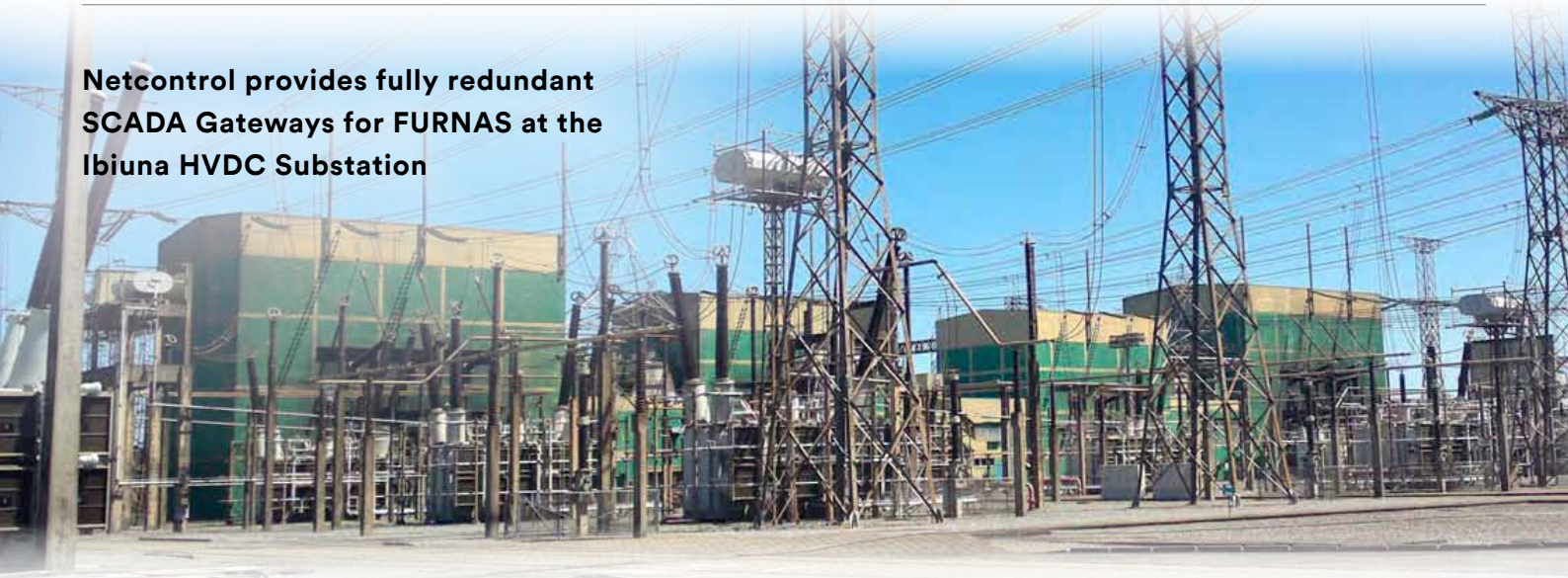


# CASE STUDY



## Ibiúna HVDC Substation

**Netcontrol provides fully redundant SCADA Gateways for FURNAS at the Ibiuna HVDC Substation**



### BACKGROUND

The Ibiúna HVDC converter site, was for a number of years the largest HV substation ever built and is still considered the most important station of its kind in the world. It connects the city of São Paulo to the Itaipu Dam hydroelectric power plant. The Dam is still the world's largest hydroelectric project in terms of annual energy production, with an annual generation output of approximately 100 TWh.

The Dam is a binational operation between Brazil and Paraguay, with the 20 generators being split equally between the two countries. This installation alone accounts for 90% of the electricity consumed by Paraguay and 20% of that consumed by Brazil.

10 Generators produce electricity at 50 Hz for Paraguay and the remaining 10 generators at 60 Hz for Brazil. There is sufficient spare capacity on the Paraguay generators that a large part of it is exported to Brazil. To facilitate this, a pair of HVDC overhead line was built between the Itaipu Dam and a HVDC converter station at Ibiuna in the state of São Paulo. Both these lines operate at +/-600 kV and are 807 km and 818 km long respectively and

are designed to carry 3150 MW or 2625 Amps per pole. The HVDC is converted at the Ibiuna station to both 345 kV and 500 kV at 60 Hz.

HVDC was chosen because of the frequency difference between the Paraguay and the Brazil electricity networks and to reduce transmission losses. A power line carrier communication network is in place between the two sides, utilising repeating stations en-route.

The HVDC equipment was installed by Asea of Sweden, now ABB in 1985.



***“The Netcontrol Substation Gateways have worked without fault and we are fully confident in the product.”***

Daniel Antunes, Furnas

**PROJECT**

Recently Furnas Centrais Electricas, the operator of the HVDC site at Ibiúna, near to the City of São Paulo, decided to upgrade their Supervisory and Control and Data Acquisition (SCADA) system to a more modern platform. Telvent was selected as the supplier for the Scada system and Netcontrol was selected as the supplier for the substation gateway between the Telvent system and the ABB RTU’s.

Netcontrol is a world class provider of Substation Gateway solutions and has vast experience in providing solutions to bridge the gap between multiple vendor systems on the Scada side and multiple vendors on the RTU and Protection side.

**SOLUTION**

A fully redundant solution was provided using the Netcontrol Gateway running their renowned NFE operating system. The gateways provided the vital link between the Asea RTU’s running ADLP80 and the Scada system running IEC60870-5-104. The Netcontrol Gateway also connected to a NTP GPS server in order to perform time synchronisation and time stamping.



As well as providing the redundant gateway system, Netcontrol also provided their low latency serial line splitters, the Netcon SLS and in order to connect to the Asea DS803 RTUs their NetconMPC (bit stream converters).

Upon recent visit to the site the Control Engineer confirmed the units have been running flawlessly and they had complete confidence in the Netcontrol Gateway products.

Netcontrol are specialised in providing substation gateway solutions and have over two decades of experience in integrating complex solutions for new and refurbished substations. With over 50 protocols available within the NFE operating system and experience of RTU’s, Protection Relays and Scada Systems from a huge pool of vendors we provide the much need interface and experience for the modern substation environment.

