Project Sheet

CZ Northwest-South corridor

Project type	transmission
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Key Information

Internal Project
AC transmission line
Mostly New

PCI number 3.11.1, 3.11.2, 3.11.4 (4th list, 31 Oct. 2019)
In Permitting

Description

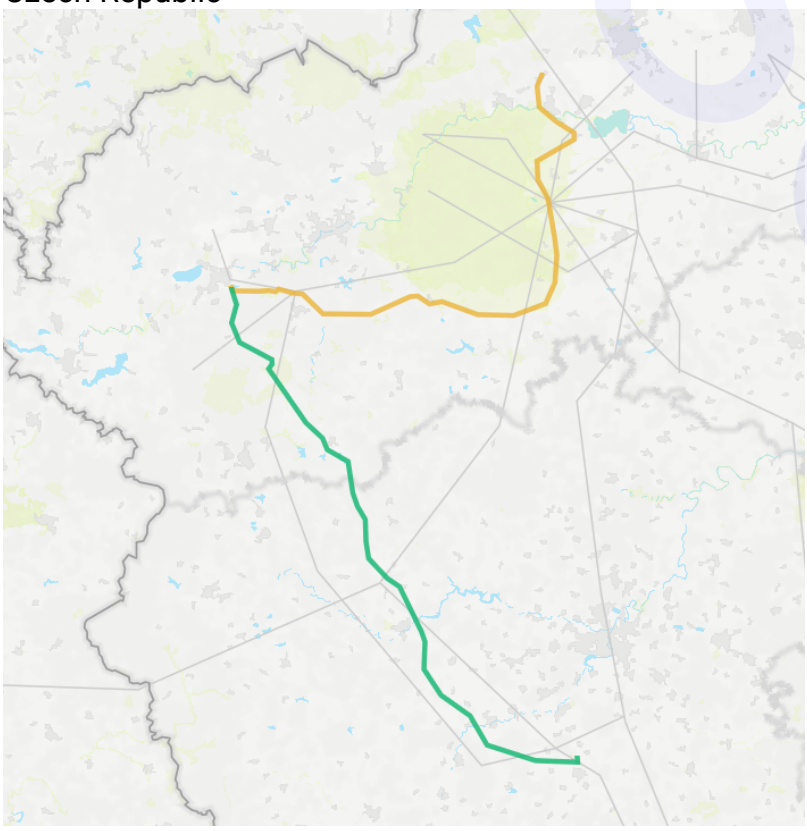
A corridor of internal 400 kV overhead lines inside the Czech Republic connecting new 420 kV substations between Vernerov, Vitkov and existing substation Prestice in the northwest-south direction. The project consists building of two 400 kV overhead lines involving changing a 220 kV double-circuit lines to 400 kV double-circuit lines with a capacity of 2x1713 MVA each between Vernerov and Vitkov and Vitkov and Prestice. Part of the project is also a construction of a new 420 kV substation Vitkov and upgrading and extension of the existing 420 kV substation Kocin.

Project promoters

CEPS

Countries

Czech Republic



National development plan(s)

24.5.2019

Additional information on the project

Information about Czech development plan and PCI projects can be found on the following links below on the CEPS website:

http://www.ceps.cz/cs/rozvoj-ps

http://www.ceps.cz/cs/projekty-spolecneho-zajmu

Related projects

As part of the PCI 3.11 which clusters five projects, the project relates also to project Kocin-Mirovka (item 313) and Prestice-Kocin (item 315). Project V413-Mirovka (item 314) was successfully commissioned in 2019.

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):

New 400 kV double circuit OHL with a transmission capacity of 2x1713 MVA and 83 km length.

New 400 kV double circuit OHL with transmission capacity of 2x1713 MVA and 87 km length.

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	83	Vernerov (CZ)	Vitkov (CZ)	In Permitting	2023	Ahead of time	
AC transmission line	87	Vitkov (CZ)	Prestice (CZ)	Under Construction	2021	Ahead of time	

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
Upgrade and extension of the existing 400/110 kV substation, increasing nominal capacity of transformers from 2x250 MVA to 2x350 MVA	Onshore substation		Kocin (CZ)	N/A	Under Construction	2023	Investment on time	
A construction of a new 400/110 kV substation	Onshore substation		Vitkov (CZ)	N/A	Under Construction	2021	Ahead of time	

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
GIS technology equipped with two transformers with nominal capacity of 2x350 MVA								

Reason for investment clustering

Project 200 that contains investment items 308 and 309 altogether with Project 35 that contains investment items 313 and 315 forms a geographically continuous (uninterrupted) network corridor from a new 420 kV substation Vernerov (commissioned the end of 2017), through a new 420 kV substation Vitkov (which is under construction with a commissioning date at the end of 2020), existing 420 kV substation Prestice, existing 420 kV substation Kocin and ending up at the existing substation 420 kV Mirovka. It is actually what is referred as a “convoy lines” or "sequantial projects" with all 4involved 400 kV overhead lines (investment 308 (Vernerov-Vitkov), 309 (Vitkov-Prestice), 315 (Prestice-Kocin) and 313 (Kocin-Mirovka)) connected in series forming a corridor from the northern-western part of the Czech grid related to the DE-CZ border into the south and eastern direction towards the CZ-SK and CZ-AT borders.

