



# **CERTIFICATION AND FINANCING PROPOSAL**

## **EL MEZQUITE WIND ENERGY PROJECT IN THE MUNICIPALITY OF MINA, NUEVO LEON**

*Revised: April 27, 2017*

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### INDEX

<b>EXECUTIVE SUMMARY</b> .....	2
<b>1. ELIGIBILITY</b> .....	3
<b>2. CERTIFICATION CRITERIA</b>	
2.1 Technical Criteria	
2.1.1. Project Description .....	4
2.1.2. Technical Feasibility .....	10
2.1.3. Land Acquisition and Right-of-Way Requirements .....	13
2.1.4. Management and Operations .....	13
2.2 Environmental Criteria	
2.2.1. Compliance with Applicable Environmental Laws and Regulations .....	14
2.2.2. Environmental Effects / Impacts .....	16
2.3 Financial Criteria .....	19
<b>3. PUBLIC ACCESS TO INFORMATION</b>	
3.1 Public Consultation .....	20
3.2 Outreach Activities .....	20

## EXECUTIVE SUMMARY

### EL MEZQUITE WIND ENERGY PROJECT IN THE MUNICIPALITY OF MINA, NUEVO LEON

- Project:** The project consists of the design, construction and operation of a 250-MW wind farm located in the municipality of Mina, Nuevo León (the “Project”). The electricity, Clean Energy Certificates (CEs) and generation capacity produced by the Project will be purchased by the Mexican federal electricity commission, *Comisión Federal de Electricidad* (CFE or the “Off-taker”) pursuant to three long-term power purchase agreements (the “CFE PPAs”), which were awarded through the 2016 Long-term Energy Auction of the Mexico and executed on January 20, 2017 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 250-MW of new renewable energy generation capacity at the point of interconnection are:
- a) Generation of approximately 890 gigawatts-hour (GWh) of electricity during the first year of operation; and
  - b) An expected displacement of approximately 428,787 metric tons/year of carbon dioxide (CO<sub>2</sub>), 1.78 metric tons/year of sulfur dioxide (SO<sub>2</sub>) and 1,175 metric tons/year of nitrogen oxides (NO<sub>x</sub>).<sup>1</sup>
- Sponsor:** Cubico Sustainable Investments Limited.
- Borrower:** Parque Eólico El Mezquite, S.A.P.I. de C.V.

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<sup>1</sup>BECC calculation of CO<sub>2</sub>, SO<sub>2</sub> and NO<sub>x</sub> indicators, which reflect the potential emissions displaced as a result of reducing a proportionate amount of future demand on natural gas-based electricity through the use of wind energy equivalent to 890 GWh. Emission factors from a combined-cycle generation facility located near the Project site were used for these calculations.

## CERTIFICATION AND FINANCING PROPOSAL

### EL MEZQUITE WIND ENERGY PROJECT IN THE MUNICIPALITY OF MINA, NUEVO LEON

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#### 1. ELIGIBILITY

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##### **Project Type**

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

##### **Project Location**

The Project is located in the municipality of Mina, Nuevo Leon, approximately 145 km (90 miles) southwest of the U.S.-Mexico border.

##### **Project Sponsor and Legal Authority**

The private-sector sponsor is Cubico Sustainable Investments Limited (the "Sponsor"), which will use a special-purpose vehicle, Parque Eólico El Mezquite, S.A.P.I. de C.V. (the "Project Company" or "Borrower") to implement the Project. The Project Company is a Mexican-based company established in 2011. Its contact representative is Osvaldo Rancé Cachafeiro.

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 of the Mexican Government.<sup>2</sup> The electricity, Clean Energy Certificates (CECs) and generation capacity produced by the Project will be purchased by the Off-taker through three separate power purchase agreements executed with the Project Company on January 20, 2017 (the "CFE PPAs").

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<sup>2</sup> Source: CENACE, Auction Decision and Contract Awards, Long-term Auction No. SLP-1/2016, September 28, 2016.

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## 2. CERTIFICATION CRITERIA

