Project Sheet

FR-BE: study Lonny-Achene-Gramme

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Key Information

Cross Border Project
AC transmission line
Mostly Upgrade

Under Consideration

Description

The project aims at sustaining further market integration within the long-term perspective of the energy transition and subsequent need to develop interconnection capacity on the French-Belgium border whilst alleviating Lonny-Achene-Gramme as bottleneck.The reinforcement strategy consists of maximizing the potential of the 400kV interconnector Lonny-Achene-Gramme through the use of cost-efficient technologies such as PSTs and HTLS as well as the possibility to rebuild Lonny-Achene-Gramme as a 2-circuit solution. The bilateral study will determine the appropriate implementation option and phasing of this implementation (for example: first install a PST, then upgrade the line capacity), taking into account 1) the optimization of flows between the 400kV interconnectors Avelin-Avelgem-Horta & Lonny-Achene-Gramme 2) that by 2025 Lonny-Achene-Gramme is a structural bottleneck due to the planned nuclear phase out in Belgium, and as such a first implementation step (for example PST) is needed 3) gain in efficiency in developing a structure with 2 circuits versus current structure with 1 circuit on Lonny-Achene-Gramme

Project motivation:

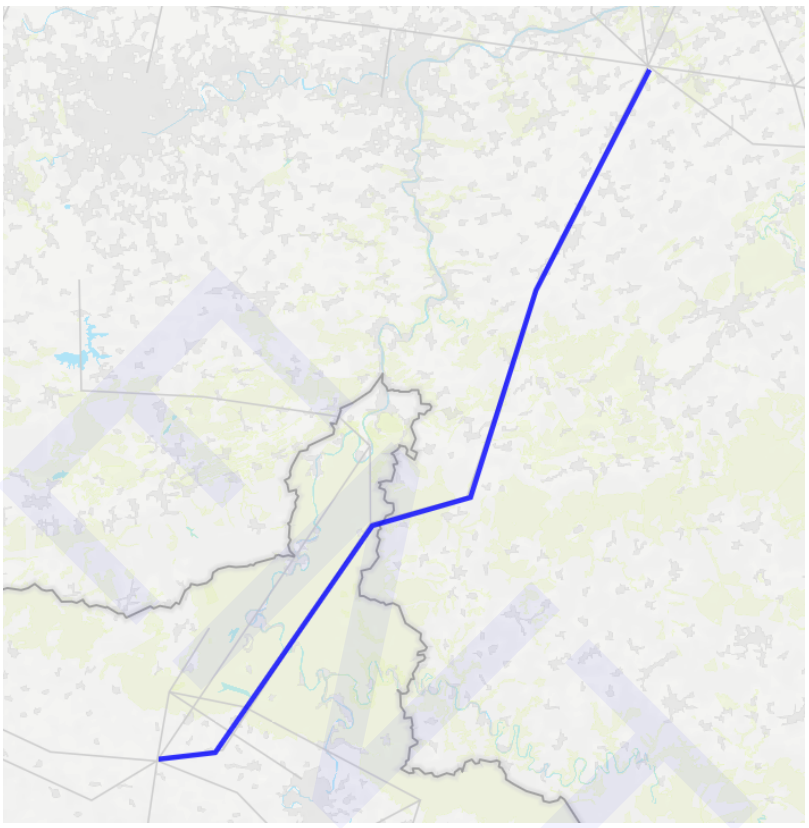
With this project RTE and Elia investigate the possibilities to further develop interconnection capacity on the FR-BE border, in line with the signals provided by the 2030 interconnection target criteria as well as the identification of needs upon 2040 scenario's, illustrating that higher power flows will emerge from future production mixes with more RES. This project fits within the strategy to develop cost efficient upgrades of the existing AC interconnectors in the CWE area.

Project promoters

ELIA
RTE

Countries

Belgium
France



National development plan(s)

NDP1, Belgium, 2020-2030, §4.2.2.2 - NDP2, France, SDDR (Schéma Décennal de Développement du Réseau -Ten Year Network Development Scheme), 2019, project n°1050, page 442, https://www.rte-france.com/fr/article/evolution-du-reseau-electrique-francais-l-horizon-2035

Additional information on the project

More information about the project can be found following this link:

- National Development Plan: https://www.elia.be/-/media/project/elia/elia-site/infra-and-projects/investment-plans/federal-development-plan-2020-2030/nl/20190516_federaal-ontwikkelingsplan_nl.pdf?la=en

Project sheet backlog

6 Nov. 2020 - Publication as part of the draft TYNDP 2020 package for consultation

Project Description & Context

Project Investments

Main investment(s): Installation of PST(s) and/or line capacity upgrade of Lonny-Achene-Gramme

Type of element	Total route length (km)	From substation 1	To substation 2	Present status	Commissioning year	Progress of the investment	Explanation in case of delay or reclustering
AC transmission line	0	Lonny (FR)	Gramme (BE)	Under Consideration	2030	Investment on time	

Is the project in the reference grid?

