Project Sheet

GerPol Power Bridge I

Project type	transmission
Project id	230
Created by	
Created on	Feb 9, 2021 10:03:06 AM

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Key Information

Internal Project
AC transmission line
New

PCI number 3.14 (including 3.14.2, 3.14.3, 3.14.4) (4th list, 31 Oct. 2019)
In Permitting

Description

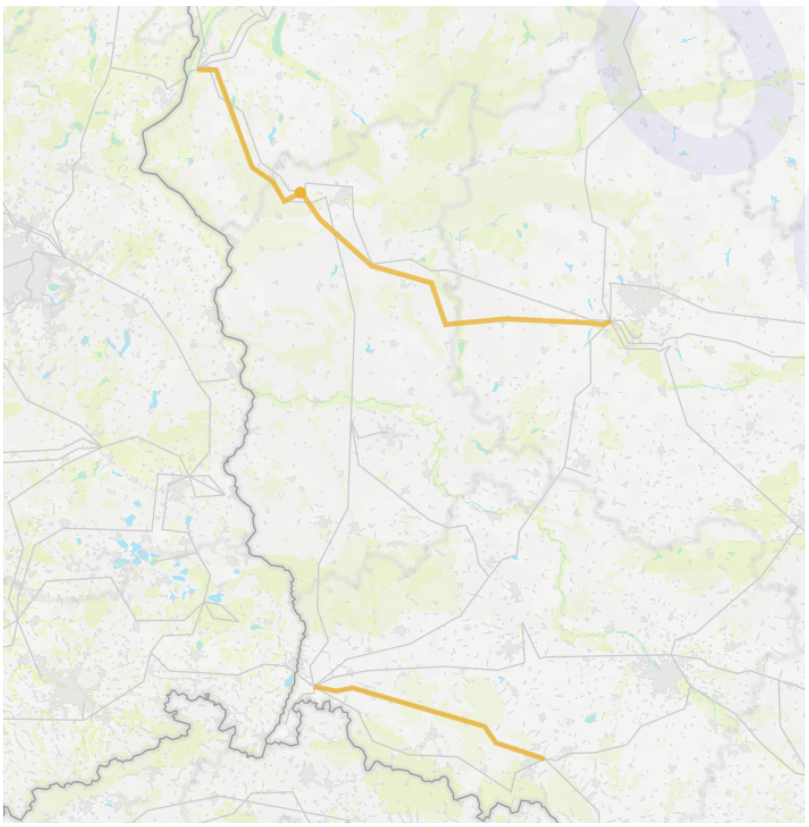
The reinforcements in the Polish transmission network in western part of the country near Polish/German border. Construction new AC 2x400 kV lines Mikułowa - Świebodzice, Krajnik - Baczyna and Baczyna - Plewiska.

Project promoters

Polskie Sieci Elektroenergetyczne S.A.

Countries

Poland



National development plan(s)

Poland, Link to PSE S.A. Development Plan where investments of this project are included:
https://www.pse.pl/documents/20182/8c629859-1420-432f-8437-6b3a714dda9c?safeargs=646f776e6c6f61643d74727565
Pages : 42, 50.”

Additional information on the project

Link to PSE S.A. Development Plan where investments of this project are included:

https://www.pse.pl/documents/20182/8c629859-1420-432f-8437-6b3a714dda9c?safeargs=646f776e6c6f61643d74727565

Pages : 42, 50. The following investments from cluster are included in 3rd PCI list: 3.14.2 Internal line between Krajnik and Baczyna (PL), 3.14.3 Internal line between Mikułowa and Świebodzice (PL), 3.14.4 Internal line between Baczyna and Plewiska (PL)

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): Construction of new 400 kV double circuit line Baczyna - Plewiska

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	147	Baczyna	Plewiska	In Permitting	2022	Rescheduled	

Other investments

Description	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
Construction of new 400 kV double circuit line Krajnik - Baczyna. One circuit will be operating temporarily on 220 kV between stations Krajnik and Gorzów with winter thermal limit 1290 A, summer thermal limit 990 A.	AC transmission line	70	Krajnik (PL)	Baczyna (PL)	In Permitting	2021	Investment on time	
Construction of new 400 kV double circuit line Mikulowa-Swiebodzice	AC transmission line	100	Mikulowa (PL)	Swiebodzice (PL)	In Permitting	2024	Rescheduled	

Description	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
in place of existing 220 kV line. One circuit will be operating temporarily on 220 kV between stations Mikulowa and Swiebodzice with winter thermal limit 1290 A, summer thermal limit 990 A.								
Construction of new 400/110 kV Substation Baczyna to connect the new line Krajnik-Baczyna.	Onshore substation		Baczyna	n.a.	In Permitting	2021	Investment on time	

Reason for investment clustering

All investments in the 230 project complement each other in bringing the desired increase of Grid Transfer Capability on the Polish-German border. Vast majority of investents in this cluster connect directly to border substations and have direct impact on border flows.

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	Finalization GerPol Power Bridge I project allows to increasing cross-border capacity on Polish-German border and thus allows to exchange more energy.
	Infrastructure designed to enable cost-efficient grid connection of high volumes of RES and/or reduce RES curtailment	This project enables the integration of additional RES on the area of western and north-western Poland as well as eastern part of Germany
	Infrastructure to facilitate and accommodate future scenarios, cross-border flows or loop flows.	This project contributes to accommodate future scenarios and cross-border flows.