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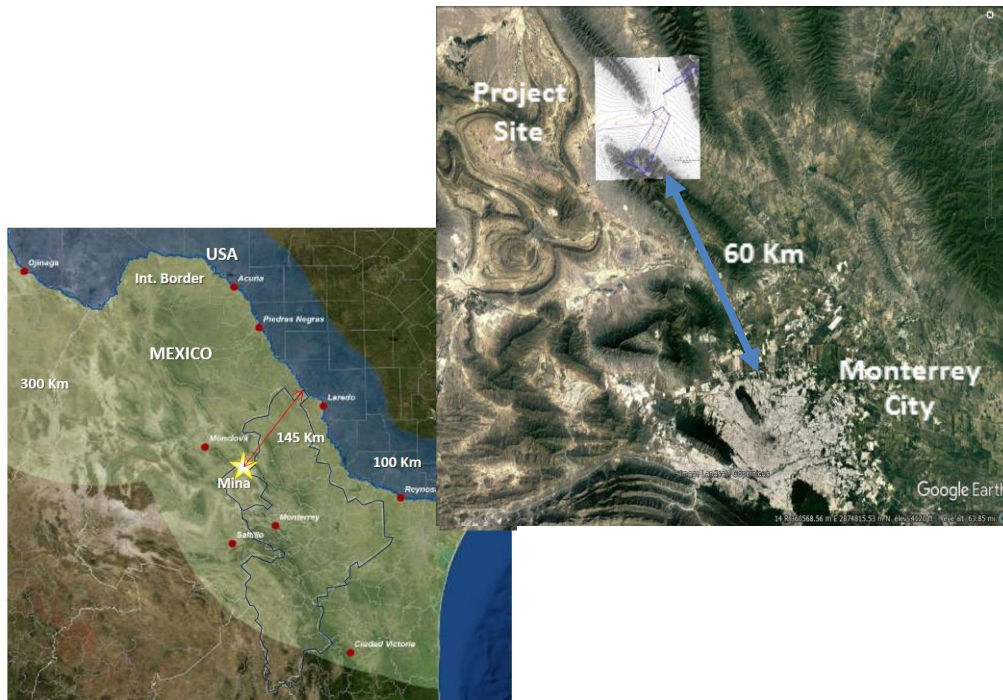
### 2.1. TECHNICAL CRITERIA

#### 2.1.1. Project Description

##### Geographic Location

The Project site is located in the municipality of Mina, Nuevo Leon in Mexico, approximately 37 miles northwest of the urban area of Monterrey, at the following coordinates: Latitude: 26°38'24"N and Longitude: 100°54'00"W. The Project will be developed on approximately 4,833 hectares (11,943 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 Mina and the metropolitan area of Monterrey in the state of Nuevo Leon. Project benefits include the generation of electricity equivalent to the annual consumption of 117,000 households.<sup>3</sup> The construction of the Project

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<sup>3</sup> Estimation based on 2,055.59 kilowatt-hours (kWh) of electricity consumption per capita in 2015 from Mexico's Energy Information System (<http://sie.energia.gob.mx/>) and 3.7 persons per household in the state of Nuevo Leon as indicated by the Mexican National Institute of Statistics and Geography (INEGI).

will also benefit local communities by generating employment opportunities and additional tax revenue.

According to the Mexican National Institute of Statistics and Geography (INEGI), the population of Nuevo Leon was 5,119,504 in 2015, which represents 4.3% of the total population of Mexico.<sup>4</sup> Between 2000 and 2010, Nuevo Leon grew at an annual rate of 1.8%, above the national average (1.4%).<sup>5</sup> According to the most current economic information from INEGI, the state of Nuevo Leon contributed 7.3% to the gross domestic product (GDP) of Mexico in 2014.

Monterrey is the capital of the state of Nuevo Leon and is located approximately 94 miles south of the U.S.-Mexico border. The metropolitan area of Monterrey consists of the urban municipalities of Apodaca, General Escobedo, Guadalupe, Juarez, Monterrey, San Nicolas de los Garza, San Pedro Garza Garcia and Santa Catarina, as well as the adjacent suburban municipalities of Cadereyta Jimenez, Cienega de Flores, Garcia, General Zuazua, Pesqueria, Salinas Victoria, Santiago and El Carmen.

According to INEGI, the population of the municipality of Mina was 5,326 residents in 2015, which represent 0.10% of the state population. The main activities in Mina are: commerce, which employs 39% of the work force, public services (29%) and mining (19%).<sup>6</sup>

### **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.<sup>7</sup> 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.

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<sup>4</sup> Source INEGI, intercensal survey of the population, 2015

<http://www.inegi.org.mx/est/contenidos/Proyectos/encuestas/hogares/especiales/ei2015/>.

<sup>5</sup> Source: INEGI, 2010 general population and housing census (<http://www3.inegi.org.mx/>).

<sup>6</sup> Source: INEGI, Economic Census 2010 (<http://www.inegi.org.mx>).

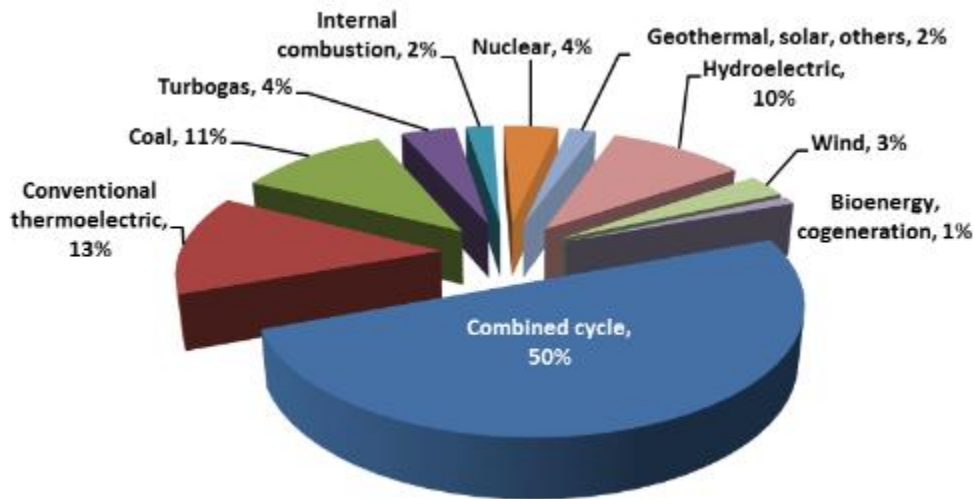
<sup>7</sup> Source: Mexican Ministry of Energy (SENER), 2016-2030 National Power System Development Program (PRODESEN).

