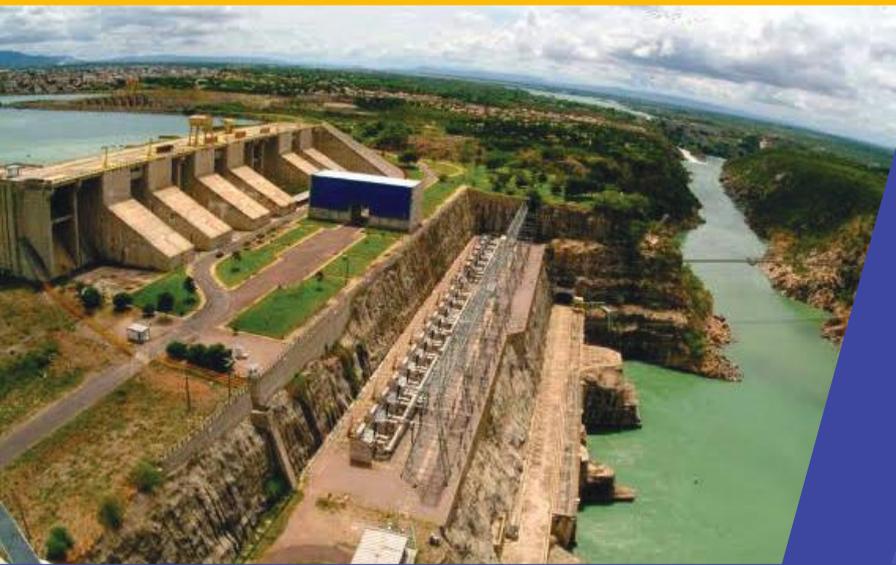


# Project Dossier



PROJECT DOSSIER

## PAULO AFONSO IV HYDROELECTRIC PLANT

### PROJECT OVERVIEW

The Paulo Afonso IV Hydroelectric Plant, also known as PA IV, is the largest plant in the Paulo Afonso Hydroelectric Complex, producing 2,462.4 MW of energy, generated from the power of the waters of the Cachoeira de Paulo Afonso, located in São Francisco River. It went into operation in 1979. The HEP is operated by Companhia Hidro-Eletrica do Sao Francisco (CHESF).

<b>Project</b>	<b>Paulo Afonso IV Hydroelectric Plant</b>
<b>Location</b>	Brazil
<b>Owner</b>	CHESF
<b>Duration</b>	2021



Powerhouse



Borehole extensometer with node



Gateway



This plant receives water from the Moxotó reservoir through a diversion channel. The turbined water, together with the turbined water in Paulo Afonso I, II and III, goes through the canyon to the Xingó Plant.

The Paulo Afonso IV dam is made up of dams and dykes of mixed earth-rockfill section with a total length of 7,430 m and maximum height of 35 m; concrete structures with a total length of 1,053.50 m comprising of a spillway with eight crest/controlled gates, with a discharge capacity of 10,000 m<sup>3</sup>/s, water intake.

The Paulo Afonso IV power house is also underground and is 210 m long, 52 m high and 24 m wide. It contains six 410.4 MW generators for an installed capacity of 2,462.4 MW. Encardio-rite has provided instrumentation for power house monitoring.

## MONITORING SOLUTION

The monitoring instrumentation plays a key role in accessing the behaviour of any megastructure like dam during construction as well as for long-term during its operation.

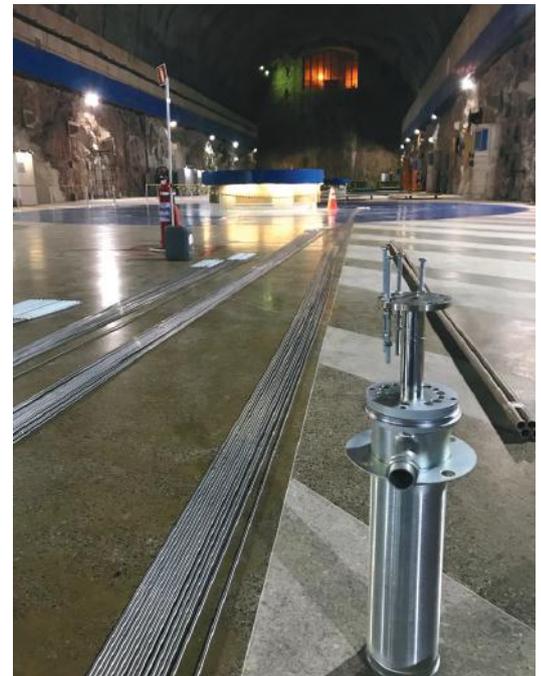
Encardio-rite supplied monitoring instruments for the project through its Brazilian associate COMMETRO. The advanced instrumentation included wireless borehole extensometers with RF communication network that were installed in the power house. Around sixteen sets of four-point extensometers have been supplied till now with nodes and gateway. The borehole extensometers comprised of vibrating wire displacement sensors, data from which was collected by wireless nodes. The nodes are interfaced with long range, low power wireless network to send the recorded data to Gateway with utmost reliability. Gateway uploads the collected sensor data to the central/cloud server via cellular communication network.

The long range radio frequency based wireless data collection network used in the project provided complete automation of monitoring with seamless connectivity. Our wireless system eliminated the need for running lengthy cables to long distances. This helps in evading a lot of hassle and prevents sensor data, which can be lost in case cable loose sensor tags, gets cut or are damaged.

The monitoring data allowed the stakeholders to continuously assess the safety of the dam, allowing them to take instant action, when and where required.



**Borehole extensometer installed with node in underground power house**



**Borehole extensometer installation in progress**



TUNNELS



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CONSTRUCTION



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