NORTH-EASTERN

CATALONIA

ELECTRICITY SUPPLY

RED ELÉCTRICA
DE ESPAÑA

August 2011

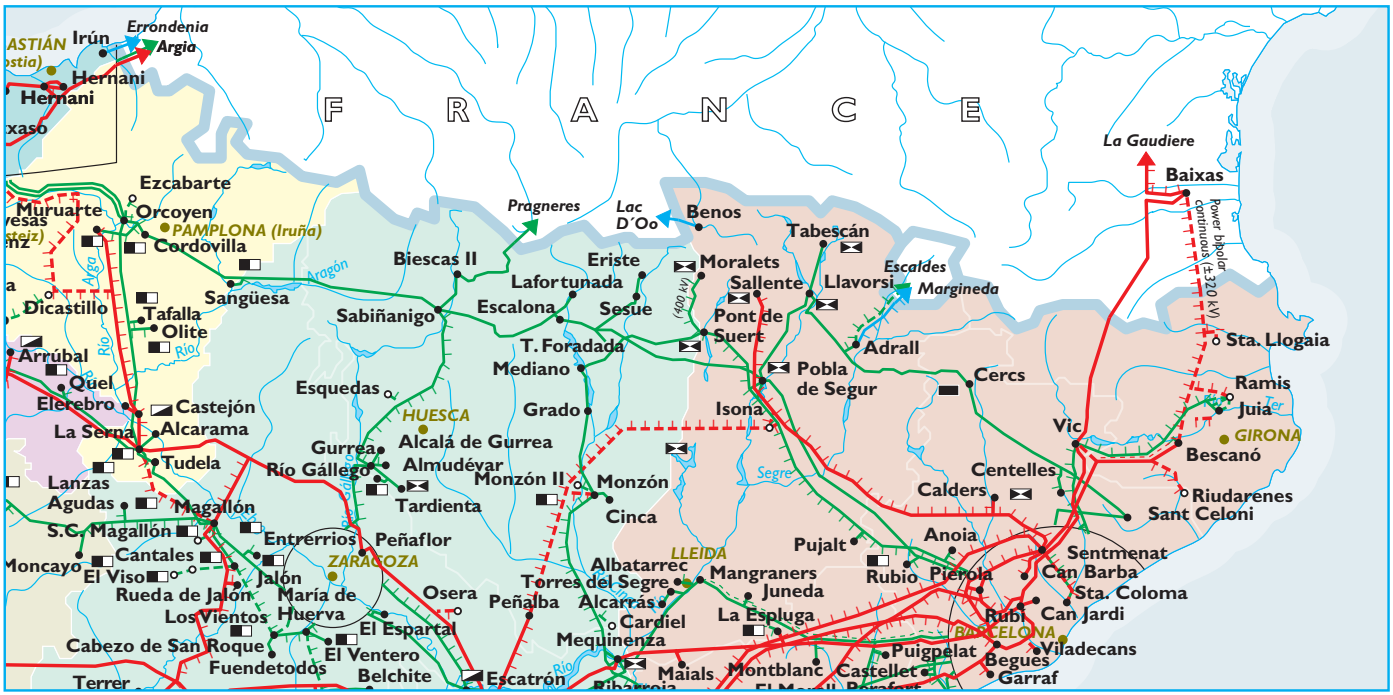
The electricity supply project for the north-eastern zone of Catalonia, included in the 2008-2016 Planning document for the gas and electricity sectors, addresses the various important needs of the Spanish electricity system.

Electricity supply in the Gerona Province

Gerona does not currently have a 400 kilovolts (kV) meshed grid, necessary to deal with its demand, this means it cannot count on the same standards of quality as the rest of Spain. This situation is clearly an obstacle for its development.

Therefore, a new high voltage line which satisfies the ever-increasing demand for electrical energy is needed. Between 2001 and 2008, the electricity demand in Catalonia increased by over 18 %, whereas in Gerona it increased by 47% between 2001 and 2007. Another important detail is the very low percentage of electricity generated in Gerona, which satisfies around 10 % of its consumption, and is primarily obtained from the hydroelectric power stations of Sau and Susqueda and consequently is heavily dependent on the availability of water. This situation shows that, under current conditions, there is insufficient grid capacity to supply energy to new clients of mid-high consumption.