Historically, CFE has undertaken efforts to increase the use of non-fossil fuel technologies in power generation. In 1994, CFE began operating its first wind farm with a capacity of 1.6 MW in La Venta, Oaxaca, and in January 2007, the La Venta II wind farm with a capacity of 83 MW initiated operations in the same area. 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. Additionally, the private sector has supported renewable energy development through wind energy projects, such as Ventika (252 MW) in Nuevo León and El Porvenir (54 MW) in Tamaulipas, both of which included funding participation by NADB.

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.<sup>8</sup> Figure 2 shows the participation of each technology to the power generation in Mexico.

**Figure 2**  
**ENERGY GENERATION BY TECHNOLOGY**



Source: SENER, PRODESEN, 2016-2030

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

<sup>8</sup> Source: SENER, PRODESEN, 2016-2030.

Project will be located in the Northeast Zone (NEZ), which includes the states of Tamaulipas, Nuevo León, a large portion of Coahuila and some municipalities from San Luis Potosí, as illustrated in Figure 3.

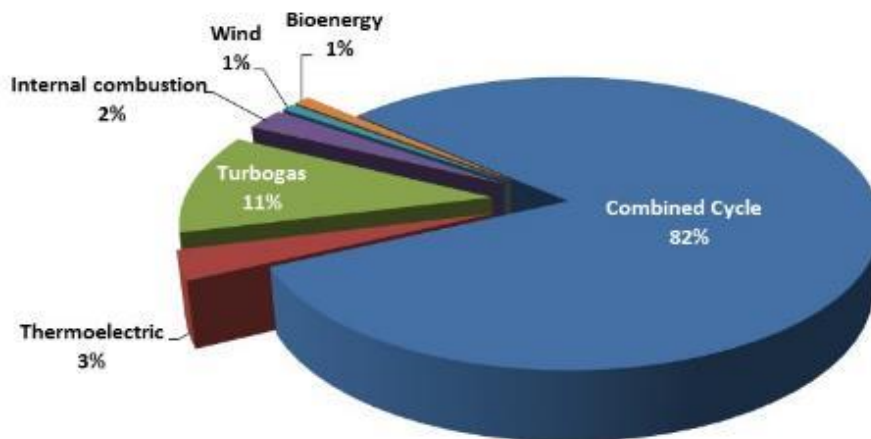
**Figure 3**  
**MEXICAN ELECTRIC SYSTEM ZONES**



Source: SENER, PRODESEN 2016-2030.

According to SENER, Nuevo León had 2,776 MW of installed generation capacity and supplied 16,652 GWh of electricity in 2015. Figure 4 shows the technologies used for power generation in the state.

**Figure 4**  
**NUEVO LEON PORTFOLIO OF ENERGY TECHNOLOGIES, 2015**  
 (MW)



Source: Chart based on PRODESEN 2016-2030.



A detailed description of the technologies used to generate electricity in the state of Nuevo Leon for public service is presented in the following table.

**Table 1**  
**ANNUAL POWER GENERATED IN NUEVO LEON, 2015**

Technology	MW	Energy Generation (GWh)	% of Energy Generation
Combined cycle	2,259	15,324	82%
Turbogas	306	952	11%
Thermoelectric	89	238	3%
Internal combustion	66	2	2%
Bioenergy	28	99	1%
Wind	22	37	1%
<b>TOTAL</b>	<b>2,770</b>	<b>16,652</b>	<b>100%</b>

Source: Chart based on PRODESEN.

As a result of this Project, wind farms will account for nearly 5.5% of electricity generation in Nuevo Leon.

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.<sup>9</sup>

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.