No

System Needs addressed by the project

Project promoter(s) selected up to 4 system needs that are addressed by their project in a predefined list. Available needs ranged from reduction of price differentials between countries, improvement of system flexibility and stability, enabling cost-efficient connection of high volumes of RES, improvement of voltage stability...
As part of the TYNDP 2020, ENTSO-E released a study investigating cross-border system needs in the 2030 and 2040 horizons.

Need		How the project addresses each need (explanation provided by the project promoter(s))
€	Infrastructure to reduce price differentials between EU and/or non-EU countries	This project increases the degree of interconnectivity between Belgium and France. The possibility of higher market exchanges between these two bidding zones leads to a higher price convergence in more hours yearly and reduces therefore the price differentials. This is also included as key trigger of the 2030 interconnection criteria.
ITEG	Infrastructure to tackle a Need identified by one of the European ITEG indicators referring to the 15% interconnection target for 2030:1. Reduce the price differential between EU countries to below 2EUR/MWh.2. Contribute	Based on IOsN report, 15% IC-target requires higher cross border transmission capacity. This project contributes to satisfy this need, provided that the project benefits

Need		How the project addresses each need (explanation provided by the project promoter(s))
	to pushing ratio between nominal transmission capacity and installed RES capacity past 30%.3. Contribute to pushing ratio between nominal transmission capacity and peak load past 30%.	outweigh its costs.
	Contribution to the power system's operational flexibility by controlling power flows and optimizing use of existing infrastructure	With the potential use of PSTs to better balance flows between the different crossborders lines, it will reduce bottlenecks and consequently increase the exchanges on the boundary itself and also in CWE area.
	Infrastructure designed to enable cost-efficient grid connection of high volumes of RES and/or reduce RES curtailment	RES integration implies higher flows in the meshed AC-grid and thus increases the need for cross border transmission capacity. This project satisfies this need in a cost-efficient manner.

Interconnection targets

In 2017, the Interconnection Target Expert Group proposed alternative indicators to the 15% interconnection criteria for every country and electrified island with a new methodology developed collaboratively between the European Commission, ENTSO-E, ENTSOG, industry, universities and other experts. The methodology is based on three indicators:
1. Price differential between EU countries, with an objective to reduce it below 2 EUR/MWh
2. Ratio between nominal transmission capacity and installed RES capacity, with a target of past 30%
3. Ratio between nominal transmission capacity and peak load, with a target of past 30%

The following maps show the ITEG methodology applied to the TYNDP 2030 scenarios, with the 2020 grid.

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Project Assessment

Transfer capacity increase (National Trends 2025)

	Border	A B	B A
Transfer capacity increase (in MW)	Belgium - France	1000	1000

CBA results

ENTSO-E has assessed the benefits delivered by each project in 2025 (scenario National Trends 2025) and in 2030 (three scenarios: National Trends, Distributed Energy and Global Ambition). Indicators B1 to B6 were computed by ENTSO-E, while promoters had the possibility to compute and submit so-called project-level benefits (B7 to B10). The benefits must be understood as benefits for Europe as a whole, not for the promoters of the project.
Results are presented per scenario.

Central scenario: National Trends

National Trends is the central policy scenario of the TYNDP2020, designed to reflect EU member state's National Energy and Climate Plans (NECP), in line with the requirement to meet current European 2030 energy strategy targets.

			Comparison of the COP21 scenarios with NT2030 average result		
	NT2025	**NT2030**	**DE2030 is < or > than NT2030**	**GA2030 is < or > than NT2030**	

Increase in socio-economic welfare

B1 Annual Socio-Economic Welfare (SEW) increase (M € / year)	max average min	22 18 15	73 66 59	>	>	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	max average min	9 6 4	34 29 27	>	>	ENTSO-E assessment
B1_RES Annual Socio-Economic	max average	1 0	9 6	<	>	ENTSO-E assessment

Welfare increase resulting from RES integration	min	0	1			

Reduction of CO2 and GHG emissions

B4 Non-CO2 emissions (kg/year)

B4a Nitrogen oxides	average	-712	-1804	n/a	n/a	ENTSO-E assessment
B4b Ammonia	average	-29	-54	n/a	n/a	ENTSO-E assessment
B4c Sulfur dioxide	average	-835	-1760	n/a	n/a	ENTSO-E assessment
B4d Particular matter 5	average	4146	19440	n/a	n/a	ENTSO-E assessment
B4e Particulate matter 10	average	-40	-104	n/a	n/a	ENTSO-E assessment
B4f Non-methane volatile organic compounds	average	4178	19565	n/a	n/a	ENTSO-E assessment

B2a Annual CO2 variation from market simulation (ktonnes / year)		max average min	-158 -258 -375	-951 -1051 -1209	 <	 >	ENTSO-E assessment
B2a_€ Annual Societal cost variation resulting from CO2 variation from market simulation monetised (M € / year)	CO2 price	60€/ ton 100€/ ton 189€/ ton	10 20 43	34 76 169	< < >	< < <	ENTSO-E assessment
B2b Annual CO2 variation due to network losses (ktonnes / year)		average	152	160	n/a	n/a	ENTSO-E assessment
B2b_€ Annual Societal cost variation resulting from	CO2 price	60€/ ton 100€/	-6 -12 -25	-5 -12 -26	n/a	n/a	ENTSO-E assessment