Electrical interconnection lines Spain-France.



This line is necessary for both Spain and Catalonia; it will provide more security of supply and an increased grid stability with regard to the non-availability of other elements of the national electricity system.

Powering the High Velocity Train

The future development of the High Velocity Train will jeopardize the electricity situation in Gerona even more. The High Velocity Train signifies an additional demand which also requires stability and quality of the electrical supply, and that can only be ensured by the incorporation of the proposed 400 kV line. With a lower voltage line, the loads required by the High Velocity Train would provoke voltage drops and distortions in the grid which would diminish the quality for the rest of the consumers.

Support for the integration of wind power into the electricity system

Spain is one of the European countries which has best promoted the integration of renewable energies and is one of the foremost countries in the world for producing wind energy. Nevertheless, wind energy is unmanageable, due to its highly unpredictable nature. Wind power generation lacks stability, given that it depends on the variability and availability of wind, and it has to be backed by other power stations which can cover these possible variations in availability and production.

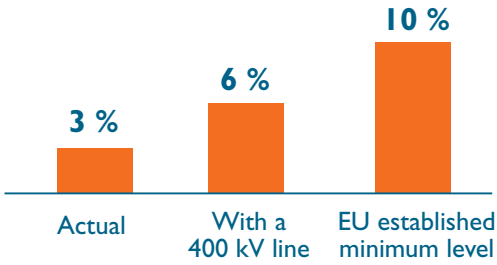
Presently, the limited level of interconnection also means the development of wind energy is limited. The new interconnection will guarantee an increase in the development of wind energy and likewise, its integration and management under secure conditions. Only with the backing of a solid and sufficiently meshed grid will we be able to continue incorporating wind generation into our energy mix.

Spain-France interconnection

Historically, the interconnections between national electricity systems have been developed in parallel with the internal grids of each country. Initially, the interconnections look for exterior support in case a fault is produced which affects the security of the national electricity supply.

Nevertheless, it has been demonstrated that interconnections are not only useful in exceptional situations, but also under normal operating conditions they offer significant advantages: optimization of daily production from the

Interconnection capacity Spain-France



power stations, better possibilities of exploiting renewable energies, generation of competition and improved conditions of supply. The importance of these interconnections explains why the companies managing the European grids are currently working on some fifty projects to strengthen the existing interconnections, in compliance with European Union directives.

Amongst these projects, the Spain-France interconnection is considered of high priority interest, together with the wind power connection between the Baltic Sea and the North Sea, the gas pipeline joining Austria and Turkey, and the interconnection between Germany, Poland and Lithuania.

The electrical interconnection between Spain and France currently consists of 4 lines: 2 in the Basque Country (Arkale-Argia and Hernani-Argia), one in Aragón (Biescas-Pragneres) and another in Catalonia (Vic-Baixas). It has a total commercial exchange capacity of 1,400 megawatts, that is to say, it represents just 3 % of the maximum actual demand on the Spanish peninsular system, far from the 10 % established by the European Union as the minimum level in the Barcelona summit of 2002.

A new 400 kV line will double the actual interconnection capacity to reach 6 %, which would mean an improved security of supply and, above all, an improved stability of the system by strengthening its link with the European system.

View of the 400 kV Sentmenat-Bescanó line crossing Las Guillerías natural park.

