Project Sheet

4th 400kV CZ-SK interconnector

Project type	transmission
Project id	330
Created by	
Created on	Feb 11, 2021 12:05:19 PM

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Key Information

Cross Border Project
AC transmission line
New

Under Consideration

Description

This new 400 kV cross-border overhead line between the substations Otrokovice (CZ) - Ladce (SK) will strenghten the transmission capacity between Slovak and Czech transmission systems, aiming to maintain secure operation of both transmission systems.

Project promoters

CEPS
SEPS

Countries

Czech Republic
Slovakia

National development plan(s)

Both CEPS and SEPS - This project is not included in the last approved NDP as the Energy Act requires to have in NDP only projects which are commisioned in the ten year time frame of the NDP.

Additional information on the project

Environmental Impact

The over-headline project Otrokovice - Ladce is included in the Czech Land Use Development Policy which is the land use plan for the entire country adopted on 15th April 2015 by the Czech government under the governmental resolution. The proposed route (corridor) of the over-headline on the Czech territory was chosen with respect to the municipalities' land plans, transport and technical infrastructures and other development plans of regional importance (local roads, highways, railways, other transport and technical infrastructures). For the purpose of finding a suitable route, a spatial – land oriented technical study was carried out that evaluated several route variants with consideration of several aspects including environmental ones. The proposed route was then communicated with relevant and respective local and regional authorities, municipalities and other technical infrastructure owners. The outputs from the above study will be taken as an important input into the environment impact assessment which is scheduled to be conducted between 2018 and 2020 in accordance with EIA legislation.

The main proposed route of the over-headline including its local variants on the Czech side does not pass through any NATURA 2000 sites. No bird areas and no European sites of interest are affected (EVL). The nearest locality EVL is EVL CHKO Beskydy (CZ 0724089) in the neighborhood

of Střelná village, to which one section of the route is approaching at the distance of about 93 m at the crossing point on the Czech-Slovakian border.

According to the opinion of the Department of Environment and Agriculture of the Regional Authority of the Zlín Region granted on 22nd May 2017, the route of the new over-headline on the Czech side does not pass through the territories of European significant sites and bird areas (NATURA 2000).

On the Slovak side this projects aims to replace the existing out-of-date 220kV interconnections between SK and CZ which are planned to be decommissioned in next ten years. For the purpose of its erection (not only) SEPS and CEPS are working on the Memorandum of understanding in order to efficiently coordinate the development activities on the common SK – CZ cross border profile. On the Slovak side the route for the purpose of the OHL erection is reserved in the spatial planning documents of the respective communities (villages, towns, county, etc.). The environmental impact assessment study will be carried out according to the particular Slovak legislation. We do not expect any objection to get an approval from the environmental point of view, as the planned route of the line is the same as the existing 220kV SK-CZ cross-border line corridor. Currently expected date of commissioning is after 2030 (but before 2035) will be written in the above mentioned MoU. The new substation 400kV Ladce (SK) is needed to connect this OHL into the Slovak transmission system - this future project is currently in a feasibility study phase.

Social impact:

From the point of view of reliability of power supply in the Zlín region on the Czech side the construction of the over-headline Otrokovice – Ladce is very important because will strengthen the connection of the Otrokovice substation to the transmission system. Otrokovice substation with three transformers 400/110 kV each with 350 MVA is currently connected to the transmission system with only two over-headlines. Otrokovice – Ladce will be the third line. The energy transferred between the transmission and distribution system by this substation represents approximately about 7% of the total energy transferred between the transmission system and all distribution companies in the Czech Republic.

From the above, it is obvious that strengthening connection of substation Otrokovice with the transmission system is vital because it will ensure energy supplies to industry and a considerable number of households in the Zlín Region, which is one of the most exposed area in the Czech Republic. Considering the long-term aspect of increasing the consumption and reducing the share of electricity production by traditional generation connected into the 110 kV distribution system, the demand on the power transmitted by the transmission system is further increased, and therefore its strengthening is crucial for the society.

The project is aiming to replace the 220kV system in the west-north Slovakia by the new 400kV substation with the new 400/110kV transformation. The connection of the third 400kV line (crossborder line Otrokovice - Ladce) to the Ladce substation will significantly improve security and reliability of the Slovak power system operation in that region, as well as during maintenaces of the transmission system equipment. In the connected 110kV distribution grid a lot of households and important consumers are connected as well as important power plants providing heat to the households in the cold months and the hyro power plants on the Váh river . This will have a substantial benefit for the society living in the Žilina and Považská Bystrica aglomeration.

Project sheet backlog

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

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Project Description & Context

Project Investments

Main investment(s): This investment consists of single circuit 400 kV OHL Otrokovice (CZ) - Ladce (SK).

