C.V., created Fisterra Energy Orejana, S.R.L. de C.V., a special-purpose company, to develop the solar energy project in Sonora, Mexico.

Zuma Energía is a Mexican renewable energy company that has positioned itself as a leader in the sector, with a portfolio of wind and solar PV projects totaling 775 MW under development and one wind farm (Ingenio Wind Farm) in operation in Oaxaca. Zuma Energía, along with its shareholders, Actis and Mesoamerica, are prominent private equity investors in renewable energy in emerging markets. Actis has accumulated over 14.5 GW of installed capacity in various markets, attesting to its global expertise in the electricity sector. Zuma is Actis’ renewable generation platform in Mexico, in keeping with the successful model it has implemented in Africa, Brazil, Chile and Central America. Mesoamerica is a respected private equity manager in Central America.

The Sponsor was awarded three contracts, including the Project, in CENACE Auction No. SLP-2/2016 held in September 2016. Zuma’s projects represent 26.5% of the energy contracted in the auction and 25.4% of the CELs.

The proposed Project will be designed to operate with minimal human intervention. Operation and maintenance tasks will be performed to optimize the operating times of the modules, reduce repair costs and extend the life of the equipment. The Sponsor will execute a Balance of System Agreement, which in addition to the engineering, procurement and construction of the Project, will cover the first two years of operation, with an option to extend the contract for another three years at a predetermined price, after which the contract may be renewed or another contractor may be procured.

Typical operation and maintenance for single-axis solar fields includes cleaning solar modules and preventive maintenance of equipment.
2.2. ENVIRONMENTAL CRITERIA

2.2.1. Compliance with Applicable Environmental Laws and Regulations

Applicable laws and regulations

According to the MIA Resolution for the solar park issued by SEMARNAT in May 2016, the Project must comply with the following laws:

- **General Law of Ecological Balance and Environmental Protection (LGEEPA)**, which establishes the environmental regulatory framework, expands the strategic vision, and conveys specific powers and duties to the states and municipalities, so that the environmental problems of each can be addressed directly. In accordance with Articles 28 and 30 of this law, the Project Sponsor developed a MIA that includes mitigation measures to preserve and protect the environment.

- **General Law for Sustainable Forest Development (LGDFS)**, which regulates and promotes the conservation, protection, restoration, production, zoning, cultivation, management and use of the country's forest ecosystems and their resources. In accordance with the provisions of Article 7, sections XL and XLV, of this law, the Project Sponsor must obtain the corresponding Forest Land Use Change Permit.

- **Federal Standard NOM-059-SEMARNAT-2010**, which identifies and lists endangered species or clusters of wildlife in Mexico and establishes the criteria for inclusion, exclusion or change in risk status for different species, based on a method for assessing the risk of extinction.

- **NOM-081-SEMARNAT-1994**, which establishes the maximum levels of noise from stationary sources and noise measuring methods.

Environmental Studies and Compliance Activities

In accordance with the environmental impact regulations established under the LGEEPA, the Sponsor prepared and submitted the following environmental documents:

- MIA assessment for the construction of a solar park and related infrastructure, submitted on February 12, 2016; and

- MIA assessment for a transmission line, interconnection substation and access road, submitted on February 28, 2017.

The MIAs identified, described and evaluated the potential environmental impacts associated with the Project—such as removal or loss of vegetation, soil erosion, noise and impacts to wildlife—and included the proposed mitigation measures to prevent or minimize any negative effect or impacts.

On May 10, 2016, SEMARNAT issued MIA Resolution No. DS-UGA-IA-0341-2016, authorizing the construction of a solar park of up to 122.2-MWac (158-MWdc) and associated infrastructure. In February 2017, the Sponsor obtained authorization from SEMARNAT for Project modifications related to changes in the solar panel trackers, an increase in plant capacity from 122.2 MWac to
up to 193.5 MWdc and in the annual energy generated, an extension of the resolution terms, and a change in legal representatives.


Based on the terms described in the two MIA assessments, SEMARNAT determined that the Project is feasible for authorization. In compliance with the MIA resolutions, the Sponsor must implement the mitigation measures proposed in the MIAs and obtain the required forest land use change permits. Additional information about the mitigation measures and conditions specified in the MIA resolution are described in Section 2.2.2.

**Pending Environmental Tasks and Authorizations**

The following documentation is pending:

- SEMARNAT Forest Land Use Change Permit for the solar park; and
- SEMARNAT Forest Land Use Change Permit for the transmission line, switchyard substation and access road.

All environmental authorizations will have to be secured prior to loan disbursement.