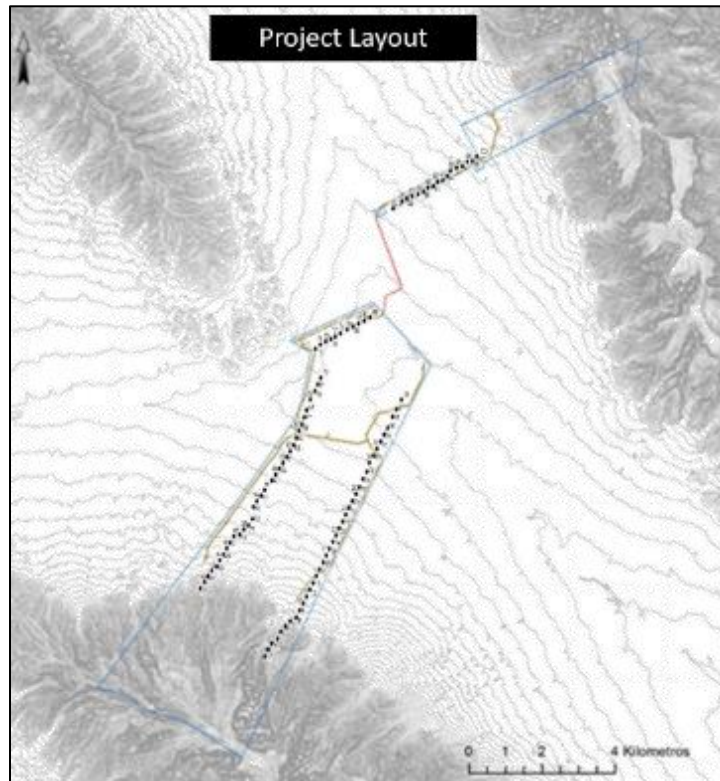
On May 13, 2016, CENACE published the guidelines for the auction of long-term renewable energy contracts. With CFE as the off-taker, contracts for the purchase of capacity and renewable energy will be for 15 years and contracts for clean energy certificates will be for 20 years. In September 2016, CENACE 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.

### **Project Scope and Design**

The Project consists of the design, construction and operation of a 250-MW wind farm located in the municipality of Mina, Nuevo León. The Project will occupy approximately 4,833 hectares (11,943 acres). Figure 5 shows the proposed layout of the wind farm.

<sup>9</sup> Source: SENER, PRODESEN 2016-2030.

**Figure 5**  
**PROJECT LAYOUT**



Source: Sponsor

The Project components include the installation of 100 wind turbines, two substations and a transmission line. The energy generated by each wind turbine will be conveyed to the collecting substation through 34.5-kV underground lines. From there, the electricity will be conveyed through a 230-kV overhead transmission line extending approximately 15.2 km (49,869 ft.) to a new substation (switchyard), where it will interconnect with an existing CFE transmission line, which interconnects with the Escobedo Substation. The Sponsor are working on the final engineering documents.

The Sponsor is evaluating a multi-contract scheme for Project construction, which consists of a Turbine Supply Agreement (TSA) with General Electric International Inc. (GE) and an Engineering, Procurement and Construction Agreement (EPC) for the balance of plant (BoP) with a subsidiary of Grupo Aldesa.<sup>10</sup> The Sponsor is considering a nine-month cushion between the TSA and EPC delivery dates and COD. Project construction is scheduled to start in June 2017 and the Commercial Operation Date (COD) will be no later than June 2019.<sup>11</sup> Table 2 presents the status of key tasks for the implementation of the Project.

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<sup>10</sup> Balance of plant (BoP) refers to all equipment and civil works for the construction of a windfarm with the exception of the turbines and all its elements.

<sup>11</sup> Source: CFE PPA CCE/SLP/201601/29, executed on January 20, 2017.

**Table 2**  
**PROJECT MILESTONES**

Key Milestones	Status
Right of ways, acquisition and lease agreements	Completed (2009, 2015, 2016)
Authorization to install wind turbines issued by the Ministry of Communication and Transportation (SCT)	Completed (January 2016)
CRE authorization for energy generation	Completed (March 2015)
CENACE impact study	Completed (April 2016)
CENACE indicative study	Completed (July 2016)
CENACE facilities study	Completed (July 2016)
CFE interconnection agreement	Completed (October 2016)
SEMARNAT environmental authorization (MIA resolution) for the wind farm	Completed (March 2013)
SEMARNAT authorization of wind farm modifications	Completed (February 2017)
SEMARNAT environmental authorization (MIA resolution) transmission line	Completed (June 2014)
SEMARNAT authorization of transmission line modification	Completed (October 2016)
SEMARNAT environmental authorization (MIA resolution) for the substation	Completed (April 2017)
SEMARNAT forestry land use change authorization for the wind farm	In process (payment submitted February 2017)
SEMARNAT forestry land use change authorization for access road	In process (submitted August 2016)
SEMARNAT forestry land use change authorization for transmission line	In process (submitted July 2016)
SEMARNAT forestry land use change authorization for substation	In process (submitted August 2016)
Archeological clearance by the National Institute of Anthropology and History (INAH)	Completed (March 2014)
Independent engineering final report	In process
Turbine supply agreement (TSA)	In process
Engineering, procurement, and construction (EPC/BoP) agreement	In process
Energy, CELs and capacity purchase agreements	Completed (January 2017)
Commercial operation date	June 2019

NADB's 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.

