Project 270 - FR-ES project -Aragón-Atlantic Pyrenees

and

This project consist of a new interconnection between France and Spain located in the Central part of the Pyrenees between Aragón region (Spain) and Marsillon (France). Internal reinforcements in Spain complement the cross border section, such as a new 400 kV line between Ejea de los Caballeros and Aragón region, including both substations. Included in the Madrid Declaration, this project aims at improving the interconnection between Iberia and mainland Europe, allowing for higher integration of RES in Iberia, especially solar and helping Spain to come closer to the 10% interconnection ratio objective.

Classification	Long-term Project
Boundary	Spain - France
PCI label	part of PCI 2.27. Capacity increase between Spain a France (generic project)
Promoted by	REE;RTE



Investments								
Investment ID	Description	GTC Contribution	Substation 1	Substation 2	Present Status	Commissioning Date	Evolution since TYNDP 2014	Evolution Driver
1211	New axis Aragon region- Marsillon (DC)	100%	Aragón region	Marsillon	Planning	2025	New Investment	
1212	New axis Ejea- Aragon region 400 kV	100%	Ejea de los Caballeros	Aragón region	Planning	2025	New Investment	
1214	new 400 kV Ejea de los Caballeros substation and connection to the lines La Serna-Magallon and Magallon Penalba	100%	Ejea de los Caballeros		Planning	2025	New Investment	
1215	New 400 kV Aragon region substation and connection to existing network and future cross border project	100%	Aragón region		Planning	2025	New Investment	

Additional Information

Project website

http://www.ree.es/es/actividades/gestor-de-la-red-y-transportista/proyectos-de-interes-comun-europeos-pic;

PCI page – link to EC platform http://ec.europa.eu/energy/infrastructure/transparency_platform/map-viewer/m/main.html

PCI 2.27 refers to a generic project for the capacity increase between Spain and France. In TYNDP 2016 this generic project is better defined with TYNDP projects 276 and 270, that according to clustering rules should be independent projects.

Other links

Spanish National Development Plan http://www.minetur.gob.es/energia/planificacion/Planificacionelectricidadygas/desarrollo2015-2020/Paginas/desarrollo.aspx

French National Development Plan

http://www.rte-france.com/fr/article/schema-decennal-de-developpement-de-reseau

Inter-Governmental agreement (Madrid Declaration) https://ec.europa.eu/energy/sites/ener/files/documents/Madrid%20declaration.pdf

Constitution of the High Level Group on Interconnections for South West Europe

http://europa.eu/rapid/press-release IP-15-5187 en.htm

Investment needs

One of the main concerns in South Western Europe is the low interconnection capacity betweeen France and Spain, too low to enable the Iberian Peninsula to fully participate in the internal electricity market, and with an interconnection ratio far from the 10% objective.

The ENTSOE CSW Regional Investment Plan published in 2015 established the future market interest of increasing the cross border capacity from 5GW reached with planned reinforcements to 8GW. The need for further development in this border is also robust in the long term according to EH2050 project.

In addition, the Madrid Declaration in 2015, signed by the EC, and Governments of France, Spain and Portugal, together with the EIB establishes the need and political commitment to further develop the interconnection after the PST in Arkale and the Biscay Gulf project in order to reach around 8 GW in the French-Spanish border. This project is one of the two additional projects needed to reach this objective capacity.

The curves in the right show how the Socio-Economic welfare of Iberian Peninsula- central Europe boundary evolves when exchange capacity increases (beyond 5 GW, boundary capacity is supposed to increase simultaneously by homothetical steps, 1/3 MIBEL-GB, 1/3 MIBEL-FR, 1/3 MIBEL-IT). So no assessment per project are behind these values. This study should be considered as an aditional analysis respect to the CBA assessment analysis.

In Vision 1, in which the main interest of cross-border development is to substitute gas by coal generation, the curve saturates much earlier than for Vision 4 (where RES optimization has been carried out) in which additional capacity mainly allows better integration of RES, especially in the Iberian Peninsula, as well as some substitution of coal by gas generation.

Further development beyond the point where the cost of additional projects is not balanced by the SEW may be driven by additional considerations, like the fulfilment of 10% interconnection rate.



Project Cost Benefit Analysis

This project has been assessed by ENTSO-E in line with the Cost Benefit Analysis methodology, approved by the EC in February 2015.

Mid-Term and Long Term projects on the French-Spanish border were assessed according to their maturity and expected commissioning dates taking into account the following order: PST in Arkale (project 184), Biscay Gulf (Project 16), Navarra-Landes (Project 276), Aragon-Atlantic Pyrenees (Project 270).