**Compliance Documentation**

The Sponsor has obtained the following federal environmental and cultural clearances required for the Project:

- MIA Resolution No. DS-SG-UGA-IA-0341-2016 for the solar park;
- MIA Resolution No. DS-SG-UGA-IA-0409-2017 for the transmission line, electrical substation and access road; and
- INAH Archeological Clearance No. 401.F (4) 77.2216/CIS-1155 issued by the National Institute of Anthropology and History (INAH).

**2.2.2. Environmental Effects / Impacts**

There is a need for affordable and environmentally-friendly alternatives to conventional hydrocarbon-based energy resources. Renewable energy projects create an opportunity to generate electricity utilizing sources that do not produce greenhouse gases (GHG) like those released by fossil-fuel-based plants. Sunlight is a source of renewable energy, which means that it can be used continuously without depleting natural resources. It is a clean form of renewable energy as no waste or pollutants are released in the generation process and, therefore, it provides an opportunity to displace GHG and other pollutants produced by traditional hydrocarbon-based energy generation, while providing local residents with a safe and reliable energy alternative. Moreover, solar energy production does not consume or pollute water, although minimal
amounts may be used for maintenance purposes. Solar energy is currently used in many developed and developing nations to meet their demand for electricity.

**Existing Conditions and Project Impact – Environment**

Historically, Mexico has depended to a great extent on fossil fuels for the generation of energy. This conventional method of energy development can affect the natural environment due to harmful emissions related to the generation process, including GHG and other pollutants, such as sulfur dioxide (SO$_2$) and nitrogen oxides (NOx).

The Project will help reduce the demand for electricity generated by fossil fuel-based power plants, and since solar-based power generation implies zero fuel costs and emissions, it will displace related harmful emissions. The anticipated environmental outcomes from the installation of 122.2 MWac of new renewable energy generation capacity (or an average of 353.5 GWh of electricity a year), include the displacement of approximately 163,808 metric tons/year of carbon dioxide (CO$_2$), 0.707 metric tons/year of SO$_2$ and 571 metric tons/year of NOx.$^{16}$

**Mitigation of Risks**

Some environmental impacts are anticipated from the implementation of the Project. The Sponsor has proposed measures that are intended to reduce, mitigate and control environmental impacts resulting from Project activities. To ensure that mitigation measures are implemented properly and in a timely manner, the Sponsor will develop the Environmental Procedures Manual described in the MIA Resolution. The following mitigation measures included in the MIA and its resolution will be implemented.

- **General:**
  - Specialized personnel with environmental expertise will always be on site during construction to monitor compliance with environmental regulations.
  - All mitigation, protection, control and restauration measures proposed in the MIA will be performed, and the conditions and terms of the MIA resolution will be met.

- **Flora:**
  - Prior to the construction phase, any species of flora protected under Mexican standard NOM-059-SEMARNAT-2010 will be identified, and steps will be taken to ensure no species are harmed during any phase of the Project.
  - The land use change authorization will be obtained, and the corresponding compensation program will be implemented.
  - Vegetation removed from the Project area will be properly transported to a final disposal site authorized by the municipality.

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$^{16}$ BECC calculation of CO$_2$, SO$_2$ and NOx indicators, which reflect the potential emissions displaced as a result of reducing future demand on natural gas-based electricity through the use of solar energy generation equivalent to 353.5 GWh/year. Emission factors from a combined-cycle power plant located near the Project site were used for these calculations.
o Use of herbicides and/or chemicals products to remove vegetation will be banned.

- **Fauna:**
  o Prior to initiating site preparation activities, wildlife will be driven from the area to avoid eradicating any specimens.
  o Prior to land clearing activities, the Sponsor will verify the existence of any fauna protected under Mexican NOM-059-SEMARNAT-2010. If detected, the Sponsor will rescue and relocate the specimens to a similar site with the concurrence of the environmental authorities.
  o Wildlife hunting, trapping and trafficking will be officially prohibited.

- **Noise:**
  o During site preparation and construction, Project activities will comply with the provisions of Mexican standard NOM-081-SEMARNAT-1994, which establishes the maximum levels of noise from stationary sources and noise measuring methods.
  o To minimize noise emissions, all vehicles will be appropriately maintained and tuned up.

- **Air quality:**
  o Construction materials and waste transported by heavy vehicles will be covered.
  o Access roads and work areas will be watered to reduce dust generation.

- **Water:**
  o During site preparation, sanitary services for handling and disposing of wastewater will be performed by a specialized company in accordance with applicable regulations.
  o Wastewater will be discharged to septic tanks.

