

ELECTRIC CORPORATION OF ECUADOR




Ducal-Membrillo
Wind
Project
Villonaco II



Futuro Energético



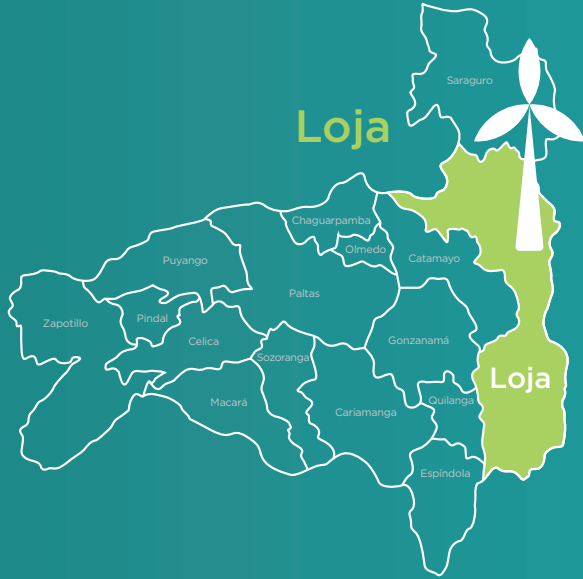
LOCATION

Ducal- Membrillo Wind Project



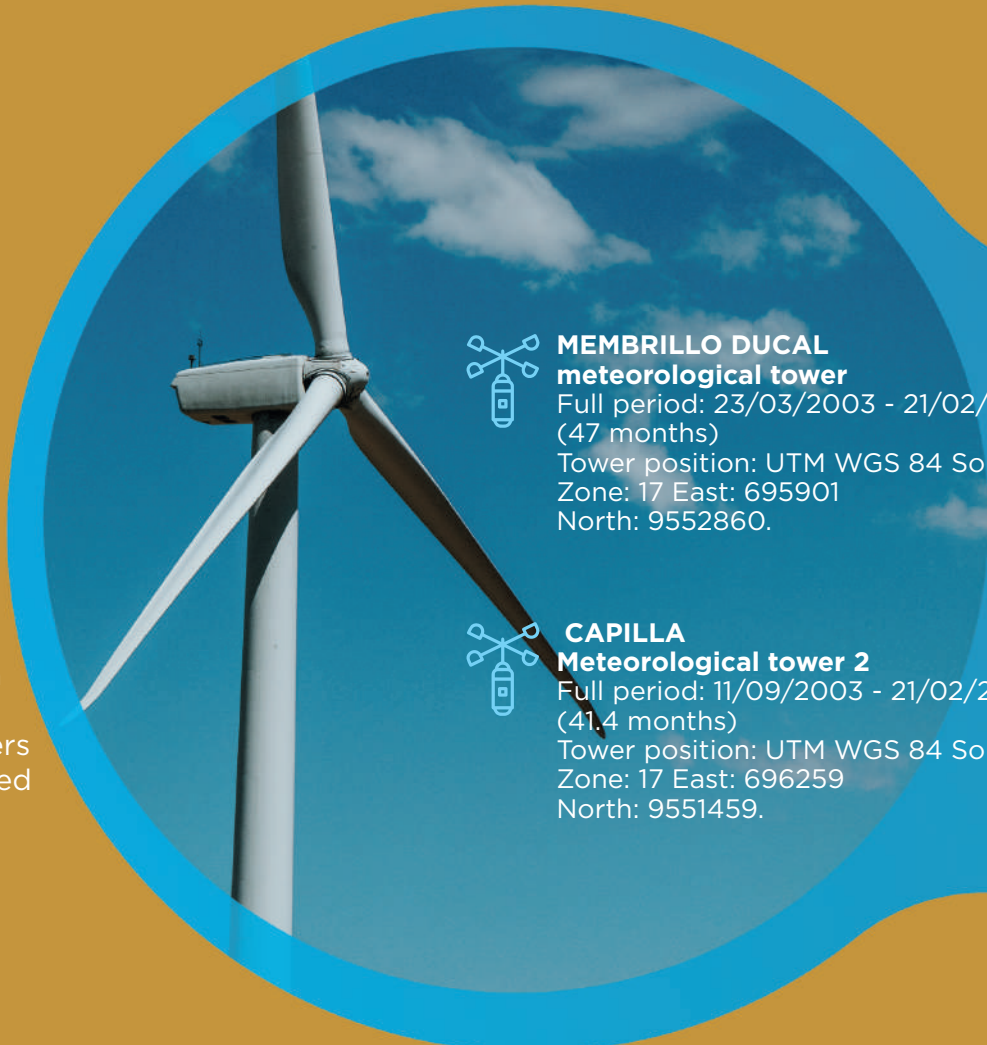
The project is located in the city of Loja, province of Loja, on the Ducal and Membrillo hills of the western Andes Mountain range, which borders the city Loja, with an NNW-SSE orientation, an approximate length of 6.3 km and an average height of 2700 m.a.s.l.





