

**Environmental and Labor Issues:**

This is a category B project according to the IIC's Environmental and Social Sustainability Policy because it could produce certain effects that may be avoided or mitigated by following generally recognized performance standards, guidelines, or design criteria. The main environmental and social considerations related to the project involve efficient resource use and pollution prevention, labor and working conditions, community health and safety, and cultural heritage. The project consists of two wind farms: Carapé I (Fingano S.A.) and Carapé II (Vengano S.A.). The environmental impact study for Carapé I was conducted by CSI Ingenieros and submitted to Uruguay's Ministry of Housing, Land Use, and the Environment (MVOTMA) in August 2011, whereas the environmental impact study for Carapé II was conducted by Estudio Ingeniería Ambiental and submitted to MVOTMA in January 2013. Since the two wind farms are adjacent to one another and their environmental characteristics are similar, for the purposes of this review they will be considered as one (Carapé).

**Topography and Environment:** The Carapé wind farm is located in the Sierra de Carapé mountains of Maldonado Department. The landscape is characterized by mountains and rocky ravines with moderate and steep slopes, interspersed with natural grasslands containing numerous rocky outcroppings, as well as native forests, and scrub. Located in an entirely rural area with moderate-to-low soil fertility, the land is used primarily for raising livestock—especially cattle—and, to a lesser degree, for eucalyptus farms and olive plantations. Some ranches in the area offer rural tourism services, although none of these are located in the vicinity of the wind farm. Population density in the project area is low, and the predominant activity is ranching. The wind farm is located near Route 39, some 20 km from the town of Aiguá, with an estimated population of 2,500.

**Impact on Wildlife:** The area has abundant wildlife, including mammal, bird, and reptile species. The project poses a potential risk to bird and bat populations. The wind farm's impact on terrestrial wildlife—the presence of humans and use of machines—will be temporary, reversible, and limited to the construction phase.

Of the roughly 270 bird species that could potentially be found at the site of the wind farm, 59 were identified during the field visits. Of these, two species are at risk according to the classification system of the International Union for Conservation of Nature (IUCN): the ñandú (*Rhea americana*), classified as "near threatened"; and the viudita blanca (*Xolmis dominicanus*), listed as "vulnerable." Furthermore, the black vulture (*Coragyps atratus*) and the seriema (*Cariama cristata*) have been identified as priority species by Uruguay's national system for protected areas (Sistema Nacional de Áreas Protegidas - SNAP), as the population of the former in Uruguay has declined and the latter, while not endangered, is taxonomically unique. Inasmuch as the ñandú and seriema are terrestrial species, the main project-related impact would involve a change in or loss of habitat.

Eleven species of bat could potentially live in the wind farm's area of influence. None is considered threatened at the national level and they are all classified in the "least concern" category of the IUCN classification system.

The main risks to birds and bats involve collisions with wind turbine rotor blades and the effects of the wind wakes they generate. Gliding species, such as birds of prey, are most exposed to these risks, as are birds that travel in large flocks, including doves. Other significant risks include habitat change or loss, noise disturbance owing to the presence of humans and vehicles, and the barrier effect on migration routes. Nevertheless, no migration routes have been detected in the wind farm's area of influence. The environmental impact studies recommend continuous monitoring to assess the impact of the wind farm during the construction and operational phases, with a view to developing measures to mitigate any potential impact.

**Impact on Flora:** Six different environments have been identified by type of vegetation: (i) grassland and savannah; (ii) mountain forest and scrubland; (iii) riverine forest; (iv) ravine forest; (v) palm grove; and (vi) eucalyptus grove. The only environment not found in the wind farm's area of influence is palm grove. This is the only type of environment protected by law, as its regeneration is difficult. No impact on flora is foreseen for the other type of environment.

**Air Emissions:** Overall, the project will have a positive impact on air emissions, as it will generate electricity from a renewable source, offsetting greenhouse gas emissions by an estimated 259,000 tons of CO<sub>2</sub> equivalent annually.

Most air emissions will occur during the construction phase, originating from vehicles and machinery operated by the contractors. In addition to gas emissions from internal combustion engines, vehicular traffic and earthmoving work will generate fugitive dust emissions. In order to mitigate gas emissions, engine maintenance and technical inspections will be performed regularly in accordance with the manufacturer's specifications. To mitigate the impact of fugitive dust, vehicle operators will be required to drive slowly on unpaved surfaces; roads will be hosed down, as needed; earthmoving work will be kept to the necessary minimum and, insofar as possible, vehicles transporting building materials or rock, soil, and brush extracted in earthmoving operations will be covered with tarps.

