ELECTRIC CORPORATION OF ECUADOR

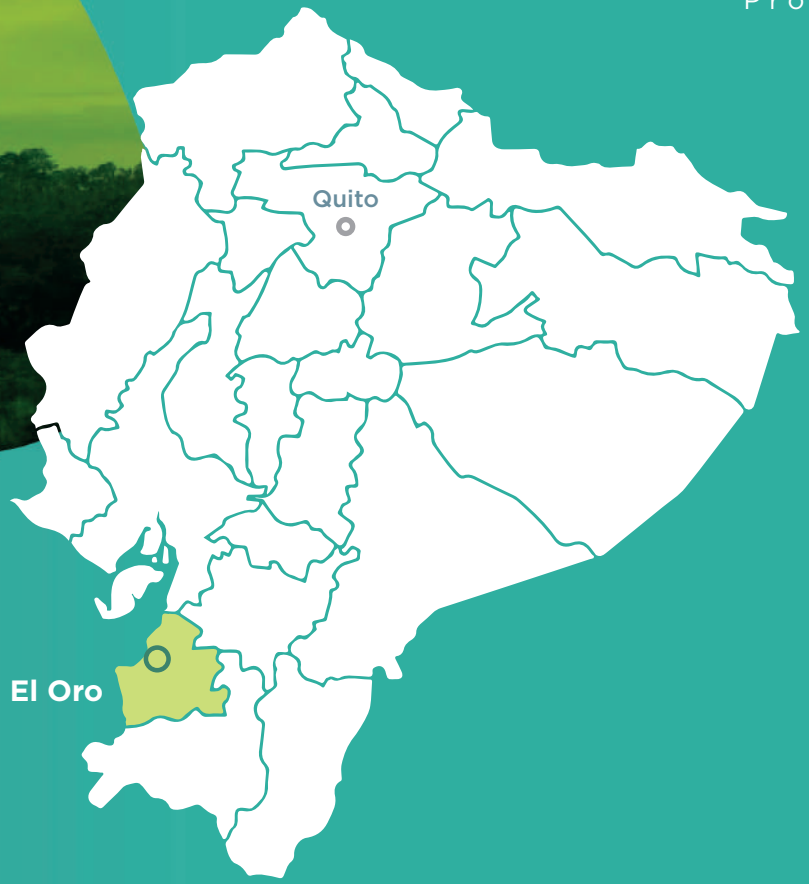
La Union Hydroelectric Project

Futuro Energético

CELEC EP
Corporación Eléctrica del Ecuador

LOCATION

La Union hydroelectric project is located in southern Ecuador. Following the main roads, it´s approximately 500 km from the country´s capital. It´s located on the northeastern limit of the province of El Oro and approximately 29 km from the city of Machala.



Along the route, the proposed works of the La Union project cross the parishes of Uzhcurrumi and Casacay, in the Pasaje canton, and the parish of Chilla, of the canton of the same name.

The project is located in the middle and middle-lower basin of the Jubones River and follows a parallel trajectory to it along its left bank. Geographically, the project is framed between the coordinates 9´930 956 mN to 9´635 437 mN and 668 870 mE to 643 594 mE.

Interconnection

At the La Union power plant there will be a 13.8/230 kV elevation substation, from which a 10 km 230 kV single-circuit transmission line will run to the Pasaje substation.

