This is an application for the Spanish energy transmission company Red Eléctrica de España in one of its 220kV lines.

INGEGRID-PFLOW 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 with of existing infrastructures.

This is the first application of its kind in Spain and one of the few in the world.

Applications:
- Overloaded transmission lines congestion relief.
- Real time control of transmission and Distribution lines impedance.

Power flow control in 220kV line
INGEGRID® Equipment Supplied for the Installation

- 2 x INGEGRID SE-C power converters for SSSC with a total power of 47.8 MVAr, water-cooled.
- 12.500V,-4Ω to 10 Ω impedance (10Ω impedance equivalent to a length of 25km in the line)
- INGESYS IC3: Control equipment (PLC)
- Magnetic elements for grid coupling.
- By-pass 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 modelling.
- Substation automation system configuration and integration with the client’s SCADA.
- Comprehensive system tests in the Ingeteam Power Electronics laboratory.
- Commissioning.

Other

In the 220 kV Torres del Segre line, overloads are detected when energy production (wind, hydraulic and combined cycles) in the area is very high. Currently, these overloads are resolved by the following:

1. Reducing hydraulic production
2. 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.

Ingeteam’s contribution has been to design, manufacture, test, assemble and commission the INGEGRID-PFLOW, giving the client the following advantages:

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