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 helps to decrease the curtailed energy in Germany due to extra market transfers (increase of NTC) on the profile DE - CZ which lead to reduction of marginal price.
	Infrastructure to facilitate and accommodate future scenarios, cross-border flows or loop flows.	This project besides the increase of NTC also consists of reinforcement of internal lines and therefore facilitates the future need for cross-

Need		How the project addresses each need (explanation provided by the project promoter(s))
		border flows.
	Contribution to the power system's operational flexibility by controlling power flows and optimizing use of existing infrastructure	The project contains the upgrade of existing 220 kV lines to 400 kV lines which will reduce infrastructure vulnerability and therefore ensure reliable and secure operation of the grid.
	Infrastructure designed to enable cost-efficient grid connection of high volumes of RES and/or reduce RES curtailment	The project is aiming at facilitation of the power flows from the RES generation in the northern part of Europe and western part of CZ therefore promotes RES integration.

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)	Czechia - Germany	500	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	15 12 9	54 52 50	<	<	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	max average min	13 10 5	65 51 40	<	<	ENTSO-E assessment
B1_RES Annual Socio-Economic Welfare increase resulting from RES integration	max average min	8 7 6	31 25 21	<	<	ENTSO-E assessment

Reduction of CO2 and GHG emissions

B4 Non-CO2 emissions (kg/year)

B4a Nitrogen oxides	average	-1205	-2772	n/a	n/a	ENTSO-E assessment
B4b Ammonia	average	-2	-1	n/a	n/a	ENTSO-E assessment
B4c Sulfur dioxide	average	-1309	-2978	n/a	n/a	ENTSO-E assessment
B4d Particular matter 5	average	1908	5775	n/a	n/a	ENTSO-E assessment
B4e Particulate matter 10	average	-63	-146	n/a	n/a	ENTSO-E assessment
B4f Non-methane volatile organic compounds	average	2008	6018	n/a	n/a	ENTSO-E assessment

B2a Annual CO2 variation from market simulation (ktonnes / year)		max average min	-237 -413 -560	-1440 -1838 -2327	> 	> 	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	15 32 69	59 132 296	< < <	< < <	ENTSO-E assessment
B2b Annual CO2 variation due to network losses (ktonnes / year)		average	61	112	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	-2 -5 -10	-4 -8 -18	n/a	n/a	ENTSO-E assessment

Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year)		max average min	168 137 124	813 668 515	< < <	< < <	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	136	380	n/a	n/a	ENTSO-E assessment
B5_€ Variation of network losses monetised (M€ /		average	4	11	n/a	n/a	ENTSO-E assessment

year)					

Security of supply

B6 Annual reduction in Energy Not Served (MWh / year)	max average min		980.571428571427	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	9.805714285571427		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	27	33	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	average	2	27	ENTSO-E assessment
B1_RES Annual Socio-Economic Welfare increase resulting from RES integration	average	9	16	ENTSO-E assessment

Reduction of CO2 and GHG emissions

B2a Annual CO2 variation from market	average	-36	-776	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	0 2 5	19 50 119	ENTSO-E assessment

Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year)	average	173	372	ENTSO-E assessment
B3a Connected RES (MW)	-			ENTSO-E assessment

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	19	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	average	12	ENTSO-E assessment
B1_RES Annual Socio-Economic Welfare increase resulting from RES integration	average	8	ENTSO-E assessment

Reduction of CO2 and GHG emissions

B2a Annual CO2 variation from market simulation (ktonnes / year)	average	-445	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	14 32 72	ENTSO-E assessment

Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year)	average	157	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).

Project Costs

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

	CAPEX (Meuro)	Uncertainty range (%)	OPEX
308. Vernerov-Vitkov	92.96	-10%, +15%	0.06
309. Vitkov-Prestice	109.73	-10%, +15%	0.005
1711. R Kocin	139.87	-10%, +15%	0.06
1712. R Vitkov	27.43	-10%, +15%	0.063
Total	369.99		0.188

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

308	The reasons for possible variations of the costs are: procurement uncertainties, exchange rate uncertainties, uncertainty regarding extra costs due to safety, environmental or legal requirements imposed during permit granting process.
309	The reasons for possible variations of the costs are: procurement uncertainties, exchange rate uncertainties, uncertainty regarding extra costs due to safety,

environmental or legal requirements imposed during permit granting process.
1711
1712

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