## 2.1.2. Technical Feasibility

### Selected Technology

The Sponsor has selected GE as the wind turbine manufacturer, whose equipment is suited to the characteristics of the Project site and will obtain the best performance (long-term energy output)

based on the wind resource. The process for technology evaluation considered elements such as profitability, contract terms, warranties and delivery times. The main components of the Project include:

- Wind Turbines. A total of 100 turbines will be mounted on steel towers, for a total installed capacity of 250 MW. Wind turbine transformers will step up the voltage of the generated power to 34.5 kV for transmission through an insulated underground cable to the collection substation. A standard, long-term operation and maintenance contract will be included with provisions regarding operational availability warranties.
- Foundations. They will be sized to withstand the stress produced by the forces acting on the towers. The foundations also include piping for ground, medium-voltage and optic-fiber cables.
- Electrical substations and transmission line. One substation will be constructed to collect the 34.5-kV energy produced by the turbines and transmitted through the underground cables. The collecting substation will step up the energy to 230 kV. From there, the electricity will be conveyed approximately 15.2 km (49,869 ft.) through a 230-kV overhead transmission line to a second substation (switchyard), where it will interconnect with an existing CFE transmission line with sufficient capacity to convey the energy generated by the Project. The existing transmission line interconnects with CFE's Escobedo Substation in the metropolitan area of Monterrey. The Sponsor is working on the final engineering documents.
- Monitoring and Control System. Through the SCADA system the operation of each turbine, as well as the Project as a whole, can be controlled and monitored from a central computer or a remote PC. In case of problems, the SCADA system will alert the operations staff. The control system will always be in operation to ensure that the machines are running in an efficient and safe manner.
- Roads. A grid of roads will be constructed for the Project, which will be used to access the wind turbines, collecting substation and the interconnection substation (switchyard). The roads will allow the transportation of the components, machinery, equipment and materials required for construction of the wind turbines, transmission line and substations. The roads will be unpaved and designed for low-volume traffic. Water will be sprayed to control dust emissions when required.
- Operation and Maintenance 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.

***Wind Resource Assessment***

The Project is located in the state of Nuevo Leon, where mid-level wind power density has been reported. According to the Mexican Power Research Institute (IIE), wind resources in the state range from 401 to 500 W/m<sup>2</sup> (see Figure 6).<sup>12</sup>

**Figure 6**  
**WIND RESOURCE IN MEXICO**



Source: Mexican Power Research Institute.

The State of Nuevo Leon developed a wind resource atlas to evaluate wind resources and their annual variability in the state using a sophisticated atmospheric simulation model capable of reproducing large-scale wind patterns with a microscale wind model that responds to land characteristics and topography to help investors identify potential locations for future wind farms.<sup>13</sup>

In order to assess available wind resources, three meteorological masts were installed at the Project site to collect data: one from November 2009 until November 2014; a second from October 2012 until November 2014; and the last from January 2015 until March 2016. The data collected from the towers, such as wind speed, wind direction and temperature at different altitudes, continues to be validated and incorporated into a wind resource analysis. Based on the Sponsor's analysis, it is estimated that the Project will produce an average of 890 GWh of electricity at P50 generation.<sup>14</sup> The results and wind measurement will be vetted for accuracy and related risks by an independent engineer prior to financial closing.

<sup>12</sup> Source: IIE, [www.iie.org.mx/](http://www.iie.org.mx/).

<sup>13</sup> Source: Wind Energy Resource Atlas of Nuevo Leon, [http://200.23.43.29/eolico/Atlas\\_de\\_Potencial\\_Eolico\\_de\\_Nuevo\\_Leon.pdf](http://200.23.43.29/eolico/Atlas_de_Potencial_Eolico_de_Nuevo_Leon.pdf)

<sup>14</sup> Source: Information provided by the Sponsor.

### **2.1.3 Land Acquisition and Right-of-way Requirements**

The Project will be developed on 4,833 hectares (11,943 acres) of privately owned land, which have been secured through lease and purchase agreements for the wind farm and switchyard substation, respectively. Right-of-way agreements for the transmission line and access roads have also been secured. Support documentation has been provided by the Sponsor.

The Project site is located in a semi-arid valley. Vegetation primarily consists of low grass, bushes and yuccas. Land use change authorizations from the Ministry of Environment and Natural Resources (SEMARNAT) will be required for construction of the Project, including the wind farm, transmission line, one access road and one substation. The wind farm will occupy approximately 403.5 hectares (997 acres) of land classified as forest.<sup>15</sup> The Sponsor paid the corresponding fee for the wind farm on February 2017 and is expected to obtain formal authorization in March 2017. The Sponsor submitted two formal requests in August 2016 for one substation and access road and another formal request in July 2016 for the transmission line.

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

### **2.1.4. Management and Operations**

As previously mentioned, the Sponsor is Cubico Sustainable Investments Limited, which created the special-purpose company, Parque Eólico El Mezquite, S.A.P.I. de C.V. to develop the Project in Nuevo Leon, Mexico.

