Project Sheet

Mid Continental East corridor

Project type	transmission
Project id	144
Created by	
Created on	Feb 8, 2021 3:31:19 PM

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Key Information

Cross Border Project
AC transmission line
Mostly New

PCI number 3.22 (4th list, 31 Oct. 2019)
In Permitting

Description

The project consists of one double circuit 400 kV interconnection line between Serbia and Romania and reinforcement of the network along the western border in Romania: one new simple circuit 400 kV line from Portile de Fier to Resita and upgrade from 220 kV double circuit to 400 kV double circuit of the axis between Resita and Arad, including upgrade to 400 kV of three substations along this path: Resita, Timisoara, Sacalaz. The main aim of this project is increasing the transmission capacity along the East-West corridor in the South-Eastern and Central Europe, simultaneously contributing to the market integration in the region of interest and enhancing the integration of large renewable sources in the Banat region, located in the close proximity of the Serbian-Romanian border. Along with that, the commissioning of the project will strongly improve the security of supply in the mentioned area, thus fulfilling one of the primary postulates of the modern transmission systems' reliable operation.

Project promoters

EMS
TRANSELECTRICA

Countries

Romania
Serbia

National development plan(s)

Planul de dezvoltare a RET perioada 2020-2029 - draft version- was submitted in October 2020 for approval to the Romanian NRA -page 16, https://web.transelectrica.ro/noutati/noutati/55_2020.08.17_14-30-42.pdf ; Plan razvoja prenosnog sistema Republike Srbije za period 2019 - 2028, Serbia, 2019-2027, page 115

Additional information on the project

On the fourth PCI list are included the following investments:

PCI 3.22.1 Interconnection between Resita (RO) and Pancevo (RS)

PCI 3.22.2 Internal line between Portile de Fier and Resita (RO)

PCI 3.22.3 Internal line between Resita and Timisoara/Sacalaz (RO)

PCI 3.22.4 Internal line between Arad and Timisoara/Sacalaz (RO)

http://www.transelectrica.ro/web/tel/proiecte-de-interes-comun

Romanian National development Plan (only in Romanian):
https://www.transelectrica.ro/web/tel/plan-perspectiva

Project sheet backlog

5 Jan. 2021 - Update of the reference to the latest available version of the Romanian NDP, submitted to the NRA in October 2020. To align with the draft NDP, update of the project costs and of the fields 'Explanation in case of delay' for investments 400 kV OHL Portile de Fier-Resita and 400 kV Substation Resita. Addition of content in the field 'Additional information on the project'.

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

Project Description & Context

Project Investments

Main investment(s): New 131 km double circuit 400kV OHL between Romania and Serbia (63 km on Romanian (thermal limit 2513 A) side and 68 km on Serbian (thermal limit 1920 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	131	Resita (RO)	Pancevo (RS)	Under Construction	2024	Delayed	Due to some delays related to investments 701 and 269 the line is not operated

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 116 km 400kV OHL single circuit between existing substation 400 kV Portile de Fier and new 400 kV substation Resita.	AC transmission line	116	Portile de Fier (RO)	Resita (RO)	Under Construction	2024	Delayed	Delays in issuing the normative acts necessary for the realization of the OHL which led to very long delays in the execution of works. The execution contract was suspended for a period of 6 months.
Upgrade of an existing 220 kV AC double circuit line (OHL) between	AC transmission line	274	Resita (RO)	Timisoara-Sacalaz-Arad (RO)	In Permitting	2025	Investment on 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
Resita - Timisoara (RO) to 400 kV double circuit line Resita-Timisoara/ Sacalaz of which: 74 km from Resita to Timisoara and 92 km from Resita to Sacalaz , both overhead lines will be built on common towers up to Icloda on 58 km. Upgrade of the existing 220 kV AC double circuit line (OHL) Timisoara/ Sacalaz-Arad to 400 kV on 67 km of which: 14 km of line will be build single circuit between Sacalaz-C.Aradului-""connection point"", 11 km single circuit from Timisoara to ""connection point"" and the rest 42 km of the line will be double circuit from								