The reference grid taken into account for 2030 includes the projects;

- Façade Atlantique (249) in France
- Massif Central North (216) in France
- Massif Central South (158) in France
- PST Arkale (184) in Spain
- Navarra Basque Country (255) in Spain

The reference grid also includes Navarra-Landes Interconnection (276) between France and Spain.

The indicators B6/B7 reflect particular technical system aspects of projects based on a summation of qualitative performance indicators, in line with the CBA methodology; these cannot be used as a proxy for the security of supply indicator.

The assessment of losses variations induced by the projects improved in the TYNDP 2016 compared to the TYNDP 2014 with a comprehensive all year round computations on a wide-area model capturing all relevant flows.

The results must however be considered with caution and not totally reliable due to their very high sensitivity to assumptions regarding the detailed location of generation which are not secured.

The project's SEW accounts for saving in generation fuel and operating costs. The project can also enable savings in generation capacity, in particular for projects connecting "electric peninsulas". These avoided investments in generation can represent a yearly equivalent, over several decades, of about several tens of millions euros of additional economic benefits.

General CBA Indicators	
Delta GTC contribution (2020) [MW]	Delta GTC was not checked for 2020 and the 2030 values were considered for SEW, RES and CO2 assessment.
Delta GTC contribution (2030) [MW]	FR-ES: 1500
	ES-FR: 1500
Capex Costs 2015 (M€)	1200 ±120
Source: Project Promoter	
Cost explanation	The cost value provided for the project corresponds to the CAPEX cost
S1	NA
S2	NA
B6	+
B7	++

Scenario specific CBA indicators	EP2020	Vision 1	Vision 2	Vision 3	Vision 4
B1 SoS (MWh/yr)	N/A	N/A	N/A	N/A	N/A
B2 SEW (MEuros/yr)	40 ±10	20 ±10	30 ±10	40 ±10	80 ±10
B3 RES integration (GWh/yr)	<10	50 ±40	150 ±20	110 ±70	370 ±50
B4 Losses (GWh/yr)	N/A	525 ±52	775 ±77	650 ±65	925 ±92
B4 Losses (Meuros/yr)	N/A	28 ±3	35 ±4	39 ±4	62 ±6
B5 CO2 Emissions (kT/year)	±100	±100	-100 ±100	-300 ±100	-900 ±100

Savings in variable generation costs (SEW) in 2020 and 2030 V1 are caused by a decrease of CCGTs in the Iberian Peninsula compensated by an increase of coal in Germany and Central Europe. Value in 2020 is higher as there is more coal. Nevertheless, the global impact on CO2 emissions is low.

In 2030 V3 and V4 the SEW is caused mainly by a decrease of CCGTs in Central Europe replaced by RES in the region. This situation results in a global decrease of CO2 emissions. In addition, SEW is higher is the V4 top-down vision, which imply higher efficiency of a European common approach for optimizing the location of RES versus national and independent approaches of RES policies, resulting in high amount of additional RES in Iberia, mainly solar.

The project increases flows in both directions but specially imports of the Iberian Peninsula in 2020 and 2030 V1 and exports in 2030 V3 and V4.

The project does neither contribute to avoid ENS at national level (as scenarios are build to fulfil adequacy requirements) nor at local level in the area of the connection points. However an increased transfer capacity between Iberia and the rest of Europe would improve the system security and its robustness from the dynamic point of view.

The project also contributes to the stability of the system and helps for a full-integrated European internal energy market. These additional benefits are not accounted in the SEW as they are difficult to monetize.

Losses increase in all the scenarios as the project allows higher long transit power flows on long distances in order to supply the demand with the cheapest generation throughout western Europe. The assessment of losses variations induced by the projects improved in the TYNDP 2016 compared to the TYNDP 2014 with a comprehensive all year round and European-wide computation. The results must however be considered with caution, and not totally reliable due to their very high sensitivity to assumptions regarding the detailed location of generation which are not secured.

Complementary information about the border on which the project is located	Vision 1	Vision 2	Vision 3	Vision 4
Average marginal cost difference in the reference case [€/MWh]	1.61	3.67	4.24	5.80
Standard deviation marginal cost difference in the reference case [€/MWh]	6.35	9.91	15.13	16.55
Reduction of marginal cost difference due to all mid-term and long-term projects [€/MWh]	15.07	10.58	9.91	13.75

The project reduces the congestion rate in a range from 7 to 10% in 2030, depending on the scenario. After the commissioning of the project the congestions are limited to 16-34%. Moreover the project increases the interconnection ratio of Spain in 1% in 2030.