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)	Germany - Poland	1500	500

Boundary capacity diagram

Network boundary the projects helps mitigate

Central East integration

Boundary capacity diagram

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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	107 90 71	202 198 194	<	<	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	max average min	86 79 71	103 96 91	>	<	ENTSO-E assessment
B1_RES Annual Socio-Economic Welfare increase resulting from RES integration	max average min	29 21 19	63 58 53	<	<	ENTSO-E assessment

Reduction of CO2 and GHG emissions

B4 Non-CO2 emissions (kg/year)

B4a Nitrogen oxides	average	-8679	-7609	n/a	n/a	ENTSO-E assessment
B4b Ammonia	average	30	-87	n/a	n/a	ENTSO-E assessment
B4c Sulfur dioxide	average	-14941	-9215	n/a	n/a	ENTSO-E assessment
B4d Particular matter 5	average	5291	21663	n/a	n/a	ENTSO-E assessment
B4e Particulate matter 10	average	-203	-324	n/a	n/a	ENTSO-E assessment
B4f Non-methane volatile organic compounds	average	5557	22131	n/a	n/a	ENTSO-E assessment

B2a Annual CO2 variation from market simulation (ktonnes / year)		max average min	-3071 -3416 -3749	-3259 -3439 -3674	> 	> 	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	126 263 567	110 248 554	< < <	< < <	ENTSO-E assessment
B2b Annual CO2 variation due to network losses (ktonnes / year)		average	578	119	n/a	n/a	ENTSO-E assessment
B2b_€ Annual Societal cost variation resulting from CO2 variation from network simulation monetised (M € / year)	CO2 price	60€/ ton 100€/ ton 189€/ ton	-21 -45 -96	-4 -9 -19	n/a	n/a	ENTSO-E assessment

Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year)		max average min	613 441 370	1757 1525 1381	<	<	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	1032	424	n/a	n/a	ENTSO-E assessment
B5_€ Variation of network losses monetised (M€ /		average	53	12	n/a	n/a	ENTSO-E assessment

year)					

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	176	132	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	average	149	68	ENTSO-E assessment
B1_RES Annual Socio-Economic Welfare increase resulting from RES integration	average	42	34	ENTSO-E assessment

Reduction of CO2 and GHG emissions

B2a Annual CO2 variation from market	average	-2818	-1952	ENTSO-E assessment

simulation (ktonnes / year)				
B2a_€ Annual Societal cost variation resulting from CO2 variation from market simulation monetised (M€ / year)	CO2 price	60€/ ton 100€/ ton 189€/ ton	20 132 383	49 127 301	ENTSO-E assessment

Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year)	average	797	789	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**	
Krajnik-Baczyna (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.
Mikulowa - Swiebodzice (New AC line)	++	++	0	
Baczyna-Plewiska (New AC line)	++	++	0	

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	82	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	average	58	ENTSO-E assessment
B1_RES Annual Socio-Economic Welfare increase resulting from RES integration	average	25	ENTSO-E assessment

Reduction of CO2 and GHG emissions

B2a Annual CO2 variation from market simulation (ktonnes / year)	average	-2060	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	66 148 332	ENTSO-E assessment

Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year)	average	474	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
Krajnik-Baczyna	In Permitting	1	Birds Directive (2009/147/EC)

Additional information by the project promoter(s)

Obtaining the Environmental Decision for the 400 kV line Mikułowa - Świebodzice is planned by the end of 2020. Until then there are many route options included in the environmental impact reports of 400 kV line Mikułowa- Świebodzice. Obtaining the Environmental Decision for the 400 kV line Baczyna - Plewiska is also planned by the end of 2020. Until then there are many route options included in the environmental impact reports of 400 kV line Baczyna - Plewiska. The Environmental decision for the line Krajnik - Baczyna was obtained in 2018. That is why the data for the residual environmental and social impact for the whole project include now only the data for the line Krajnik - Baczyna.

Residual social impact

Investment	Investment status	Distance (km)	Type of sensitivity

Additional information by the project promoter(s)

Obtaining the Environmental Decision for the 400 kV line Mikułowa - Świebodzice is planned by the end of 2020. Until then there are many route options included in the environmental impact reports of 400 kV line Mikułowa- Świebodzice. Obtaining the Environmental Decision for the 400 kV line Baczyna - Plewiska is also planned by the end of 2020. Until then there are many route options included in the environmental impact reports of 400 kV line Baczyna - Plewiska. The Environmental decision for the line Krajnik - Baczyna. That is why the data for the residual environmental and social impact for the whole project include now only the data for the line Krajnik - Baczyna.

Project Costs

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

	CAPEX (Meuro)	Uncertainty range (%)	OPEX
353. Krajnik-Baczyna	45.2	5%	0.116
355. Mikulowa - Swiebodzice	89	5%	0.307
1035. Baczyna	24.9	5%	0.675
1232. Baczyna-Plewiska	91.9	5%	0.7
Total	251		1.798

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

353	Uncertainty regarding extra costs due to safety, environmental or legal requirements imposed during permit grating process
355	Uncertainty regarding extra costs due to safety, environmental or legal requirements imposed during permit grating process
1035	Uncertainty regarding extra costs due to safety, environmental or legal requirements

	imposed during permit grating process
1232	Uncertainty regarding extra costs due to safety, environmental or legal requirements imposed during permit grating process

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