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
""connection point"" to Arad.								
New 400 kV substation Resita (T400/220 kV 400 MVA + T 400/110 kV 250 MVA), as development of the existing 220/110 kV substation.	Onshore substation		Resita (RO)	Resita (RO)	Under Construction	2025	Delayed	The contractor responsible for the execution of the investment has gone into insolvency and thus the auction must be resumed
Replacement of 220 kV substation Timisoara with 400 kV substation (2x250 MVA 400/110 kV)	Onshore substation		Timisoara (RO)	Timisoara (RO)	In Permitting	2025	Delayed	Long duration of the procurement procedure, delays due to executor and the pandemic impact of COVID 19.

Reason for investment clustering

This Project aims to enhance the transmission capacity along the East-West corridor in the South-Eastern and Central Europe. The investments are complementing each other as the main enhancements in Romania which remove bottlenecks and integrate RES to the network. Clustering of investments had the purpose to identify investments contributing to the increase of transfer capacity on the same corridor. Based on upper mentioned information it is crucial to cluster all these investments together, to utilize the possible benefits.

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	The project contributes to the increase of the transfer capacity across the border between Serbia and Romania. Increased cross-border capacities allow countries to exchange more energy and this will have an impact on reducing the marginal costs.
ITEG	Infrastructure to tackle a Need identified by one of the European ITEG indicators referring to the 15% interconnection target for 2030:1. Reduce the price differential between EU countries to below 2EUR/MWh.2. Contribute to pushing ratio between nominal transmission capacity and installed RES capacity past 30%.3. Contribute to pushing ratio between nominal transmission capacity and peak load past 30%.	The project contributes to reach the 15% interconnection target for 2030 and also will help to reduce the price differentials between the countries.
	Infrastructure designed to enable cost-efficient grid connection of high volumes of RES and/or reduce RES curtailment	The project enhances the transmission capacity along the East-West corridor in the South-Eastern and Central Europe. The project supports the large scale integration of new RES in the region of South-West Romania and North-East Serbia.

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)	Hungary - Romania	617	335
Transfer capacity increase (in MW)	Romania - Serbia	844	600

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	2 1 1	17 11 6	>	>	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	max average min	1 -1 -3	2 -1 -3	>	<	ENTSO-E assessment
B1_RES Annual Socio-Economic Welfare increase resulting from RES integration	max average min	1 0 0	4 2 0	>	>	ENTSO-E assessment

Reduction of CO2 and GHG emissions

B4 Non-CO2 emissions (kg/year)

B4a Nitrogen oxides	average	-12	-1	n/a	n/a	ENTSO-E assessment
B4b Ammonia	average	-2	-22	n/a	n/a	ENTSO-E assessment
B4c Sulfur dioxide	average	2	-6	n/a	n/a	ENTSO-E assessment
B4d Particular matter 5	average	18	967	n/a	n/a	ENTSO-E assessment
B4e Particulate matter 10	average	-2	-3	n/a	n/a	ENTSO-E assessment
B4f Non-methane volatile organic compounds	average	19	948	n/a	n/a	ENTSO-E assessment

B2a Annual CO2 variation from market simulation (ktonnes / year)		max average min	145 28 -24	124 42 -58	< 	>>>>

year)					

Security of supply

B6 Annual reduction in Energy Not Served (MWh / year)	max average min		109	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	1.09	>	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	26	19	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	average	10	-11	ENTSO-E assessment
B1_RES Annual Socio-Economic Welfare increase resulting from RES integration	average	7	5	ENTSO-E assessment

Reduction of CO2 and GHG emissions

B2a Annual CO2 variation from market	average	-188	303	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 9 26	-8 -20 -47	ENTSO-E assessment

Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year)	average	150	114	ENTSO-E assessment
B3a Connected RES (MW)	-			ENTSO-E assessment

Non scenario-dependent indicator(s)

