



Static Synchronous Series Compensator in Torres de Segre 220 kV

- Customer: Red Eléctrica de España
- Project name: ESP-LIDER
- Location: Lleida (Spain)
- Status: Operating since 2014

Project

Ingeteam installed a SSSC (Static Synchronous Series Compensator) device in the 220 kV Torres de Segre substation in Lleida (Spain), with the aim of maximizing the use of the **existing electricity grid** to achieve the massive **integration of renewable energy**.

In the 220 kV line, **overloads** were detected when energy production (wind, hydraulic and combined cycles) in the area was very high.

Traditionally, these overloads were resolved by reducing hydraulic production or separating bars in the 220 kV substation to evacuate all of the generation directly towards the 400 kV level, using a 400 / 220 kV transformer.

SSSC contribution has given the client the following advantages:

- The construction of a new 220 kV line has been avoided, avoiding much greater execution times and environmental and social impacts
- A reduction in hydraulic production has been avoided
- Operating costs have been eradicated



Converter manufacturing process

Solution

SSSC device is based on the technology of **power electronics** and varies the line's impedance and, consequently, the power flow through it.

This makes it possible to avoid line overloads by diverting part of the power flow to other less loaded parallel routes **improving the efficiency** of existing infrastructures.

The aforementioned project was the **first installation in Europe**, and it has been operating **since 2014** without any incident.

INGETEAM EQUIPMENT SUPPLIED FOR THE INSTALLATION

2 x INGEGRID™ SE-C power converters for SSSC

- Total power: 47.8 MVAR
- Water-cooled
- 12.500 V
- Impedance: -4 Ω to 10 Ω (a 10 Ω impedance is equivalent to a length of 25 km in the line)

INGESYS™ IC3: control equipment (PLC)

Magnetic elements for grid coupling

Bypass switch and thyristor

Local SCADA: control equipment including INGESYS™ IT software and local SCADA

SERVICES PROVIDED

Electrical and electronic system specification

System container specification

Static and dynamic power flow simulation and modeling

Substation automation system configuration and integration with the client's SCADA

Comprehensive system tests in the Ingeteam Power Electronics laboratory

Commissioning

Applications

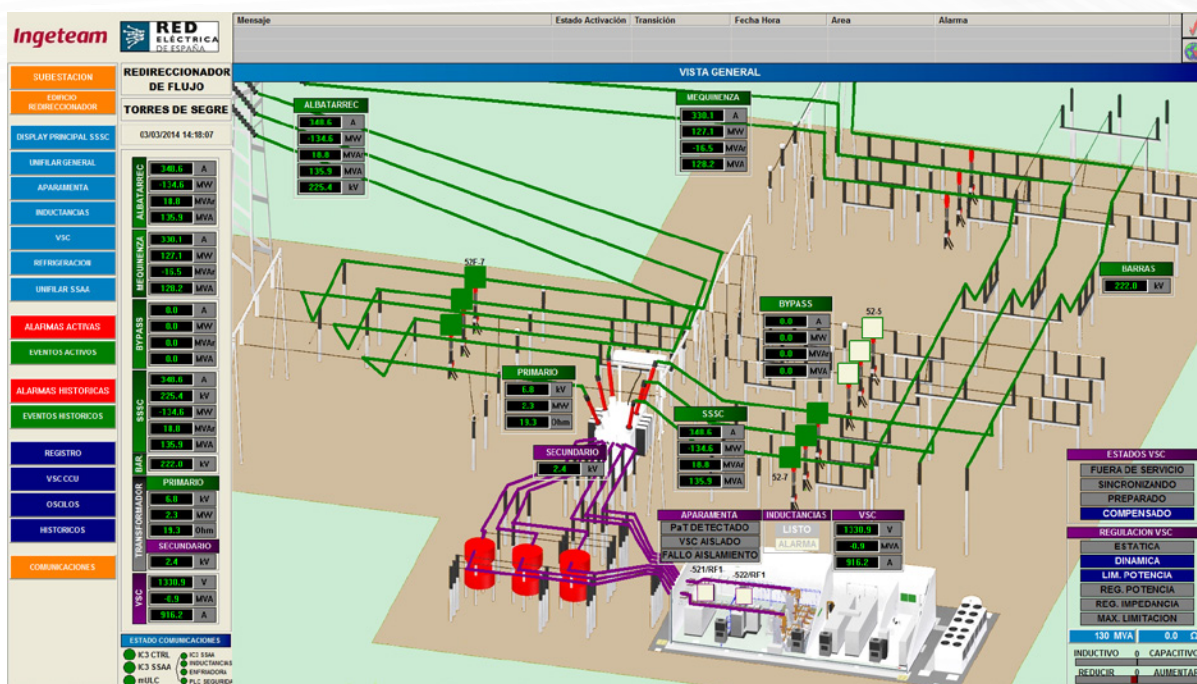
- Overloaded transmission lines congestion relief
- Real time control of transmission and distribution lines impedance



SSSC testing at Ingeteam's high voltage laboratory



Interior view



SCADA display

The technical data in this flyer are subject to change without prior notice. RL01IPT_PSC01_A/022024