Project Sheet

Avelgem-Center: new corridor (Boucle du Hainaut)

Project type	transmission
Project id	340
Created by	
Created on	Feb 11, 2021 12:10:36 PM

Index

Key Information 3
Description 3
Project Description & Context 5
Project Investments 5
System Needs addressed by the project 5
Interconnection targets 6
Project Assessment 10
Transfer capacity increase (National Trends 2025) 10
CBA results 10
Central scenario: National Trends 10
Scenarios: Distributed Energy & Global Ambition 12
Non scenario-dependent indicator(s) 14
Sensitivity Study: Current Trends 14
Residual impact 15
Project Costs 15

ENTSOE

Key Information

Internal Project
AC transmission line
New

Planned But Not Yet Permitting

Description

The development of ~6 GW transport capacity through the elaboration of a new corridor between the Avelgem substation and the center of the Belgium (substation to be determined along the axis Bruegel-Courcelles). This corridor is envisioned to be implemented in AC technology as per the example of the Stevin project. Timing, routing, scope, etc. subject to feasibility studies and subsequent spatial planning procedures.

Project motivation:

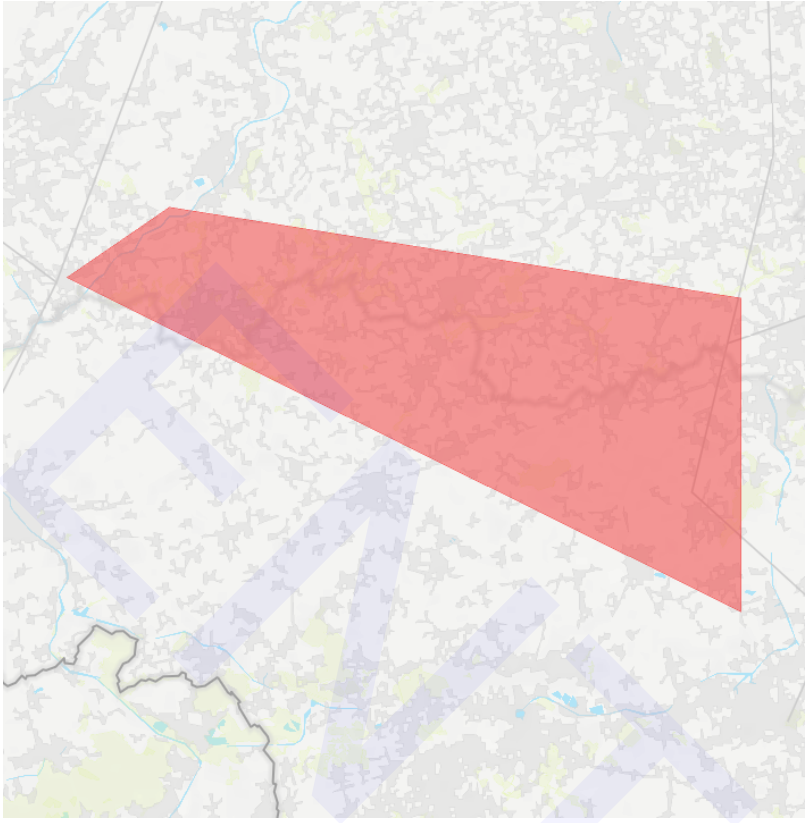
Today, the west and the center of the country are connected on 380 kV via only one corridor between Mercator and Horta, which is currently being upgraded to HTLS. Additional capacity between the west and the center is, however, required to sustain price convergence within a European merit order increasingly characterized by RES. A new corridor between Avelgem and the center of the country would deliver around 6 GW of capacity and at the same time increases the maintainability and reliability of the grid, fulfilling the regulatory expectation that internal grids should be sufficiently strong so that society can fully reap the benefits from European market integration. Furthermore, the Avelgem – Center corridor is a pre-requisite for the integration of new offshore production capacity, for the connection of new large power plants west of Mercator, and for the integration of a second interconnector with Great-Britain (Nautilus).

Project promoters

ELIA

Countries

Belgium



National development plan(s)

NDP1, Belgium, 2020-2030, §4.1.4, page 10
https://www.elia.be/-/media/project/elia/elia-site/infra-and-projects/investment-plans/federal-development-plan-2020-2030/fr/20190516_plan-de-developpement-federal_fr.pdf

Additional information on the project

More information about the project can be found following these links:

- Project site:
https://www.elia.be/en/infrastructure-and-projects/infrastructure-projects/boucle-du-hainaut

- 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): Realisation of a 6 GW new corridor including PSTs

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	100	Avelgem	Center (TBD)	Planned But Not Yet Permitting	2028	Investment on time	

Is the project in the reference grid?

