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Focus. "Italy - France": The invisible line that transmits energy

- **World's longest completely underground path**
- **€1.4 billion in total investment**
- **€150 million a year in cost savings for the Italian electricity system**
- **70 companies and 500 workers employed**
- **Terna 23rd foreign interconnection**
- **A strategic European project at the forefront of environmental sustainability**

The new electricity interconnection between France and Italy, once fully implemented, will increase the grid transmission capacity between the two countries from today's 2,650 MW to over 4,400 MW, i.e., by more than **60%.** As a result, the border with France will be Italy's **most important one when it comes to electricity**. Currently, Italy has four active electricity interconnection lines with France, the last of which, the Rondissone-Albertville, dates back to 1985.

The "Piedmont-Savoy" power line is a **unique project in global terms** for the engineering, technological and environmental solutions used: **consisting exclusively of DC land cable** (HVDC High Voltage Direct Current), it is an example of cutting-edge technological and engineering excellence. Its construction will fully complement existing roads and highways, including the Frejus safety tunnel, to minimize its impact on sites of environmental and archaeological importance, as well as completely avoiding urban areas.

The line is Terna's **23rd foreign electricity interconnection** and it is part of the Development Plan for the European electricity grid. The European Commission* recently identified 81 initiatives in the list of PCIs (Projects of Common Interest), among which the new "Piedmont-Savoy" line along with 10 other Terna projects. The strategic value of the project at the international level is also confirmed by the fact that both the feasibility studies and the design were co-funded by the European Commission with more than €1.3 million.

The type of path used for the new connection required a study on methods never used before for laying the cables, particularly for a total of about 14 km of viaducts along the Frejus A32 highway involved in the works for the laying of the cables, for which it was necessary to carry out complex studies to overcome the expansion joints of the viaducts. The cable technology identified for this connection features extruded XLPE insulation - one of the first applications for this level of voltage. Indeed, the latter is an unprecedented technical innovation in Italy, and has been used just a few times abroad.

Benefits

- Cost reduction for the Italian electricity system amounting to €150 million a year.
- Increased grid safety guaranteed thanks to the over 65% increase in trading capacity between the two countries.
- Up to 1,200 MW[1] transmission capacity across the Italian-French border.
- Fewer grid bottlenecks between European countries
- Significant impact on allied industries, since more than 70 Italian companies (civil engineering, electro-mechanical, and electrical/energy sectors) and more than 500 workers will be involved.

Technical/economic data

- Total investment of €1.4 billion, of which about €800 million for the Italian section and €600 million for the French section, plus an additional €60 million in investment that Terna has already spent on the

[1] In addition to the 1,200 MW supplied by the "Piedmont-Savoy" HVDC, there are another 600 MW resulting from works along the "Cornier (F) - Montagny (F) - Albertville (F) - LaPraz (F) - Villarodin (F) - Venaus (I) - Piossasco (I)" line, also considering the additional upgrades included in the Development Plan

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renovation of the Piossasco power station. On the Italian side, about half the amount will be covered by Terna, the rest by Transenergia.

- Total length of the project: 190 km, 95 km in Italy and 95 km in France. In Italy, the line will involve 25 municipalities in the Province of Turin, starting from the existing power station in Piossasco (Turin) to the future Frejus safety tunnel, whose entrance is in the town of Bardonecchia (Turin).
- The line will be mainly built in a way that complements existing roads and highways, involving, for about 17 km, provincial and municipal roads and agricultural land, for about 5 km, a stretch of provincial road no. 589, for about 66 km, the A32 Turin-Bardonecchia expressway and for about 6.3 km, and still in Italy, the Fréjus safety tunnel, currently under construction.
- The project comprises 2 conversion modules of 500 MW each, with HVDC-VSC (High Voltage Direct Current - Voltage Source Converter) type plant and a maximum power of 600 MW, highly innovative both in relation to the voltage level and the power output of the plant.
- The new Converter Station, the underground cable's arrival point, will be built within the existing power station in Piossasco to avoid impacting other areas in the same municipality, to optimize space and existing infrastructure and to provide security and reliability for the electricity grid.

The stages of the project

The new electricity interconnection between Italy and France has been included in the projects for the development of the National Transmission Network (NTN) since the 2008 Development Plan. It was then re-proposed in subsequent Development Plans and included in the program agreement signed on February 27, 2008 by the Region of Piedmont and Terna, as part of the strategic objectives for the upgrading and rationalizing of the electricity grid in Piedmont. These are the main stages of the project:

- 15 July 2013: Start of works on the Italian side
- 8 April 2011: MISE (Ministry for Economic Development) decree which authorized the construction on the Italian side
- 19 October 2009: Start of project authorization procedure
- 27 February 2008: program agreement signed by the Region of Piedmont and Terna
- 30 November 2007: stipulation of the agreement between Italy and France to facilitate the integration of their respective markets, mandating Terna and RTE to examine a 1000 MW upgrade of the interconnection capacity between the two countries, with minimal environmental impact.

All the numbers of the new "Italy-France" line

€1.4 billion	in total investment
€150 million a year	in cost savings for the Italian electricity system
€1.3 million	co-funded by the European Commission
Up to 1,200 MW	in increased transmission capacity across the Italian-French border
190 km	total length of the line (50% in Italy and 50% in France)
Over 97%	laid along Italian main and secondary roads
Over 500	workers employed, including professionals, technicians and laborers
Over 70	companies involved (civil and electro-mechanical, specialists in the electricity/energy sector)
30 years	since "Rondissone-Albertville", the last interconnection line with France
25	Italian municipalities involved
Terna's 23rd	foreign interconnection line
#1 project in the world	in terms of technology and length of the completely underground path

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