Project Sheet

Belgium-Netherlands: Zandvliet-Rilland

Project type	transmission
Project id	262
Created by	
Created on	Feb 11, 2021 11:24:06 AM

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) 13
Sensitivity Study: Current Trends 14
Residual impact 15
Project Costs 15

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Key Information

Cross Border Project
Phase shifting transformer
New

Under Construction

Description

Bilateral study has assessed multiple reinforcement options. The study concluded that an upgrade of the existing corridor Zandvliet-Rilland via the installation of two additional PSTs in Zandvliet and the upgrade of Zandvliet-Rilland line to high capacity conductors is the most appropriate solution. The constuction of the substation Rilland is part of TenneT's project "Zuid-West 380"", id 346.

Project motivation:

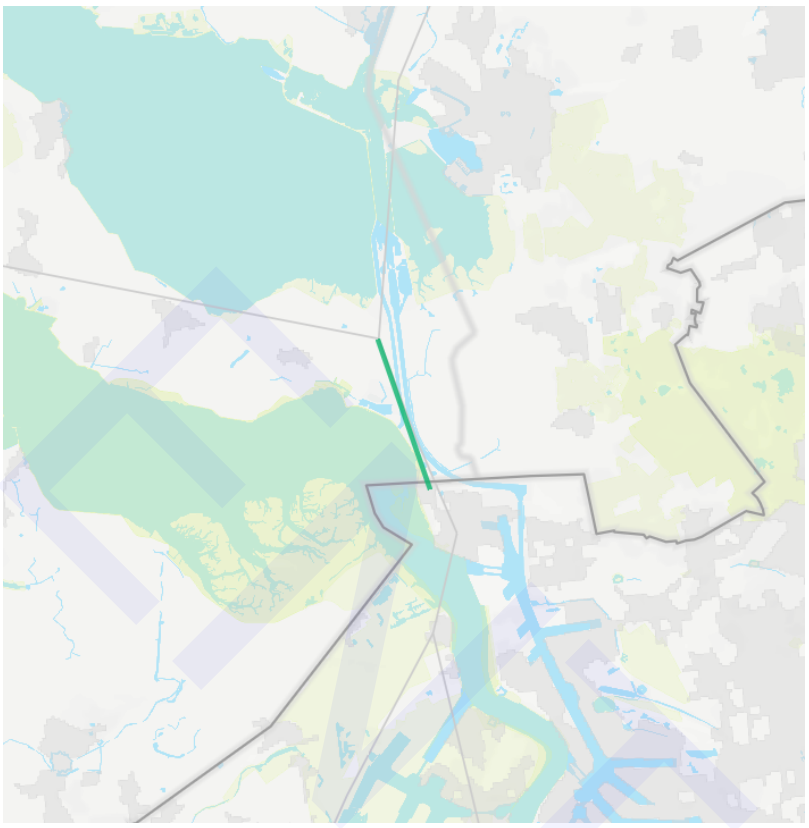
A need has been identified during TYNDP16 and TYNDP18 to develop additional interconnection capacity between Belgium and The Netherlands. This project effectively increases the degree of interconnectivity between the Belgian and Dutch bidding zone. The possibility of higher market exchanges between these two bidding zones leads to a higher price convergence in more hours of the year and reduces therefore the price differentials. This project has an important adequacy contribution due to decreasing figures of installed conventionals (bad market conditions) and especially in light of the nuclear phaseout. 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. PSTs will also help to balance the flows over the different cross border lines of the Belgian Dutch interconnection.Based on the above, the project directly contributes to the interconnection criteria 2030.

Project promoters

ELIA
TENNET-NL

Countries

Belgium
Netherlands



National development plan(s)

NDP1, Belgium, 2020-2030, §4.2.2.1

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): Upgrade of the capacity of the cross-border lines by replacing the current conductors with high performance (HTLS) conductors combined with the installation of additional phase shifting transformers in Zandvliet.