Cubico Sustainable Investments Limited is headquartered in London, with offices located in international markets, including Italy, Mexico and Brazil. The company owns a portfolio of 33 wind and solar projects with more than 2.2 GW of capacity in all stages of development across eight countries. Cubico has wind farms in operation in Brazil, England and Italy. This Project is its first wind farm under development in Mexico, with an additional portfolio of more than 500 MW currently in the planning stage. The wind turbines being considered for the Project are from GE Renewable, a worldwide turbine manufacturer and one of the top-ranked companies in terms of installed capacity. It has 23 GW of power generation installed in Mexico, of which 124 MW are wind farms.

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 turbines, reduce repair costs, and extend the life of the equipment. The Sponsor will execute a Full Service Agreement (FSA) with GE Renewables. The FSA will specify the tasks to be performed for all turbines and balance of plant operations and maintenance during the term of the agreement. The scope of the SMA will include such services as industry standard O&M management tasks, reporting, remote monitoring and resets, and maintaining logs and records.

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<sup>15</sup> Source: SEMARNAT, Official Letter No. 139.04.1-0001(17), January 2, 2017.

## 2.2. ENVIRONMENTAL CRITERIA

### 2.2.1. Compliance with Applicable Environmental Laws and Regulations

#### Applicable laws and regulations

According to the Environmental Impact Assessment (MIA) Resolutions issued by SEMARNAT in March 2013 for the wind farm, in June 2014 for the transmission line, and in April 2017 for the electrical substation, 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.
- Federal Standard NOM-041-SEMARNAT-2006, which establishes the maximum permissible levels of pollutants emitted by vehicles using gasoline as fuel.
- Federal Standard NOM-045-SEMARNAT-2006, which establishes the maximum permissible levels of exhaust fume opacity from vehicles that use diesel, as well as test procedures and the technical characteristics of measuring equipment.
- Federal Standard NOM-052-SEMARNAT-2005, which establishes the characteristics, identification procedures and classification of hazardous solid waste.
- 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.
- Federal Standard NOM-080-SEMARNAT-1994, which establishes the maximum permissible noise levels of exhaust systems of motor vehicles, motorcycles and three-wheel motor vehicles, as well as noise measuring methods.
- Federal Standard NOM-081-SEMARNAT-1994, which establishes the maximum levels of noise from stationary sources and noise measuring methods.
- Federal Standard NOM-044-SEMARNAT-2006, which establishes the maximum permissible levels of hydrocarbons, nitrogen oxides, carbon monoxide and particulate emissions and the opacity of fumes emitted by vehicles using diesel as fuel.
- Federal Standard NOM-054-SEMARNAT-1993, which establishes the procedures for determining the incompatibility of two or more types of solid waste deemed hazardous under NOM-052-SEMARNAT-2005.
- Federal Standard NOM-138-SEMARNAT/SS, which establishes maximum permissible limits for fossil fuels in soils and the specifications for their characterization and remediation.

**Environmental Studies and Compliance Activities**

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

- On July 06, 2012, a MIA for the construction of a wind farm and access roads in Mina, Nuevo Leon;
- On January 27, 2014, a MIA for the construction of a transmission line in Mina, Nuevo Leon;
- On August 16, 2016, a MIA for the construction of an electrical substation in Mina, Nuevo Leon.

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, as well as included the proposed mitigation measures to prevent or minimize any negative effect or impacts.

On March 19, 2013, SEMARNAT issued MIA Resolution No. SGPA/DGIRA/DG/01807, authorizing the construction of a 246-MW wind farm and related infrastructure, and on June 3, 2014, issued MIA Resolution No. 139.003.03.385/14 for the construction of the transmission line. The Sponsor obtained authorization from SEMARNAT for Project modifications related to the length of the transmission line on October 25, 2016, and to the wind farm layout and number of turbines on February 15, 2017.

On August 16, 2016, the Sponsor prepared and submitted a MIA for the electrical substation located at the interconnection point and on January 25, 2017 provided additional information requested by SEMARNAT. On April 10, 2017, SEMARNAT issued MIA Resolution No. 139.003.03.592/17 authorizing the construction of the electrical substation, and released a copy to Sponsor on April 25, 2017.

All three resolutions concluded that, although the Project would have some environmental impacts, they could be avoided or minimized by implementing the set of mitigation measures proposed by the Sponsor and SEMARNAT. Additional information about the mitigation measures and conditions included in the MIA Resolutions are described in Section 2.2.2.

**Pending Environmental Tasks and Authorizations**

The following documentation is in the process of being obtained:

- SEMARNAT forestry land use change authorization for the wind farm;
- SEMARNAT forestry land use change authorization for access road;
- SEMARNAT forestry land use change authorization for transmission line; and
- SEMARNAT forestry land use change authorization for electric substation

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 SGPA/DGIRA/DG01807 issued by SEMARNAT for the wind farm;
- SEMARNAT Authorization SGPA/DGIRA/DG01066 for modifications to wind farm;
- MIA Resolution 139.003.03.385/14 issued by SEMARNAT for the transmission line;
- SEMARNAT Authorization 139.003.03.1311/16 for modification of transmission line;
- MIA Resolution 139.003.03.592/17 issued by SEMARNAT for the electrical substation; and
- Archeological Clearance D-055/2014 issued by the Mexican National Institute of Anthropology and History (INAH).