Tariffs

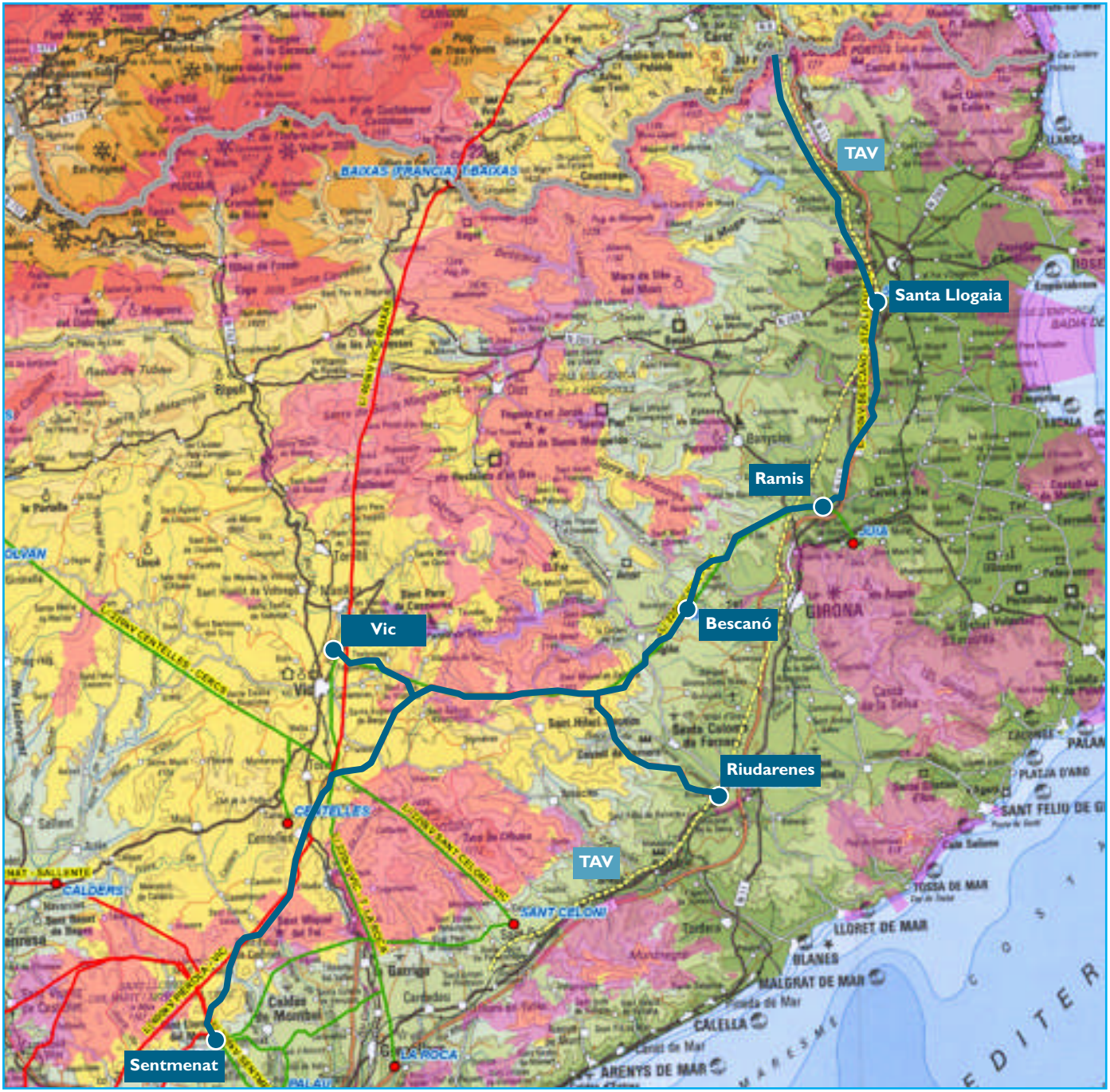
The integration into the single European electricity market will result in increased energy exchanges with the rest of the continent and will favour a reduction in the electricity tariffs, matching those of the countries of the zone.

Route · August 2011 situation

The new interconnection with France, which was approved by the Council of Ministers in the 2008-2016 Planning document for the gas and electricity sectors, is defined by the line between Santa Llogaia and the French border. The development of the transmission grid in north-eastern Catalonia consists of this interconnection and three additional projects of 400 kV which join the Sentmenat substation with the substations at Vic, Bescanó, Ramis and Santa Llogaia and a service connection to the Ruidarenes substation.

Therefore, 4 independent projects currently exist:

- Sentmenat-Vic-Bescanó
- Bescanó-Ramis-Santa Llogaia
- Powering Ruidarenes
- Santa Llogaia-French border


TAV
Santa Llogaia
Ramis
Bescanó
Vic
Riudarenes
TAV
Sentmenat

Route of the four projects.

Sentmenat-Vic-Bescanó

The line will allow a 400 kV supply to Gerona and will be the base to develop other installations to power the High Speed Train, improve the supply to the Gerona-Costa Brava area and develop the interconnection with France.