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
Phase shifting transformer				Under Construction	2022	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 increases the degree of interconnectivity between the Belgian and Dutch bidding zone. The possibility of higher market exchanges between these two bidding zones leads to a higher price convergence in more hours of the year and reduces therefore the price differentials.
	Infrastructure to address system adequacy deficiencies and/or mitigate the risk of power failures.	This project has an important adequacy contribution due to decreasing figures of installed conventionals and considering the nuclear phaseout in Belgium.
	Infrastructure to facilitate and accommodate future scenarios, cross-border flows	The installation of phase shifting transformers will help to balance the flows over the different cross border lines on the Belgian-Dutch border.

Need		How the project addresses each need (explanation provided by the project promoter(s))
	or loop flows.	
	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)	The Netherlands - Belgium	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	10 9 8	29 28 28	>	>	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	max average min	2 2 1	4 4 3	>	>	ENTSO-E assessment
B1_RES Annual Socio-Economic	max average	14 13	44 43	<	<	ENTSO-E assessment

Welfare increase resulting from RES integration	min	12	42			

Reduction of CO2 and GHG emissions

B4 Non-CO2 emissions (kg/year)

B4a Nitrogen oxides	average	-345	107	n/a	n/a	ENTSO-E assessment
B4b Ammonia	average	-6	0	n/a	n/a	ENTSO-E assessment
B4c Sulfur dioxide	average	-541	217	n/a	n/a	ENTSO-E assessment
B4d Particular matter 5	average	-2273	-9427	n/a	n/a	ENTSO-E assessment
B4e Particulate matter 10	average	-14	13	n/a	n/a	ENTSO-E assessment
B4f Non-methane volatile organic compounds	average	-2261	-9435	n/a	n/a	ENTSO-E assessment

B2a Annual CO2 variation from market simulation (ktonnes / year)	max average min	-61 -74 -96	-121 -141 -159	< 	< 	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	3 6 12	4 10 23	< > >	>> >>	ENTSO-E assessment
B2b Annual CO2 variation due to network losses (ktonnes / year)	average	9	44	n/a	n/a	ENTSO-E assessment
B2b_€ Annual Societal cost variation resulting from	CO2 price 60€/ ton 100€/	-1 -3 -6	-2 -3 -7	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	297 265 237	1164 1148 1127	<	<	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	108	171	n/a	n/a	ENTSO-E assessment
B5_€ Variation of network losses monetised (M€ / year)	average	3	3	n/a	n/a	ENTSO-E assessment

Security of supply

B6 Annual reduction in Energy Not Served (MWh / year)	max average min		2277	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	22.77	>	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	42	29	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	average	29	11	ENTSO-E assessment
B1_RES Annual Socio-Economic Welfare increase resulting from RES integration	average	23	21	ENTSO-E assessment
Reduction of CO2 and GHG emissions				
B2a Annual CO2 variation from market simulation (ktonnes / year)	average	-543	-311	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	4 26 74	8 20 48	ENTSO-E assessment
Integration of renewable energy sources				
B3 Annual avoided curtailment (RES integration) (GWh / year)	average	462	487	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	
Belgium-Netherlands: Zandvliet-Rilland (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	14	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	average	6	ENTSO-E assessment
B1_RES Annual Socio-Economic Welfare increase resulting from RES integration	average	16	ENTSO-E assessment

Reduction of CO2 and GHG emissions

B2a Annual CO2 variation from market simulation (ktonnes / year)	average	-201	ENTSO-E assessment
B2a_€ Annual Societal cost variation resulting from CO2 variation from market	CO2 price	60€/ ton 100€/ ton 189€/	6 14 32	ENTSO-E assessment

simulation monetised (M€ / year) ton		

Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year) average	300	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
Belgium-Netherlands: Zandvliet-Rilland	Under Construction	2	Habitats Directive (92/43/EEC)
		2	Birds Directive (2009/147/EC)

Residual social impact

Investment	Investment status	Distance (km)	Type of sensitivity
Belgium-Netherlands: Zandvliet-Rilland	Under Construction	7	Sensitivity regarding population density - Land that is close to densely populated areas

Project Costs

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

	CAPEX (Meuro)	Uncertainty range (%)	OPEX
1257. Belgium-Netherlands: Zandvliet-Rilland	60	10%	0.1
Total	60		0.1

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

1257 Considering project status, marginal uncertainties continue to exist regarding CAPEX estimations. These uncertainties are mainly related to potential cost add-ons/reductions that only become apparent closer to the realisation of the project.