Yes

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 deals with future more frequently expected situations with coinciding imports from France and UK together with evacuation of offshore wind. This project contributes to sustain price convergence between regions. Increased redundancy of onshore path ways will put less restrictions on cross border transmissions capacity for the market.
	Infrastructure to facilitate and accommodate future scenarios, cross-border flows or loop flows.	This project contributes to resolving internal congestions, considering expected high international flows as well as internal grid flows due to increased market exchanges.
	Contribution to the power system's operational flexibility by controlling power flows and optimizing	This projects foresees the installation of phase shifting transformers enabling power flow control and optimizing the use of existing infrastructure.

Need		How the project addresses each need (explanation provided by the project promoter(s))
	use of existing infrastructure	
	Infrastructure designed to enable cost-efficient grid connection of high volumes of RES and/or reduce RES curtailment	This project creates the necessary onshore grid capacity to facilitate offshore wind development. This project will facilitate further offshore development and create grid hosting capacity for onshore and offshore RES development.

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.

ENTSOE

ENTSOE

ENTSOE

Project Assessment

Transfer capacity increase (National Trends 2025)

	Border	A B	B A
Transfer capacity increase (in MW)	Internal (Belgium)	6000	6000

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.

This project was assessed with the internal redispatch methodology. Because this project was assessed with one tool only, there is no variation between min, max and average values.

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	218 218 218	157 157 157	>	>	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	max average min	45 45 45	41 41 41	>	>	ENTSO-E assessment

B1_RES Annual Socio-Economic Welfare increase resulting from RES integration	max average min	252 252 252	207 207 207	>	>	ENTSO-E assessment

Reduction of CO2 and GHG emissions

B4 Non-CO2 emissions (kg/year)

B4a Nitrogen oxides	average	1817	1817	n/a	n/a	ENTSO-E assessment
B4b Ammonia	average	134	134	n/a	n/a	ENTSO-E assessment
B4c Sulfur dioxide	average	3427	3427	n/a	n/a	ENTSO-E assessment
B4d Particular matter 5	average	-4639	-4639	n/a	n/a	ENTSO-E assessment
B4e Particulate matter 10	average	284	284	n/a	n/a	ENTSO-E assessment
B4f Non-methane volatile organic compounds	average	-4697	-4697	n/a	n/a	ENTSO-E assessment

B2a Annual CO2 variation from market simulation (ktonnes / year)	max average min	-2 -2 -2	-1467 -1467 -1467	<	>	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	0 0 0	47 106 236	< < <	< < <	ENTSO-E assessment
B2b Annual CO2 variation due to network losses (ktonnes / year)	average	-46	-76	n/a	n/a	ENTSO-E assessment
B2b_€ Annual Societal cost	CO2 price 60€/ ton	1 4	2 5	n/a	n/a	ENTSO-E assessment

variation resulting from CO2 variation from network simulation monetised (M € / year)	100€/ ton 189€/ ton	8	12			

Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year)	max average min	5027 5027 5027	5194 5194 5194	>	>	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	-79	-160	n/a	n/a	ENTSO-E assessment
B5_€ Variation of network losses monetised (M€ / year)	average	-3	-6	n/a	n/a	ENTSO-E assessment

Security of supply

B6 Annual reduction in Energy Not Served (MWh / year)	max average min		N/A	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	N/A	>	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	257	195	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	average	81	49	ENTSO-E assessment
B1_RES Annual Socio-Economic Welfare increase resulting from RES integration	average	257	236	ENTSO-E assessment
Reduction of CO2 and GHG emissions				
B2a Annual CO2 variation from market simulation (ktonnes / year)	average	-1536	-1384	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	11 72 209	35 90 213	ENTSO-E assessment
Integration of renewable energy sources				
B3 Annual avoided curtailment (RES integration) (GWh / year)	average	5209	5240	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	
Avelgem-Center: new corridor (New AC line)	++	++	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	242	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	average	51	ENTSO-E assessment
B1_RES Annual Socio-Economic Welfare increase resulting from RES integration	average	266	ENTSO-E assessment
Reduction of CO2 and GHG emissions			
B2a Annual CO2 variation from market simulation (ktonnes / year)	average	-1839	ENTSO-E assessment
B2a_€ Annual Societal cost variation resulting from	CO2 price 60€/ton 100€/	59 132 296	ENTSO-E assessment

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

Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year)	average	5031	ENTSO-E assessment
B3a Connected RES (MW)	-		ENTSO-E assessment

Comments on the CBA results by the project promoter(s)

The project enables the integration of the second wave of offshore wind in Belgium, as well as future cross border interconnection, RES integration and alleviation of internal congestions. The calculated benefits illustrate the facilitation of part of the SEW of project ID 120, but do not include another important anticipated SEW factor, which is the realization of additional PINT interconnection capacity from project 121.

Residual impact

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

Project Costs

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

	CAPEX (Meuro)	Uncertainty range (%)	OPEX
1519. Avelgem-Center: new corridor	500	25%	0.5
Total	500		0.5

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

1519 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.