Project Sheet

North CSE Corridor

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Key Information

Cross Border Project
AC transmission line
Mostly New

Planned But Not Yet Permitting

Description

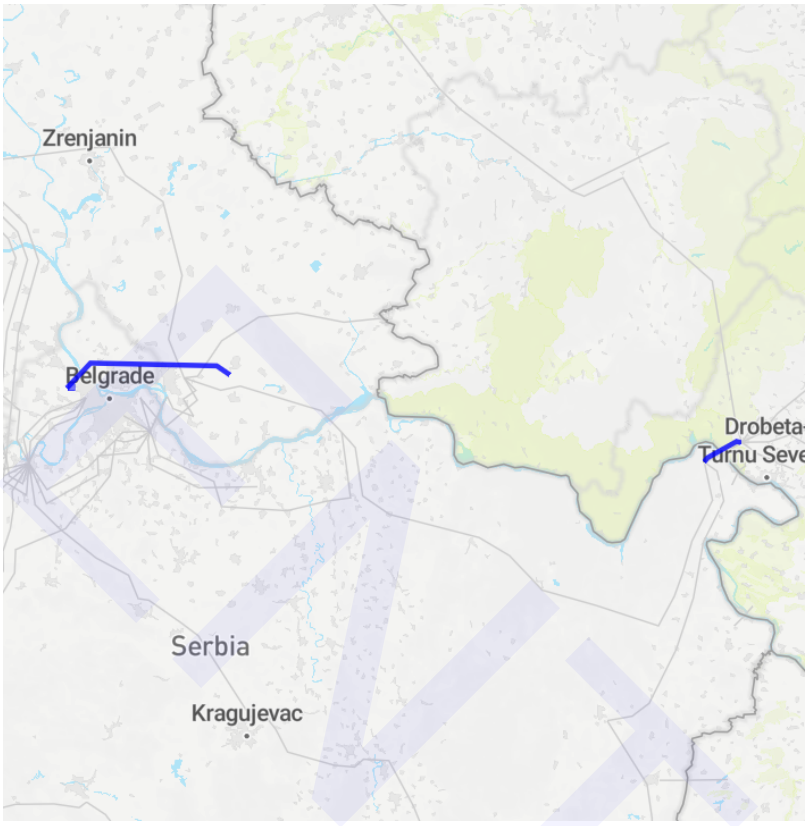
This project will consist of three investments. The investments of this project are SS 400/110 Belgrade West, OHL 400 kV SS Belgrade West - WPP Cibuk and doubling existing OHL 400 kV Portile de Fier (RO) - Djerdap 1 (RS). Every investment included in this project represents a segment of the new significant corridor in the East-to-West direction, boasting the massive cross-border impact on the boundary between Serbia and Romania. This, in detail, means that the project will enhance the market integration in the region, allowing the lower difference in marginal energy costs, allow the connection of huge capacities of renewable sources that have applied for connection in the observed area (only in Serbia, there is about 3 GW of new wind and solar power plants foreseen in the Banat region) and affect the security of supply in the aforementioned region by increasing the available balancing capacity across the mentioned border. It is clear that the new renewable capacities, enabled for connection by this project's commissioning, will enormously change the generation mix in Serbia and provide a boost for the Serbian transition towards the sustainable and environmentally acceptable green energy production.

Project promoters

EMS
TRANSELECTRICA

Countries

Romania
Serbia



National development plan(s)

Plan razvoja prenosnog sistema Republike Srbije za period 2019 - 2028, page 158 (Serbian national TYNDP 2019-2028). The project is not included in the last approved Romanian NDP but is included in the draft version of Romanian NDP (Planul de dezvoltare a RET perioada 2020-2029 - draft version) submitted in October 2020 for approval to the Romanian NRA -page 253,
https://web.transelectrica.ro/noutati/noutati/55_2020.08.17_14-30-42.pdf

Additional information on the project

https://www.ems.rs/page.php?kat_id=191

Project sheet backlog

5 Jan. 2021 - Specification that the project is included in the draft version of the Romanian NDP submitted to the Romanian NRA in October 2020

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

Project Description & Context

Project Investments

Main investment(s): Portile de Fier (RO) - Djerdap (RS) 2nd . Doubling the existing OHL 400 kV (1.5 km on Serbian (thermal limit 1800 A) and 0.5 km on Romanian(thermal limit 2192 A) Side)

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	2	Portile de Fier	Djerdap	Under Consideration	2030	Investment on 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
New SS 400/110 kV Belgrade West	Transformer				Under Consideration	2030	Investment on time	
"""New OHL 400 kV WPP Cibuk - SS Belgrade West"""	AC transmission line	60	WPP Cibuk	Belgrade West	Under Consideration	2030	Investment on time	

Reason for investment clustering

These investments will help the evacuation of RES in North-East part of Serbia and enhance energy exchange in the East-West corridor