**Noise, Shadow Projection, and Electromagnetic Interference:** Potential noise levels were modeled to take both the construction and operational phases into account, using dwellings located within 3 km of the wind turbines as points of reference. The reference noise parameters were based on the machinery that will be used during the construction phase, as well as data furnished by the manufacturer on the noise levels generated by the wind turbines during operation. Considering the 45 dB limit established by Uruguay's National Directorate for the Environment (Dirección Nacional de Medio Ambiente - DINAMA), a subagency of MVOTMA, the modeling values were found to be below this limit for all dwellings analyzed.

Shadow projection on nearby dwellings was also examined. To this end, international recommendations that set permissible daily and annual limits for shadow projection were used as a reference point. The results of this study found shadow projection on nearby dwellings to be insignificant.

With respect to the generation of electromagnetic fields, Uruguay's electricity and power plant authority (Administración Nacional de Usinas y Transmisiones - UTE) adopted the reference parameters established by the International Commission on Non-ionizing Radiation Protection (ICNIRP). As regards the wind farm, the medium voltage (31 kV) cables linking wind turbines to the booster substation will constitute the most significant source of electromagnetic fields. However, because these cables will be buried, their impact will be insignificant.

**Solid and Liquid Waste:** Waste generated by the wind farm will be managed pursuant to the environmental management plan governing construction (EMP-C). Most solid and liquid waste associated with the project will be generated during the construction phase. Workers will have access to essential services (e.g., dressing rooms, restroom facilities, and break room), offices, a lab, materials depots, and a concrete manufacturing plant. Domestic wastewater will be removed by an outside firm. In addition, portable toilets will be provided for workers in areas outside the construction site. Insofar as possible, machine and vehicle maintenance will be performed at workshops or garages off site. If repairs must be performed on site, the EMP-C indicates the pertinent measures for handling oil, lubricants, rags, used spare parts, and other contaminated items. Each wind turbine requires approximately 550 m<sup>3</sup> of concrete. A designated area will be used for cleaning concrete mixer trucks; this area will be equipped with a containment pad to capture

wastewater for subsequent treatment, including the separation of solids and hydrocarbons.

Any non-hazardous industrial waste generated during the installation process (e.g., plastic, wood, iron, cardboard, wire, and metal) will be temporarily stored before it is sent to recycling centers or final disposal sites licensed by the Maldonado municipal government. Waste contaminated with hydrocarbons (e.g., containers, filters, rags, and soil) will be stored separately and removed by a licensed firm for treatment and final disposal.

The EMP-C contains contingency measures to be followed in the event of spills of oil or other pollutants. Containment, remediation, and ex-post evaluation measures are included.

**Cultural and Archaeological Heritage:** There are no declared heritage sites on the land slated for the wind farm. While the farm does contain some stone walls and corrals that are typical of the region, these have not been systematically studied and their origins and history are unknown. To avoid disturbing these sites, the projected location of some wind turbines has been changed, and any sites that could potentially be affected will be marked during the construction and installation phase.

**Occupational Health and Safety:** Inasmuch as the wind farm is monitored remotely, no workers are required on site for its day-to-day operation. Nevertheless, the operator must comply with the safety procedures established by the wind turbine manufacturer.

The EMP-C contains a contingency plan for fires, spills, and accidents both on and off site. The contingency plan will need to be modified for the operational phase.

**Labor and Social Issues:** Fingano S.A. and Vengano S.A. comply with Uruguayan labor laws and International Labor Organization (ILO) standards. Core labor standards include social security contributions, freedom of association to form labor unions, nondiscrimination in the workplace, and the prohibition of child labor. In accordance with Uruguayan law, workers and their dependents receive medical coverage through the National Health Fund (FONASA), as well as insurance against workplace accidents and occupational illnesses.

With a view to implementing the project, Carapé encouraged community participation through a series of surveys of the area's inhabitants and meetings with municipal government authorities and local economic stakeholders. This process provided information on the population's main concerns as to the potential social, economic, environmental, and cultural impacts of the project. Although there are concerns over how project-related changes to the landscape might impact tourism, there has also been widespread support for the project.

**Monitoring and Reporting:** Carapé will implement an environmental and social action plan (ESAP) to ensure compliance with the IIC's environmental and occupational health and safety requirements. Activities under the ESAP will include the implementation of a contingency plan and an environmental monitoring plan. The company will submit annual progress reports to the IIC on the implementation of the ESAP.