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Overview of Planned Huascachaca Mines Wind Turbine Project

Developer: Corporación para la Investigación Energética (CIE)

Main Web Site: <http://www.energia.org.ec>

Huascachaca Project Overview: http://www.energia.org.ec/default.asp?tema=eol_proyect1

Photo Gallery: http://www.energia.org.ec/default.asp?tema=fotos_eolico

A translation button is located at the top of most current browser windows.

Located 84 km southeast of the city of Cuenca, in the canton of Santa Isabel and Saraguro, the area known as Huascachaca Mines has an adequate area and proven wind resources for a project with a generating capacity of 30 to 50 MW using 1.5 MW turbines. The yearly average wind speed at 40 meters is 5.99 m/s.

Latitude: 3° 21' 24.9" South Longitude: 79° 23' 6.7" West Elevation: 1100 meters

Data Acquisition and Summary

On the basis of three years of wind monitoring and prefeasibility studies, beginning in 2005 and using two towers of 26 meters and one of 40 meters, CIE added two 50-meter towers in December 2008 equipped with state-of-the-art sensors and measuring devices. At the same time, the equipment on the existing towers was upgraded to verify earlier results at 26 and 40 meters and to provide a more complete map of the energy resources at the site. In addition to wind speed, barometric pressure, temperature and humidity also were measured.

Annual Mean Wind Speed	5.99 m/s
Average Barometric Pressure	88.6 kPa
Average Annual Temperature	21.9 °C
Average Relative Humidity	58 %

Based on these measurements, CIE is in the process of selecting the locations for the wind turbines and is proceeding with studies in regard to geological and soil conditions, environmental impacts, routes for access roads, electrical connections among the wind turbines, and the integration of the wind farm to the National Interconnected System and sub-transmission system of the South Central Utility.

Monitoring Tower Distribution: Tower #1, at Uchucay, is 40-m and has anemometers at 20, 30 and 40-m. Tower #2, in the same sector, is 50-m, with pairs of anemometers at 30, 40 and 50-m

(5 total). Tower #3, at Yulug, is 50-m and also has pairs of anemometers at 30, 40 and 50-m (6 total). Tower #4 [Polygon 26m] has anemometers at 15 and 26-m. Tower #5, also at Yulug, is 26-m with anemometers at 15 and 26-m.

Data Processing: Information from all the sensors is logged at 10-minute intervals, stored on memory cards within the loggers and transmitted daily via email using cellular networks. The data are downloaded into computers and processed using Garrad Hassan WindFarmer™ and WAsP™ software to calculate the energy distribution, terrain roughness and micro-siting over the topography map (scale 1:5000). The software uses wind data, specs from various types of turbines, and a variety of power curves to determine the monthly energy production and the optimal turbine layout.

Additional calculations, to be performed during January 2010, will be corrected using restrictions such as roads and bridges, trucks and cranes available, transmission line capacities, and other site-specific parameters. Final engineering and financial studies are expected to be completed by the end of 2010 when all factors are known in regard to sizes and weights of turbines and towers, shipping and transportation logistics, acquisition of cranes and trucks, site preparation, and other factors. For that reason, a complete range of services will be requested from potential turbine manufacturers.

Project Development and Financing

The project will be developed and financed by ELECAUSTRO S.A., a governmental power generation company that already owns several hydro and thermal power plants in southern Ecuador. The agreement includes a priority dispatch provision and power purchase agreement, since the national distribution system will pay for the power as it is introduced into the grid. A high voltage connection point (138kV) is available in close proximity to the site.

The price will be regulated and will be approximately [US] \$0.09 per kWh.