FRENCH HVDC LINKS IN SERVICE…

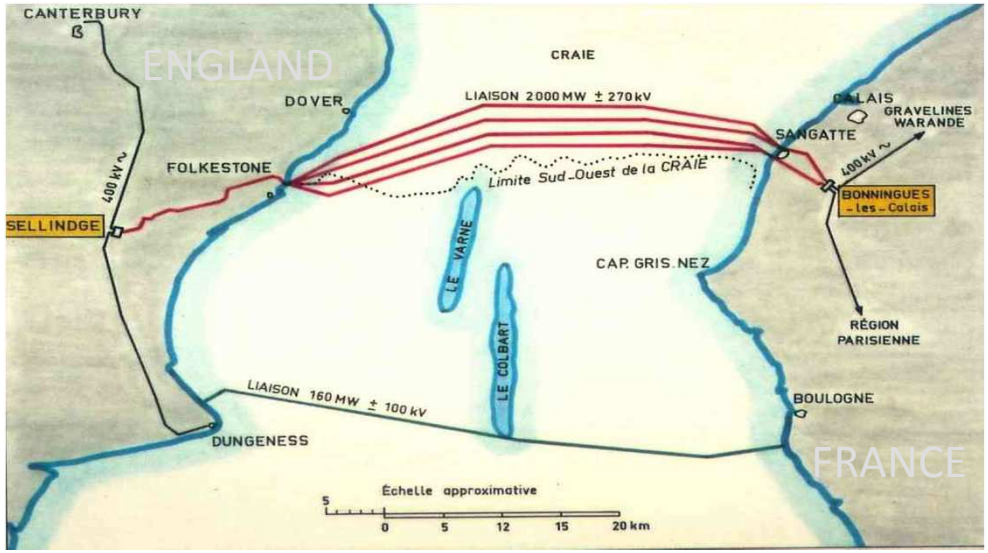
…AND TO COME

THE FRENCH 400kV GRID AND HVDC LINKS

- 400 kV substation
- 1 circuit line
- 2 circuits 400 kV per line or more with at least 1 circuit in 400 kV
- HVDC link in service
- Decided and ongoing HVDC link
- HVDC link under study

IFA 2000

France to England, **Underwater** HVDC link – In service



- Commissioning : 1986
- 2 000 MW : 2 bipole of 1 000 MW
  4 cables / bipole
- +/- 270 kV
- LCC converter station
- 73 km including 46 km of submarine route

- *Submarine cables* :
  Copper conductor, MI insulation
- *Underground cables* :
  Copper conductor, OF insulation
- Cable manufacturer : Nexans
- Maximal water depth : 55 m