	2025			
B9 Avoidance of the Renewal/ Replacement Costs of Infrastructure (Meuro)	50			This indicator was submitted by the promoter(s). ENTSO-E confirms the consistency of the proposed indicator with the CBA Guideline 3.0. About the computation of this indicator by the project promoter(s)

This indicator was computed in a study performed by SC ISPE PROIECTARE ȘI CONSULTANȚĂ SA in 2020. The promoter(s) stated that the submitted value was computed in accordance with the CBA Guideline and explained it as follows:

The 400kV corridor Portile de Fier-Resita-Timisoara-Sacalaz-Arad is part of the Project 144 and eliminates the need of upgrading the existing infrastructure. The new project enables to maintain the existing level of grid reliability and security.
The promoter(s) certified that the values submitted and assessed in the study relate to countries located within the ENTSO-E perimeter only.

B8.0 Stability (Transient, Voltage and Frequency Stability)	**Transient stability**	**Voltage stability**	**Frequency stability**	

B8.0 Stability (Transient, Voltage and Frequency Stability)	Transient stability	Voltage stability	Frequency stability	
New_400 kV OHL RO-RS (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.
400 kV OHL Portile de Fier-Resita (New AC line)	++	++	0	
Upgrade of the existing 220kV double circuit OHL Resita - Timisoara - Sacalaz - Arad to 400kV double circuit line (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	9	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	average	-4	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 /	average	143	ENTSO-E assessment

year)			
B2a_€ Annual Societal cost variation resulting from CO2 variation from market simulation monetised (M€ / year)	CO2 price	60€/ ton 100€/ ton 189€/ ton	-5 -10 -23	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).

Residual environmental impact

Investment	Investment status	Distance (km)	Type of sensitivity
New_400 kV OHL RO-RS	Under Construction	1	Habitats Directive (92/43/ EEC)
400 kV OHL Portile de Fier-Resita	Under Construction	30	Habitats Directive (92/43/ EEC)
Upgrade of the existing 220kV double circuit OHL Resita -Timisoara - Sacalaz - Arad to 400kV double circuit line	In Permitting	34.5	Habitats Directive (92/43/ EEC)
400 kV Substation Resita	Under Construction	0	
400 kV Substation Timisoara	In Permitting	0	

Additional information by the project promoter(s)

The data provided is based on the environmental agreements obtained.

Residual social impact

Investment	Investment status	Distance (km)	Type of sensitivity
New_400 kV OHL RO-RS	Under Construction	0	
400 kV OHL Portile de Fier-Resita	Under Construction	0	
Upgrade of the existing 220kV double circuit OHL Resita -Timisoara - Sacalaz - Arad to 400kV double circuit line	In Permitting	0	
400 kV Substation Resita	Under Construction	0	
400 kV Substation Timisoara	In Permitting	0	

Project Costs

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

	CAPEX (Meuro)	Uncertainty range (%)	OPEX
238. New_400 kV OHL RO-RS	47	-5%, +5%	0.23
269. 400 kV OHL Portile de Fier-Resita	25	-5%, +5%	0.13
270. Upgrade of the existing 220kV double circuit OHL Resita -Timisoara - Sacalaz - Arad to 400kV double circuit line	75	-5%, +5%	0.5
701. 400 kV Substation Resita	24	-5%, +5%	0.24
705. 400 kV Substation Timisoara	18	-5%, +5%	0.18
Total	189		1.28

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

238	Cost represents the currently expected total project investment cost. Uncertainty range related to procurement/construction cost uncertainties.
269	Cost represents the currently expected total project investment cost. Uncertainty range related to procurement/construction cost uncertainties.
270	Cost represents the currently expected total project investment cost. Uncertainty range related to procurement/construction cost uncertainties.
701	Cost represents the currently expected total project investment cost. Uncertainty range related to procurement/construction cost uncertainties.
705	Cost represents the currently expected total project investment cost. Uncertainty range related to procurement/construction cost uncertainties.