CO2 variation from network simulation monetised (M € / year)	ton 189€/ ton					

Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year)	max average min	10 6 2	244 157 36	<	>	ENTSO-E assessment
B3a Connected RES (MW)	-			n/a	n/a	ENTSO-E assessment

Impact on grid losses

B5 Variation of network losses (GWh / year)	average	265	512	n/a	n/a	ENTSO-E assessment
B5_€ Variation of network losses monetised (M€ / year)	average	11	13	n/a	n/a	ENTSO-E assessment

Security of supply

B6 Annual reduction in Energy Not Served (MWh / year)	max average min		256	n/a	n/a	ENTSO-E assessment
B6_€ Annual Socio-Economic Welfare increase resulting from reduction in Energy Not Served monetised (M€ / year)	average	n/a	2.56	>	n/a	ENTSO-E assessment

Scenarios: Distributed Energy & Global Ambition

DE and GA are two scenarios created in line with the COP21 targets to understand the impact on infrastructure needs agains different pathways reducing EU-28 emissions to net-zero by 2050. For these two scenarios, projects were assessed with a subset of CBA parameters.

		DE2030	GA2030	

Increase in socio-economic welfare

B1 Annual Socio-Economic Welfare (SEW) increase (M€ / year)	average	160	87	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	average	74	32	ENTSO-E assessment
B1_RES Annual Socio-Economic Welfare increase resulting from RES integration	average	3	15	ENTSO-E assessment

Reduction of CO2 and GHG emissions

B2a Annual CO2 variation from market simulation (ktonnes / year)	average	-1392	-904	ENTSO-E assessment
B2a_€ Annual Societal cost variation resulting from CO2 variation from market simulation monetised (M€ / year)	CO2 price 60€/ ton 100€/ ton 189€/ ton	10 65 189	23 59 139	ENTSO-E assessment

Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year)	average	64	347	ENTSO-E assessment
B3a Connected RES (MW)	-			ENTSO-E assessment

Non scenario-dependent indicator(s)

B8.0 Stability (Transient, Voltage and Frequency Stability)	Transient stability	Voltage stability	Frequency stability	
Study Lonny-Achene-Gramme (AC line high temperature conductor/conductor replacement (e.g., duplex to triplex))	-	-	0	Qualitative assessment by ENTSO-E based on information on the project technology provided by the project promoter(s). This indicator is not dependent on scenarios or time horizons.

Sensitivity Study: Current Trends

'Current Trends' describes a future where the energy transition is slower than planned.

		CT2030	

Increase in socio-economic welfare

B1 Annual Socio-Economic Welfare (SEW) increase (M€ / year)	average	28	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	average	10	ENTSO-E assessment
B1_RES Annual Socio-Economic Welfare increase resulting from RES integration	average	0	ENTSO-E assessment

Reduction of CO2 and GHG emissions

B2a Annual CO2 variation from market simulation (ktonnes / year)	average	-353	ENTSO-E assessment
B2a_€ Annual Societal cost variation resulting from CO2 variation from market	CO2 price 60€/ton 100€/ton 189€/	11 25 57	ENTSO-E assessment

simulation monetised (M€ / year)	ton		

Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year)	average	3	ENTSO-E assessment
B3a Connected RES (MW)	-		ENTSO-E assessment

Residual impact

Information on the residual impact of the project was provided by the project promoter(s).

Residual environmental impact

Investment	Investment status	Distance (km)	Type of sensitivity

Note based on CBA Guideline 3.0: Given that the actual route of the project might not be defined due to the low degree of maturity of its investment(s), an environmental assessment is not yet available.

Additional information by the project promoter(s)

Note based on CBA Guideline 3.0: Given that the actual route of the project might not be defined due to the low degree of maturity of its investment(s), an environmental assessment is not yet available

Residual social impact

Investment	Investment status	Distance (km)	Type of sensitivity

Note based on CBA Guideline 3.0: Given that the actual route of the project might not be defined yet because of the low degree of maturity of its investment(s), a residual social impact assessment is not yet available.

Additional information by the project promoter(s)

Note based on CBA Guideline 3.0: Given that the actual route of the project might not be defined due to the low degree of maturity of its investment(s), a residual social assessment is not yet available

Project Costs

The project costs were provided by the project promoter(s).

	CAPEX (Meuro)	Uncertainty range (%)	OPEX
1008. Study Lonny-Achene-Gramme	90	25%	0.1
Total	90		0.1

Explanation provided by the project promoter on the CAPEX uncertainty range:

1008 Considering project status, significant uncertainties exist regarding CAPEX estimations. These uncertainties are estimated based on both historic experience for similar projects and on present uncertainties regarding choice of final grid solution and related material/ resources costs.

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