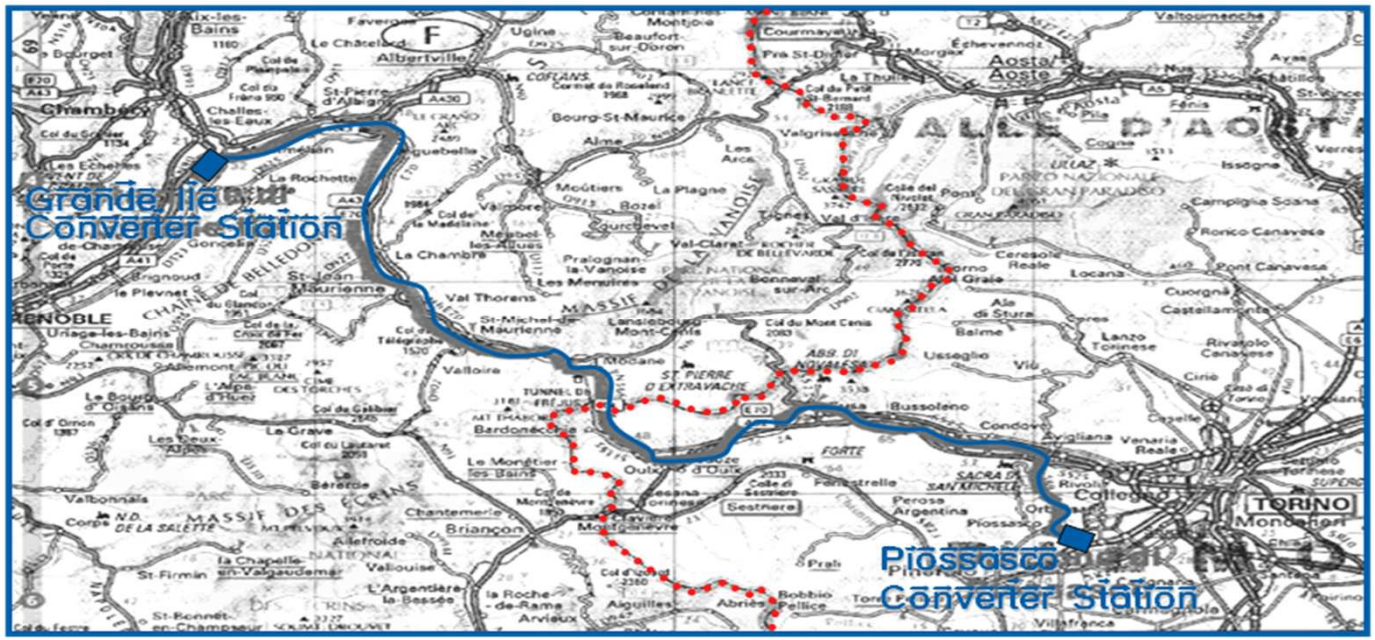
FRANCE - SPAIN

Underground HVDC link – Ongoing

- Expected commissioning : 2014
- 2 000 MW : 2 bipole of 1 000 MW
  2 cables / bipole
- +/- 320 kV
- VSC converter station
- 65 km including 40 km in France
- 2 500 mm² Copper conductor and XLPE insulated cables
- Cable manufacturer : Prysmian

PIEMONT - SAVOIE

France to Italie, **Underground** HVDC link – Ongoing



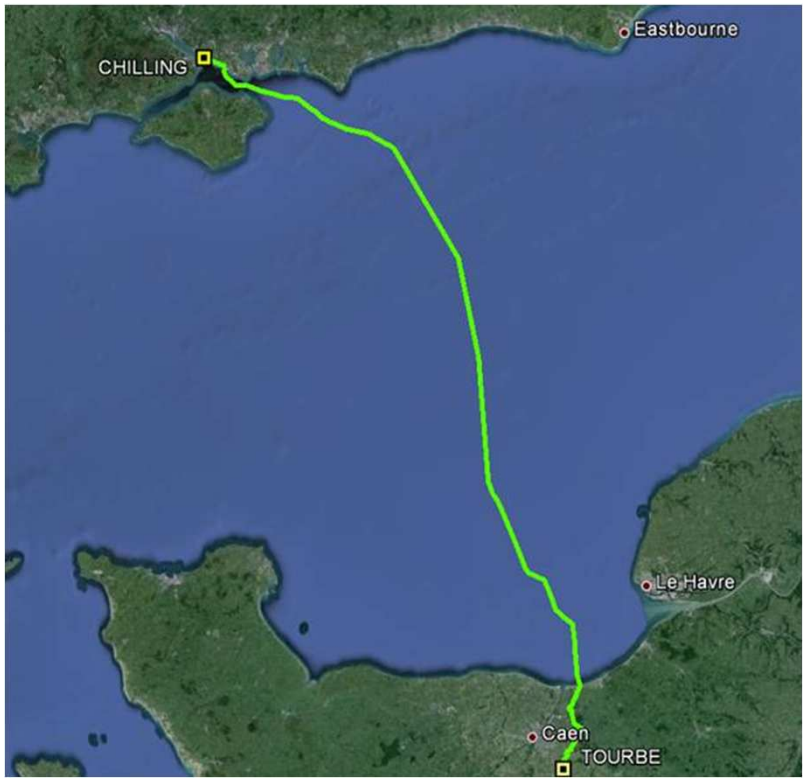
- Expected commissioning : 2019
- 1 200 MW : 2 bipole of 600 MW
  2 cables / bipole
- +/- 320 kV
- VSC converter station
- 190 km including 95 km in France
- Cables : Aluminum conductor, XLPE insulation

MIDI-PROVENCE

Midi region to Provence region, **Underwater** HVDC link – Ongoing

- Expected commissioning : 2020
- 1 000 MW : 1 bipole of 2 cables
- +/- 320 kV
- VSC converter station
- 190 km including 160 km of submarine route
- Maximal water depth : 100 m

France to England, **Underwater** HVDC link – Ongoing



- Expected commissioning : 2020
- 1 000 MW : 1 bipole of 2 cables
- +/- 320 kV
- VSC converter station
- 280 km including 220 km of submarine route
- Maximal water depth : 100 m