Conduction or low-pressure tunnel

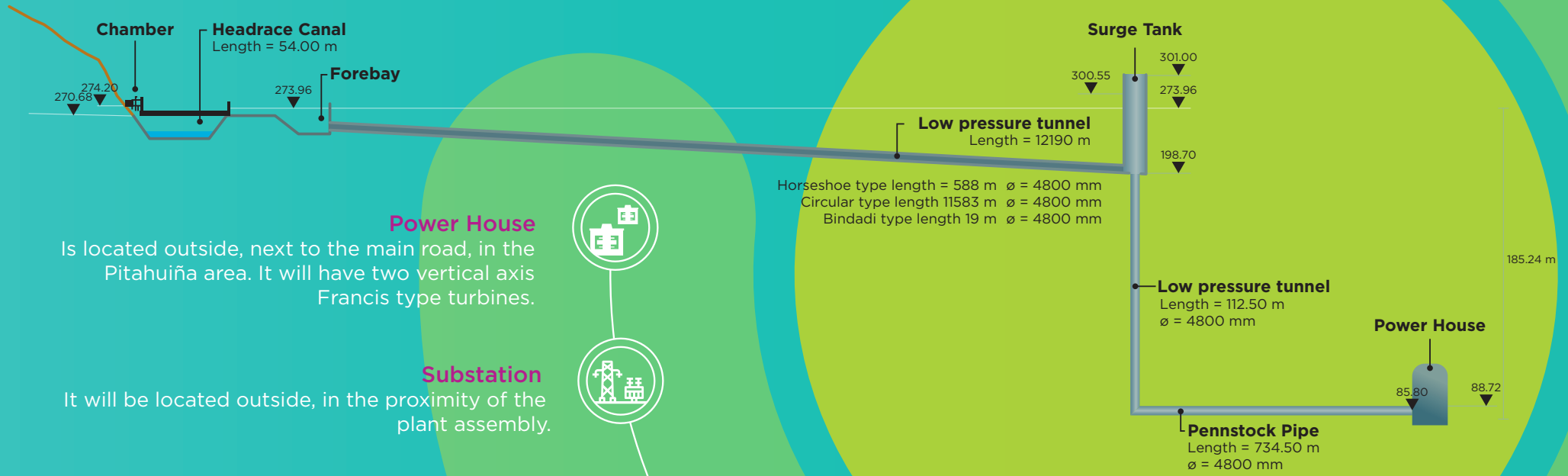
It developes along the right bank of the Jubones River and is 12.2 km long, it is designed for a flow rate of 65.0 m^3/s, which corresponds to the same flow rate used in the Minas San Francisco power plant.

Surge tank

A vertical, surge tank, of circular horizontal cross section, with a total height of 99.0 m, to the profile of the natural terrain in the Pitahuiña area.

Penstock

It will be built underground, with a 4.8 m internal diameter and a total length of 888 m including the bifurcator. The longitudinal profile of the of the penstock is developed in two sections: (i) a vertical well, of 112.50 m of difference in level and (ii) a horizontal section of 734.50 m long plus 41 m for the bifurcator.



Power House

Is located outside, next to the main road, in the Pitahuiña area. It will have two vertical axis Francis type turbines.

Substation

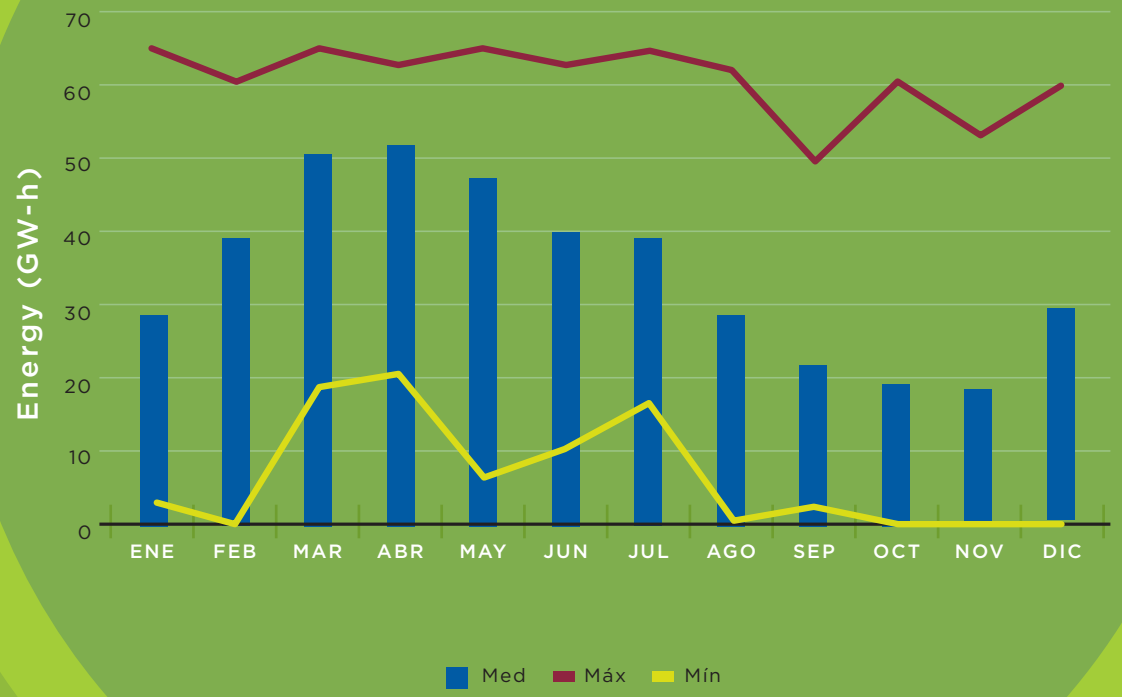
It will be located outside, in the proximity of the plant assembly.