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 reduce price differentials between EU and/or non-EU countries	As the project contributes to the increase of the transfer capacity across the border between Serbia and Romania, it is safe to claim that it will enhance the market integration in the region and reduce the price differentials, as requested by this need.
	Infrastructure to address system adequacy deficiencies and/or mitigate the risk of power failures.	The internal investments in Serbia, included in the scope of North CSE Corridor, are foreseen to mitigate the risks of potential blackouts in the Belgrade region. Investment SS Belgrade West will provide major help in reducing the loading of the existing 400/x and 220/x kV substations in Srem area.
	Infrastructure and/or market design to provide balancing flexibility (e.g. international pooling / sharing of reserves, coordinated development of reserve capacity)	Due to the fact that the commissioning of this project creates an additional energy corridor between Serbia and Romania, as confirmed by the NTC calculations, it can be claimed that it will, among other benefits, prove to be a major asset in the balancing flexibility area for both sides.
	Infrastructure designed to enable cost-efficient grid connection of high volumes of RES and/or reduce RES curtailment	As the Banat region in the close proximity of the border between Serbia and Romania offers a great possibility for the connection of renewable sources, the investments enveloped by this project will most certainly help the safe and reliable placement of the produced energy in the systems of interest.

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)	Serbia - Romania	347	622

Boundary capacity diagram

Network boundary the projects helps mitigate

Eastern Balkan

Boundary capacity diagram

ENTSO-E

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	1 0 0	5 3 0	>	>	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	max average min	0 0 0	1 -1 -6	>	<	ENTSO-E assessment
B1_RES Annual Socio-Economic Welfare increase resulting from RES integration	max average min	1 0 0	1 0 0	>	>	ENTSO-E assessment

Reduction of CO2 and GHG emissions

B4 Non-CO2 emissions (kg/year)

B4a Nitrogen oxides	average	6	-95	n/a	n/a	ENTSO-E assessment
B4b Ammonia	average	-1	-2	n/a	n/a	ENTSO-E assessment
B4c Sulfur dioxide	average	9	-112	n/a	n/a	ENTSO-E assessment
B4d Particular matter 5	average	0	301	n/a	n/a	ENTSO-E assessment
B4e Particulate matter 10	average	0	-6	n/a	n/a	ENTSO-E assessment
B4f Non-methane volatile organic compounds	average	-1	307	n/a	n/a	ENTSO-E assessment

B2a Annual CO2 variation from market simulation (ktonnes / year)		max average min	3 -4 -17	203 32 -29	< 	< 	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 1	-1 -2 -5	>> >> >>	< > >>	ENTSO-E assessment
B2b Annual CO2 variation due to network losses (ktonnes / year)		average	1	3	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	0 0 0	0 0 -1	n/a	n/a	ENTSO-E assessment

Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year)		max average min	13 4 0	28 8 1	>	>	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	0	12	n/a	n/a	ENTSO-E assessment
B5_€ Variation of network losses monetised (M€ /		average	0	0	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	11	6	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	average	7	-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	average	-128	24	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	1 6 17	-1 -2 -4	ENTSO-E assessment

Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year)	average	85	81	ENTSO-E assessment
B3a Connected RES (MW)	-			ENTSO-E assessment

Security of supply

Non scenario-dependent indicator(s)

B8.0 Stability (Transient, Voltage and Frequency Stability)	Transient stability	Voltage stability	Frequency stability	
Portile de Fier (RO) - Djerdap (RS) 2nd (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.
New OHL 400 kV WPP Cibuk - SS Belgrade West (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	1	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	average	1	ENTSO-E assessment
B1_RES Annual Socio-Economic Welfare increase resulting from RES integration	average	1	ENTSO-E assessment

Reduction of CO2 and GHG emissions

B2a Annual CO2 variation from market simulation (ktonnes / year)	average	-35	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 3 6	ENTSO-E assessment

Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year)	average	21	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

Note based on CBA Guideline 3.0: Given that the actual route of the project might not be defined due to the low degree of maturity of its investment(s), an environmental assessment is not yet available.

Residual social impact

Investment	Investment status	Distance (km)	Type of sensitivity

Note based on CBA Guideline 3.0: Given that the actual route of the project might not be defined yet because of the low degree of maturity of its investment(s), a residual social impact assessment is not yet available.

Project Costs

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

	CAPEX (Meuro)	Uncertainty range (%)	OPEX
1536. Portile de Fier (RO) - Djerdap (RS) 2nd	3.5	5%	0.03
1537. New SS 400/110 kV Belgrade West	22	5%	0.33
1538. New OHL 400 kV WPP Cibuk - SS Belgrade West	14	5%	0.15
Total	39.5		0.51

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

1536	Uncertainty of prices of necessary materials. Difference between the estimated capex cost for the investment and the standard costs of investments is caused by fact that the ACER report considers only 14 EU member countries, in which the unit price for this type of project is higher than price for corresponding projects in Serbia.
1537	Uncertainty of prices of necessary materials. Difference between the estimated capex cost for the investment and the standard costs of investments is caused by fact that the ACER report considers only 14 EU member countries, in which the unit price for this type of project is higher than price for corresponding projects in Serbia.
1538	Uncertainty of prices of necessary materials. Difference between the estimated capex cost for the investment and the standard costs of investments is caused by fact that the ACER report considers only 14 EU member countries, in which the unit price for this type of project is higher than price for corresponding projects in Serbia.