- **Soil and solid waste:**
  o Oils, fuels and other pollutants will not be placed directly on the ground during any stage of Project development or operation.
  o Procedures will be implemented for the separation, storage, collection and use or disposal of the different types of waste generated in the different stages of the Project.
  o Solid waste will be handled in accordance with SEMARNAT regulations.
Natural Resource Conservation

The Project will support natural resource conservation by reducing the demand on fossil fuels for energy production and providing related improvements to air quality. The Project is anticipated to produce an average of 353.5 GWh of zero-carbon electricity during 20 years of operation, equivalent to the annual energy consumption of approximately 47,470 households.

In addition, clean technologies such as solar energy require no water for electricity production, whereas fossil-fuel-fired generation is typically water intensive. Water to be used during the construction and operation phase, will be transported by water tanks to the Project site.

No Action Alternative

The “no action” alternative to the development of renewable energy sources would result in greater demand for conventional fossil-fuel-based energy production, further depleting natural resources for the purpose of meeting an ever-growing demand for energy, as well as a lost opportunity to generate emission-free energy, such as that derived from solar sources. Moreover, the Project will help meet the goals related to emissions reduction, while also helping to meet increased demand for electricity. Should the Project not be implemented, the mix of renewables in Mexico’s energy portfolio will be delayed.

Existing Conditions and Project Impact – Health

Epidemiological research has shown that both chronic and acute exposure to harmful emissions associated with fossil fuel-based energy production can lead to serious respiratory problems. It is estimated that, at the very least, prolonged exposure to excessive levels of pollutants can deteriorate the respiratory capacity of human beings and greatly contribute to the increased incidence of cardiopulmonary diseases, such as asthma, heart ailments, and lung cancer.

By using clean renewable resources instead of conventional fossil fuel sources in power generation, the Project will positively impact the region by reducing pollutants and thus help to contain the severity of respiratory problems and other diseases aggravated or caused by air pollution. In addition, the reduction of GHG emissions is expected to mitigate climate effects that create more vulnerable conditions for human health.

Transboundary Effects

No transboundary impacts are anticipated as a result of the development of the Project, given its distance from the border. However, the Project will aid in addressing the larger environmental concerns related to greenhouse gases and global warming targeted by international agendas and will be consistent with the North American Climate, Clean Energy, and Environment Partnership Action Plan announced by the governments of the U.S., Mexico and Canada on June 29, 2016.

Other Local Benefits

The Project will promote the social and economic development of the municipality of Hermosillo, Sonora. The Project is expected to generate temporary jobs during construction, as well as permanent jobs during operation. Employment of construction personnel will provide a temporary beneficial impact on local businesses and the regional economy through increased
expenditure of wages for goods and services. Personnel for construction will be drawn from local populations to the extent feasible.

2.3. FINANCIAL CRITERIA

The Project Sponsor has requested a loan from the North American Development Bank (NADB) to complete the financing of the Project. The proposed payment mechanism is consistent with the project structure normally seen in the renewable energy industry and with the long term PPA for energy and Clean Energy Certificates (CELS) bid by the CFE’s, in accordance with the new Mexican electricity regulatory framework. NADB will be participating in the transaction with other senior lenders. The source of payment will be the revenue generated by the Project in accordance with the pricing established under the PPAs that have been signed by the Project Company. NADB loan will have no recourse beyond the Project Company, Fisterra Energy Orejana SRL de C.V.

The Project’s revenue from the sale of electricity and CELs is estimated to be sufficient to: a) cover scheduled O&M expenses, b) fund any debt service reserve, c) pay the debt service on the senior loans, and d) comply with debt service coverage requirements.

In addition, NADB’s analysis verified that the Project Company has the legal authority to contract financing and pledge their revenue for the payment of financial obligations. The Project Company has also the legal and financial capacity to operate and maintain the Project based on the experience provided by their development team. Project Company will contract the Project O&M services with a firm with ample experience and expertise in the industry. NADB will verify that the projected O&M costs and contract warranties are in accordance with industry standards.

Considering the Project’s characteristics and based on the financial and risk analyses performed, the proposed Project is considered to be financially feasible and presents an acceptable level of risk. Therefore, NADB proposes providing a market-rate long term senior loan for the equivalent in pesos of up to $50 million dollars, to the Project Company, for the construction of the project described herein.

3. PUBLIC ACCESS TO INFORMATION

3.1. PUBLIC CONSULTATION

BECC released the draft project certification and financing proposal for a 30-day public comment period beginning March 14, 2017. The following documentation is available upon request:

- MIA assessment for the construction of a solar park and related infrastructure, submitted on February 12, 2016;
- MIA Resolution No. DS-SG-UGA-IA-0341-2016 issued by the SEMARNAT Office in Sonora on May 10, 2016;
• Social Impact Study for Orejana Solar Photovoltaic Plant, September 18, 2015; and
• INAH Archeological Clearance No. 401.F (4) 77.2216/CIS-1155, issued by the National Institute of Anthropology and History (INAH) on November 22, 2016.