The project also includes the dismantling of a 400 kV line Pierola-Vic (37 km), a 220 kV line Vic-Juià (39.5 km), and a 110 kV line which passes through Las Guillerías (16.5 km). This leaves the 400 kV line as the only line in the area and that will supply energy to respond to the ever-increasing demand.

The construction of this installation began in May 2007 and it was commissioned in July 2011.

Route of the Sentmenat-Vic-Bescanó line.

Powering Riudarenes

Powering the Riudarenes substation, necessary to supply energy to the High Speed Train, will be done via a service connection from the Vic-Bescanó line. The placement of the line has been decided in conjunction with ADIF (the company responsible for the rail transport system in Spain) and the final layout took into account the presence of the Gerona-Costa Brava airport, and also the proximity of populated areas with large residential and industrial growth, situated in the surrounding areas of Gerona. Necessary measures have been included in the implementation project, to maintain the maximum distance possible from populated areas and to avoid recognised protected zones within the area.

It is currently in its processing period.

Route of the Riudarenes supply line.

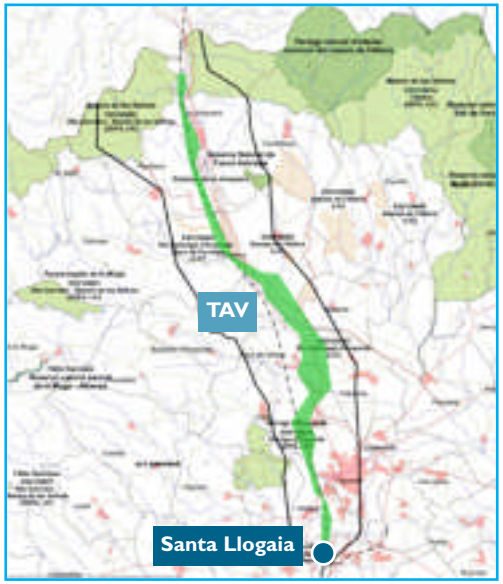
Bescanó-Ramis-Santa Llogaia

This line will allow the supply of energy to the High Speed Train and create 2 new power nodes in the supply grid with the construction of the Ramis substation (Gerona) and Santa Llogaia substation (Figueras). This will eliminate the need for a new 220 kV line in the Gerona area and minimise the number of installations in the vicinity.

Route of the Bescanó-Ramis-Santa Llogaia line.

INELFE is a joint venture company between Spain and France that will be responsible for carrying out the interconnection project.

Route proposed for the interconnection.



The route was established, as is the case of the Sentmenat-Vic-Bescanó line, in accordance with the criteria of the Generalitat and the Catalonian Parliament, taking advantage of the already existing electricity infrastructure. Therefore, the Bescanó-Ramis and Ramis-Santa Llogaia lines have been established in parallel with the 220 kV Bescanó-Juià line and the 132 kV Juià-Figueras line respectively.

It is currently in its processing period.

Santa Llogaia-French border

In June 2008, the Spanish and French governments signed an agreement which put into action the electrical interconnection project between both countries. The line will link up the area of Santa Llogaia d'Alguema in the Alt Empordá region, with that of Baixas in the south of France, and will allow the exchange capacity through the Pyrenees to be increased to 1,400 megawatts. Therefore, with this project the import and export capacity of electricity between Spain and the rest of Europe will be doubled and will increase to 6 % of actual maximum demand, still far short of the 10 % which was the minimum established in the Barcelona summit in 2002.

In October 2008, INELFE was formed, a joint venture company between Spain and France, whose function is to carry out the interconnection project, including the feasibility studies as well as the completion of the construction works.

The project establishes that the line between Santa Llogaia y Baixas be an underground direct current line and that the existing infrastructure be utilised wherever possible. It is contemplated as an exceptional project because it is the first time that a direct current line is capable of achieving a power of 2,000 MW and a voltage of 320 kV.

This installation has been given the Administrative Authorisation and the Environmental Impact Declaration since December 2010. The implementation project for the line has been made public in order to get the approval for the project and the Declaration of Public Utility, which will allow construction.