### **2.2.2. Environmental Effects / Impacts**

There is a need for affordable and environmentally beneficial alternatives to conventional hydrocarbon-based energy sources. Renewable energy projects create an opportunity to generate electricity without the atmospheric emissions caused by fossil-fuel-based plants. Wind is a renewable energy source, which means that it can be used continuously without depleting natural resources. It is a clean form of renewable energy as no waste products or pollutants are created 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, wind energy production does not consume or pollute water. Wind 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<sub>2</sub>) and nitrogen oxides (NO<sub>x</sub>).

The Project will help reduce the demand for electricity generated by fossil fuel-based power plants, and since wind-based power generation implies zero fuel costs and emissions, it will displace related harmful emissions. The anticipated environmental outcomes from the installation of 250 MW of new renewable energy generation capacity (or approximately 890 GWh), are the displacement of approximately 428,787 metric tons/year of carbon dioxide (CO<sub>2</sub>), 1.78 metric tons/year of sulfur dioxide and 1,175 metric tons/year of nitrogen oxides.<sup>16</sup>

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<sup>16</sup> BECC calculation of CO<sub>2</sub>, SO<sub>2</sub> and NO<sub>x</sub> indicators, which reflect the potential emissions displaced as a result of reducing a proportionate amount of future demand on natural gas-based electricity through the use of wind energy generation equivalent to 890 GWh. Emission factors from a combined-cycle facility located near the Project site were used for these calculations.

Mitigation of Risks

Some environmental impacts are anticipated from the implementation of the Project. The Sponsor has proposed mitigation measures that are intended to reduce, mitigate and control the environmental effects resulting from Project activities. To ensure that mitigation measures are implemented properly and in a timely manner, the Sponsor developed an Environmental Monitoring Program and obtained SEMARNAT approval.<sup>17</sup> Below is a list of relevant mitigation measures included in the MIAs and their resolutions, which will be implemented during Project construction and/or operation.

- General
  - A technical-economic study will be developed by the Sponsor three months before construction start-up, to determine the amount of a performance bond and/or insurance to ensure compliance with all terms and conditions described in the MIA resolution.
  - A performance bond or insurance policy will be issued as a guaranty.
  - The programs and mitigation measures will be implemented by a specialized technician.
  
- Flora
  - Land clearing activities will be restricted to designated Project areas to prevent the removal of additional vegetation.
  - Native flora protected by law will be identified, rescued and relocated. The Sponsor will implement protection and relocation programs for slow growing species and those listed in Mexican Standard NOM-059-SEMARNAT-2010.
  - A Reforestation Program will be implemented by establishing groves of native plants to recover three times the area affected and create a buffer zone.
  
- Fauna
  - A monitoring program for birds, bats and the Monarch butterfly will be implemented before and after construction to analyze flight patterns and the potential for collisions. If necessary, additional mitigation measures will be applied.
  - Activities to identify, rescue and relocate wildlife will be carried out.
  
- Noise
  - The Sponsor will monitor noise levels in accordance Mexican Standard NOM-081-SEMARNAT-1994.
  - The maximum noise level of the wind turbines will not exceed the limits established in Mexican Standard NOM-081-SEMARNAT-1994.

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<sup>17</sup> Source: SEMARNAT, Official Letter SGP/DGIRA/DG/06010 dated August 16, 2016, regarding compliance with resolution conditions.

- To minimize noise, all vehicles and machinery will be properly maintained and receive regular tune-ups.
- Air quality
  - Construction materials and waste transported by heavy vehicles will be covered.
  - Access roads will be watered to reduce dust.
- Water resources
  - A drainage system will be implemented to prevent flooding.
  - Septic tanks will be used to dispose of wastewater.
- Soil and Solid Waste
  - Oils, fuels, and other pollutants will not be placed directly on the ground during any stage of Project development or operation.
  - 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.
  - Solid waste will be handled in accordance with the General Law for Comprehensive Waste Management and Prevention and its regulations.

#### Natural Resource Conservation

The Project will support natural resource conservation by reducing the demand on fossil fuels for energy production and associated improvements to air quality. The Project is anticipated to produce approximately 890 GWh of zero-carbon electricity in the first year of operation, equivalent to the annual energy consumption of approximately 117,000 households.<sup>18</sup>

In addition, clean technologies such as wind energy require no water for electricity production, whereas fossil-fuel-fired generation is typically water intensive. Water to be used during the construction 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 wind sources. Additionally, the Project will help meet the goals related to emissions reduction, while satisfying increased demand for electricity. Should the Project not be implemented, the mix of renewables in Mexico’s energy portfolio will be delayed.

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<sup>18</sup> Estimation based on 2,055.59 kilowatt-hours (kWh) of electricity consumption per capita in 2015 from Mexico’s Energy Information System (<http://sie.energia.gob.mx/>) and 3.7 persons per household in the state of Nuevo Leon as indicated by INEGI.