Discharge

The discharge consists of a channel divided into two rectangular sections by a basin that separates the flow discharged by the two units.

Global scheme of the development of use, where it is possible to distinguish the different components of the project.

Average monthly production
La Union project



Annual and monthly hydropower production

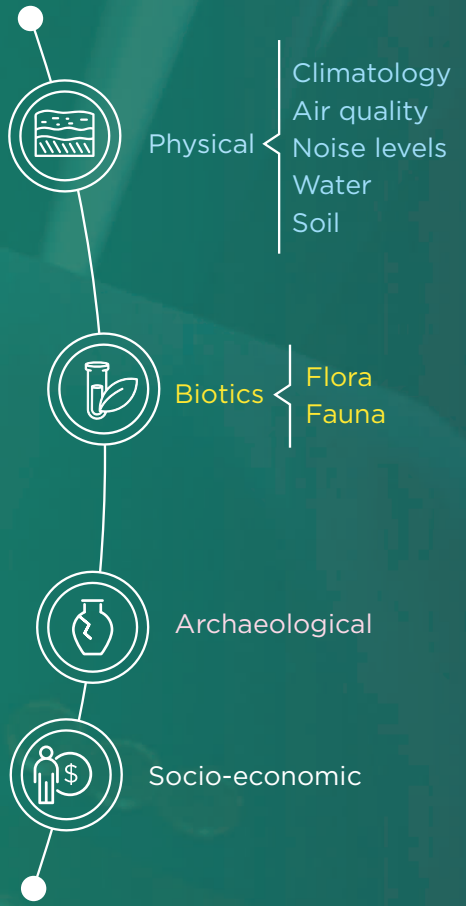
The maximum and minimum power generated by the plant is 94.0 and 21.3 MW, with an associated maximum daily energy production of 2.19 GWh, the installed power of the project is 92.2 MW. The plant factor is 0.51 with an average annual energy production of 412.3 GWh; the guarantee that the plant operates with the design flow is 26%.

The months with the highest energy production are March, April and May with rates fluctuating between 45 and 55 GWh/month, a situation that denotes the hydrological complementarity with the projects in the Paute river basin.

Level of study	Definitive design			
Existing studies	• Topography • Hydrology • Geology • Environmental study • Mechanical equipment • Electrical equipment • Hydropower production study			
Power (MW)	92,2	Energy (GWh/year)	412	
Estimated plant factor (%) and design flow	51% - 65 m^3/s	Study completion date	Year 2011	
Estimated construction time	60 months			
Estimated construction budget	274 (MM USD)	Civil works 167 MM USD Electromechanical works 75 MM USD Environmental mitigation 5 MM USD Transmission 15 MM USD + 5%* *(Percentage for engineering, administration and contingencies).		

The Definitive Environmental Impact Study EIAD – of the La Union Hydroelectric Project was carried out based on the Environmental Regulations in force and the Procedures Manual for the Environmental Evaluation of Electric Projects and Activities of CONELEC.

The areas of direct and indirect influence for construction and operation were determined.




Futuro Energético
CELEC EP
Corporación Eléctrica del Ecuador