The public comment period ended on April 13, 2017, with no comments received.

3.2. OUTREACH ACTIVITIES

As part of the environmental authorization process, on February 18, 2016, SEMARNAT published the request for environmental authorization of the solar park in its weekly publication (Gaceta Ecológica), which provides information about the projects under evaluation. The ruling did not report any public comments received. On February 16, 2016, the Sponsor published an extract of the MIA for the solar park under review by SEMARNAT in the newspaper, Sonora Expreso, in Hermosillo, Sonora. Additionally, on March 3, 2017, the Sponsor published an extract of the MIA for the construction of the switchyard substation, transmission line and access road to the park in the newspaper, El Diario de Sonora, in Hermosillo, Sonora.

Social Impact Study

Under the Mexican Power Industry Law, anyone interested in obtaining a permit or authorization to develop projects in the energy sector must present a Social Impact Assessment (SIA) to SENER. In accordance with the guidelines and methodologies established by SENER, the study must identify the communities and towns in the area of influence of a Project, as well as identify, characterize, predict and assess its possible consequences for the population, along with mitigation measures and plans for managing the social aspects of the Project, including: a Social Management Plan (SMP), Social Investment Plan (SIP), Monitoring and Evaluation Plan, Communication Strategy and Community Involvement Plan, social baseline, and stakeholder analysis. The evaluation also requires that indigenous communities or groups be identified in the area of influence of the Project to determine if they need to be consulted. Based on the assessment, SENER will verify compliance with social impact and sustainable development regulations.

In September 2015, the Sponsor presented a SIA for the Project to the Social Impact and Land Occupancy Department of SENER. In addition to reviewing the information presented in the document, field visits were made to analyze first-hand the current situation in the Project area and to complement the main findings regarding its social performance. SENER is expected to issue its response in May 2017.

As part of the evaluation of social impacts, the Sponsor implemented a series of anthropological methods, including discussion groups and socialization assemblies during the development of the study. The information obtained from this process resulted in the identification of 20 positive social impacts, 20 neutral social impacts, and no negative social impacts. The positive impacts identified were related to opportunities for local employment, access to the Project site for educational purposes, and an increase in land value. The neutral social impacts included the fact that the Project is not close to any community (10 km or 6.2 miles) and will not affect agricultural and livestock grazing activities in the area. The study also identified two indigenous communities
located 43 km (26.7 miles) from the Project area; however, no social impacts from the Project were identified. To mitigate any potential negative impacts that might arise, the SIA identifies a set of mitigation measures to be considered and included in a Social Management Plan to be implemented by the Sponsor during Project construction and operation.

**Media Search**

BECC conducted a media search to identify potential public opinion about the Project. References to the Project were found on several Internet sites, such as *Energía hoy*, *Reforma-Economía*, *El Mañana* y *El Diario mx*. These articles can be found at the following links:

- **Energía hoy** (October 20, 2016) – “¿Quién está detrás de los ganadores de la segunda subasta? Santiago Barcón” (Who is behind the winners of the second auction? Santiago Barcón)
  
  http://www.energiahoy.com/site/quien-esta-detras-de-los-ganadores-de-la-segunda-subasta-santiago-barcon/

- **Reforma-Economía** (September 28, 2016) – “Invertirán 4 mil mdd en energías verdes” (Four billion dollars to be invested in green energy)
  
  http://www.reforma.com/aplicacioneslibre/articulo/default.aspx?id=949957&md5=92b6d15f5974cb17d1117ff8a12525&ta=0dfebac11765226904c16cb9ad1b2e&po=4

- **El Mañana** (October 4, 2016) – “Garantizan inversión solar por 4.5 mddd” (4.5 billion dollars in solar investment guaranteed)
  
  http://www.elmanana.com/garantizaninvertionsolarpor45mddd-3422411.html

- **El Diario mx** (September 28, 2016) – “Invertirán 4 mil mdd en energías verdes” (4 billion dollars to be invested in green energy)
  
  http://diario.mx/Economia/2016-09-28_a204b990/invertiran-4-mil-mdd-en-energias-verdes/

In summary, these publications highlight the scope of the Project. Opposition to the Project was not detected from the available media coverage. The Project Sponsor has complied with all public consultation requirements related to the applicable environmental clearance and permitting processes.