It is planned to install 29 aerogenerators of 1.5 to 2 MW: with a total installed power of 42 48 MW. Each aerogenerador will have a 0.69/20 kV transformation center, and will be interconnected through a 20 kV underground circuit.

Wind resource measurements are available from 2003 to 2011. Several campaigns have been carried out to measure the wind resource at heights ranging from 20 to 70 m. An average annual speed of 10 m/s and a predominant ESE direction is estimated at a height of 70 m. The meteorological towers of the project are detailed below.

**MEMBRILLO DUCAL
meteorological tower**

Full period: 23/03/2003 - 21/02/2007
(47 months)
Tower position: UTM WGS 84 South
Zone: 17 East: 695901
North: 9552860.

**CAPILLA
Meteorological tower 2**

Full period: 11/09/2003 - 21/02/2007
(41.4 months)
Tower position: UTM WGS 84 South
Zone: 17 East: 696259
North: 9551459.

**MEMBRILLO
Meteorological tower 3**

Full period: 08/07/2004 - 24/10/2006
(27.5 months)
Tower position: UTM WGS 84 South
Zone: 17 East: 696080
North: 9552777.

**DUCAL
Meteorological tower 4**

Full period: 24/09/2008 - 30/11/2011
(38.2 months)
Tower position: UTM WGS 84 South
Zone: 17 East: 695675
North: 9552913.

Alternative 1

Evacuation of the generated energy will be carried out by a 230 kV transmission line with an approximate length of 20 km, which will depart from the project's elevation substation, located in Cerro Ducal, this will increase the voltage from 34,5 kV to 230 kV, until it reaches the Matala photovoltaic project, in order to reach La Avanzada (140 km) from here and by means of a simple circuit line, it must be taken into account that this project must share the energy evacuation line with the Matala plant. With this, the line would be: central Membrillo-central Matala-Catacocha (reference point)-La Avanzada.

Alternative 2

Another alternative would be to evacuate energy from the project through a 230 kV line that starts from the Matala power plant substation to the Membrillo Ducal power plant (20 km) and then to S/E Cumbaratza through a 60 km simple line. Total 80 km from Matala to Cumbaratza.

The connection alternatives must be evaluated in subsequent studies and observe the expansion plan of the National Transmission System





Through Resolution No. MAATE-SCA-2022-0021-R of June 27, 2022, the Ministry of the Environment, Water and Ecological Transition grants CELEC EP, the Environmental License for the “Villonaco 2 Wind Project - Ducal Membrillo Site”, located in the province of Loja, cantons of Loja and Catamayo, El Tambo and Loja parishes, with SUIA Code: MAAE-RA-2020-366427.





	Level of study	Basic feasibility		
	Existing studies	• Basic feasibility study (2012) must be updated		
	Power (MW)	80.5	Energy (GWh/year)	315
	Estimated plant factor (%) and performance	45%	Date of approval of design/studies	Update
	Estimated construction time	24 months		
	Estimated construction budget	120 (MM USD)		





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