The agreement reflects the recommendations from the report submitted to the Spanish and French governments by the ex European Commissioner Mario Monti. Due to the difficulties in reaching a solution, Monti was appointed by the European Union as the coordinator of the high voltage electrical line between the two countries. This appointment responds to the need to expedite the implementation of one of the basic infrastructures for the European Commission which historically has met with stiff opposition from local environmentalist groups.

After almost two decades of negotiations, this electrical interconnection, besides responding to the ever-increasing demand of Gerona, will also help to facilitate the integration of renewable energy into the system.

ENVIRONMENTAL ACTIONS

In the development of these projects, Red Eléctrica has adopted a complete series of preventative, corrective and compensatory measures, with the object of minimising the effects on the natural and social environments where these installations are to be situated.

Design of the route

The principal criteria used when determining the route was to maintain the greatest possible distance between the installations and the urban centres and heavily populated areas, as well as from recognised protected zones, places of interest and forested areas. Also, in some cases, the option of using existing lines and to dismantle old lines that the new lines could substitute was used. Therefore, as in the case of the Sentmenat-Vic-Bescanó line, the number of installations currently situated in protected areas was reduced to one, particularly in the area of PEIN (Plan for Spaces of Natural Interest) and Red Natura (Nature Network) 2000 of Cingles de Bertí, Savassona and Las Guillerías, where the 400, 220 and 110 kV lines are to be eliminated.

The raising of one of the towers of the Sentmenat-Bescanó line.

Individualised study of each tower

In the development of each project the towers were analysed, both from its geographical location point of view as well as from its positioning within the environment. In general, the towers have been situated in cultivated or forested areas determined as the least productive, considering at all times the possibility of reducing the number of towers.

In general, the heights of the towers were increased for environmental reasons. Therefore, the tower supports were raised above ground level, so as to avoid obstacles, such as forested areas. By doing this, the impact on vegetation was reduced and the risk of fire avoided. It was also decided to resort to using towers with asymmetric legs, with the object of adapting the bases of the towers to the gradient of the ground.

The towers used in these projects -double or quadruple circuits in double vertical configuration- allows the line to be compacted with the existing ones thus minimising the effect on the majority of the environmental elements and as such, reduce the space used by half. The incorporation of tall, narrow towers, helps save wooded areas and, in many cases, it will not be necessary to fell trees to clear safety corridors.

Tower with asymmetric legs, adapted to the terrain of La Selva region.

View of the Sentmenat-Bescanó line in the Osona region.

Development of the Environmental Vigilance Programme

With the objective of verifying fulfilment of the measures outlined in each Environmental Impact Declaration, an Environmental Vigilance Programme has been designed and a Compliance Commission created in conjunction with the Department of the Environment and the General Office of Mining and Energy of the Generalitat.

In addition to verifying the adopted measures, the programme will supervise and check the restoration of affected zones and the cleanup operation after the works have finished.

Definition of access roads

When determining access roads, the existing road network was taken advantage of and also improved. Also, when designing the new access routes, whose length has been minimised, the presence of protected species, nesting sites and burrows, forested areas etc., were taken into account. In addition, the works have adapted terrains to reduce movements of soil and embankments and also to reduce the felling of trees.

Cable laying using a helicopter.

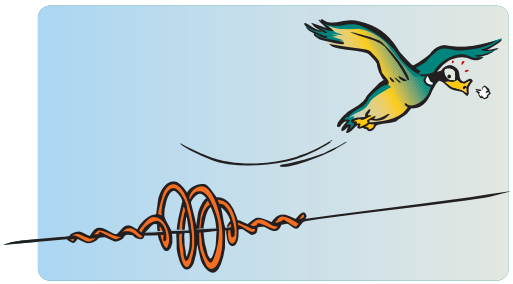
Erection of towers and hanging of cables

In wooded areas the towers are assembled on site and the cables are hung by helicopter or by hand to reduce the possible effects on the zone.

Restoration of damage caused

At the end of the construction phase, Red Eléctrica will put into action corrective measures with the objective of regenerating the environment, reducing or eliminating residual impacts.

Cable signalling devices for birds.



Positioning of bird safety devices

In the cases where a risk exists of birds colliding with the lines, measures will be introduced for signalling the presence of an earth cable with bird flight diverters, increasing its visibility and reducing the probability of collisions by those species prone to crash into cables.

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