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	78	Otrokovice (CZ)	Ladce (SK)	Under Consideration	2035	New Investment	

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
This investment consists of the new 400 kV substation Ladce, which will replace existing 220 kV substation Považská Bystrica and will therefore increase security of supply in this particular region. After commissioning this new 400 kV substation it will be possible to build new 400 kV cross-	Onshore substation		Ladce (SK)	Ladce (SK)	Planned But Not Yet Permitting	2027	New Investment	

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
border OHL from Ladce (SK) to Otrokovice (CZ).								

Reason for investment clustering

The new 400kV CZ-SK cross-border single OHL Otrokovice (CZ) - Ladce (SK) aims to increase NTC at the CZ-SK cross-border profile. The new 400kV substation Ladce (SK) is clustered with the CZ-SK cross-border line into one projects as it is directly connected into the new 400kV substation Ladce (SK).

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 facilitate and accommodate future scenarios, cross-border flows or loop flows.	This project increases the NTC on CZ - SK profile and therefore facilitates the future need for cross-border flows and improves operational security.
	Contribution to the power system's operational flexibility by controlling power flows and optimizing use of existing infrastructure	The project replaces the decommissioning of the two 220 kV interconnectors on the CZ - SK profile. In this way the secure operation of both transmission systems and the power exchange will be ensured.
	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 eastern 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 - Slovakia	500	500

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.

Because its planned commissioning date is in 2035 or later, this project has only been assessed in the 2030 scenarios and based on a subset of CBA indicators.

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	2 2 2	8 4 1	>	>	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	max average min	-1 -1 -1	-1 -2 -3	>	>	ENTSO-E assessment

B1_RES Annual Socio-Economic Welfare increase resulting from RES integration	max average min	0 0 0	0 0 0	>	>	ENTSO-E assessment

Reduction of CO2 and GHG emissions

B4 Non-CO2 emissions (kg/year)

B4a Nitrogen oxides	average	N/A	292	n/a	n/a	ENTSO-E assessment
B4b Ammonia	average	N/A	-6	n/a	n/a	ENTSO-E assessment
B4c Sulfur dioxide	average	N/A	350	n/a	n/a	ENTSO-E assessment
B4d Particular matter 5	average	N/A	382	n/a	n/a	ENTSO-E assessment
B4e Particulate matter 10	average	N/A	16	n/a	n/a	ENTSO-E assessment
B4f Non-methane volatile organic compounds	average	N/A	353	n/a	n/a	ENTSO-E assessment

B2a Annual CO2 variation from market simulation (ktonnes / year)	max average min	45 45 45	109 68 38	<	<	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	-2 -3 -8	-2 -5 -11	>|>|>	>|>|>	ENTSO-E assessment
B2b Annual CO2 variation due to network losses (ktonnes / year)	average	0	N/A	n/a	n/a	ENTSO-E assessment
B2b_€ Annual Societal cost	CO2 price 60€/ ton	0 0	N/A N/A	n/a	n/a	ENTSO-E assessment

variation resulting from CO2 variation from network simulation monetised (M € / year)	100€/ ton 189€/ ton	0	N/A			

Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year)	max average min	0 0 0	8 5 3	>	>	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	N/A	N/A	n/a	n/a	ENTSO-E assessment
B5_€ Variation of network losses monetised (M€ / year)	average	N/A	N/A	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	9	7	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	average	10	1	ENTSO-E assessment
B1_RES Annual Socio-Economic Welfare increase resulting from RES integration	average	4	4	ENTSO-E assessment
Reduction of CO2 and GHG emissions				
B2a Annual CO2 variation from market simulation (ktonnes / year)	average	-198	-36	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	1 9 27	1 2 6	ENTSO-E assessment
Integration of renewable energy sources				
B3 Annual avoided curtailment (RES integration) (GWh / year)	average	84	92	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	3	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	average	-2	ENTSO-E assessment
B1_RES Annual Socio-Economic Welfare increase resulting from RES integration	average	2	ENTSO-E assessment

Reduction of CO2 and GHG emissions

B2a Annual CO2 variation from market simulation (ktonnes / year)	average	85	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 -14	ENTSO-E assessment

Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year)	average	31	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
1498. New CZ-SK 400 kV interconnector	83.2	±10%	0.37
1499. New 400 kV substation Ladce	3.1	±10%	0.25
Total	86.3		0.62

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

1498 The project is still under consideration phase therefore costs estimate are rather uncertain, the project scope can also change with influence to the total costs, other influencing factors are procurement uncertainties, exchange rate uncertainties, uncertainty regarding extra costs due to safety, environmental or legal requirements imposed during permit granting process.

1499 The costs of the investment are in 2018 price levels, when the estimation of the project investment costs have been done. The value of the costs provided includes implementation phase costs (studies, permissions, etc.), construction costs of the substation equipment and the costs for the substations extensions. All possible factors that can influence the investment costs value are therefore considered in the "Cost Uncertainty Range".