### **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 Mina in the state of Nuevo Leon. The Project is expected to generate temporary jobs during construction and 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 would 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 structures normally used in the renewable energy industry. The source of payment will be: (i) the revenue generated by the Project from the sale of electricity, clean energy certificates (CELs) and generation capacity (*Potencia*) to CFE Suministrador de Servicios Básicos, a wholly owned subsidiary of CFE, established by the PPA that was awarded to the Project Company following the CENANCE bidding process. And (ii) revenues generated from the sales to the wholesale spot market. NADB will have no recourse beyond the Project Company.

The revenue from the sale of electricity, clean energy certificates (CELs) and generation capacity generated by the Project, as well as sales to the wholesale spot market 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 initial analysis verified that Parque Eólico El Mezquite, S.A.P.I. de C.V. has the legal authority to contract financing and pledge its revenue for the payment of financial obligations. Moreover, it has the legal and financial capacity to operate and maintain the Project given the experience of its development team. Moreover, Parque Eólico El Mezquite, S.A.P.I. de C.V. will outsource the O&M services to 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 loan for up to \$100 million dollars to Parque Eólico El Mezquite, S.A.P.I. de C.V. for the construction of the Project.

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### **3. PUBLIC ACCESS TO INFORMATION**

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#### **3.1. PUBLIC CONSULTATION**

BECC released the draft project certification and financing proposal for a 30-day public comment period beginning December 16, 2016. The following documentation was made available upon request:

- Environmental Impact Assessment (MIA) for the El Mezquite Wind Farm, July 6, 2012;
- MIA Resolution SGPA/DGIRA/DG01807 issued by SEMARNAT for the wind farm;
- SEMARNAT Authorization SGPA/DGIRA/DG01066 for modifications to the wind farm;
- MIA Resolution 139.003.03.385/14 issued by SEMARNAT for the transmission line;
- SEMARNAT Authorization 139.003.03.1311/16 for modifications to transmission line; and
- Archeological clearance D-055/2014 from INAH.

The public comment period ended on January 17, 2017, with no comments received.

#### **3.2. OUTREACH ACTIVITIES**

As part of the environmental authorization processes for the Project, on July 12, 2012, SEMARNAT published the request for environmental authorization of the wind farm in its weekly publication (*Gaceta Ecológica*), which provides information about the projects under evaluation. On January 30, 2014 and August 18, 2016, SEMARNAT published in its weekly publication the request for environmental authorization of the transmission lines and electrical substation, respectively. According to the rulings, no public comments were received regarding the wind farm or the transmission line, and there were no requests for public consultations.

Additionally, on July 12, 2012, the Sponsor published an extract of the MIA for the wind farm under review by SEMARNAT in the newspaper, *El Porvenir* in Monterrey, Nuevo Leon. The Sponsor also published extracts of the MIAs under review by SEMARNAT in the newspaper A.B.C. in Monterrey: for the transmission line on January 27, 2014, and for the electrical substation on August 22, 2016.

### **Social Impact Evaluation**

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.

The Sponsor confirmed through an official letter from the Social Impact and Land Occupancy Department of SENER that the Project did not require a SIA because its generation permit had already been issued by CRE prior to enactment of the new law.<sup>19</sup> Nevertheless, as a good business practice, the Sponsor performed a SIA through a consulting firm. Based on the review, the social impacts are minor, site-specific, and mainly related to the construction phase, such as the generation of solid waste and wastewater and occupational risks. They are largely reversible through mitigation measures and proper management. No forced land sales or involuntary resettlements were identified. Nor were any indigenous communities or groups identified near the Project site. The assessment also recommends ongoing and reinforced communication with both the authorities and the community of Mina as Project implementation moves forward.

### **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 *El Economista America*, *Economía Terra* and *El Economista*. These articles can be found at the following links:

- *El Economista América* (October 7, 2016) – “*Cubico, de energía limpia, gana proyectos por 700 mdd en México*” (Cubico awarded US\$700 million in clean energy projects in Mexico) <http://www.eleconomistaamerica.com/empresas-eAm-mexico/noticias/7878297/10/16/Cubico-de-energia-limpia-gana-proyectos-por-700-mdd-en-Mexico.html>
- *Economía Terra* (February 3, 2015) – “*(Eólica) desarrollará Sowitec parque en Mina, Nuevo León*” (Wind) Sowitec to develop wind farm in Mina, Nuevo León)

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<sup>19</sup> Source: SENER, Official Letter No. 117.-DGISOS.165/2017, February 22, 2017.

<https://economia.terra.com.mx/eolica-desarrollara-sowitec-parque-en-mina-nuevo-leon,da053509da05b410VgnCLD200000b1bf46d0RCRD.html>

- *El Economista* (February 2, 2015) – “Luz verde a nuevo parque eólico en Nuevo León” (Green Light for new wind farm in Nuevo León)  
<http://eleconomista.com.mx/estados/2015/02/02/luz-verde-nuevo-parque-eolico-nuevo-leon>

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 followed all public consultation requirements in order to comply with applicable environmental clearance and permitting processes.