Project Sheet

Italy-Slovenia

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Key Information

Cross Border Project
DC transmission line
New

PCI number 3.21 (4th list, 31 Oct. 2019)
In Permitting

Description

The project consists in a new HVDC link between Salgareda (Italy) and Divaca/Bericevo (Slovenia) which will strengthen the connection between Slovenia and Italy. On Italian side the project is under permitting since 2012, on Slovenian side the project is under consideration (under study). Terna and ELES are evaluating the opportunity to implement the project according to the following two phases:

• reinforcement of existing grid (PSTs, upgrade of existing lines)

o Delta GTC contribution: 400 MW

• HVDC link (two separate investments: one for the IT side and one for the SI side)

o Rated power: 800/600 MW

o Commissioning date: 2028 (or later, depending on the Study Phase results in Slovenia)

o Delta GTC contribution: 600 MW

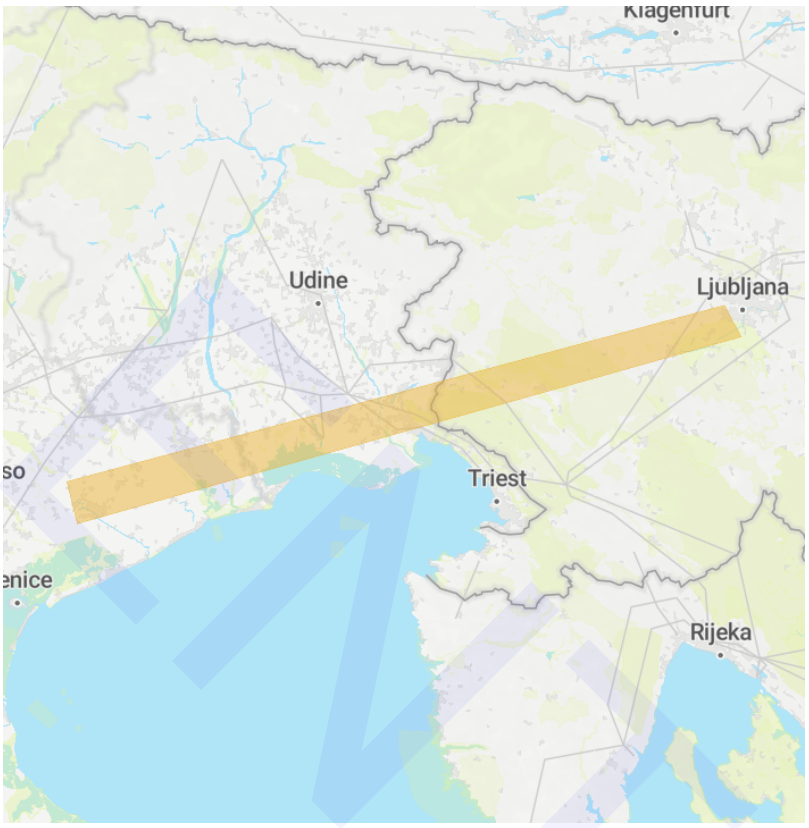
Due to an update of the list of cross-border projects interconnecting Italy with other Member States within 2020, the 2020 interconnection ratio of Italy has been updated accordingly (from previous value of 9% computed by ENTSO-E in TYNDP 2018 to roughly 8%). As the Interconnection level of 10% will not be reached by 2020, Italy is requested to investigate options of further interconnections.

Project promoters

ELES
TERNA

Countries

Italy
Slovenia



National development plan(s)

Avanzamento Piani di Sviluppo precedenti 2015/Pag.190, Italy

Additional information on the project

PCI website:

https://ec.europa.eu/energy/sites/ener/files/documents/pci_3_21_en.pdf

Slovenian NDP (only in slovenian):

http://www.eles.si/za-poslovne-uporabnike/razvoj-in-uporaba-prenosnega-omrezja/strategija-razvoja-elektroenergetskega-sistema-rs.aspx

Italian Development Plan:

http://www.terna.it/it-it/sistemaelettrico/pianodisviluppodellarete/pianidisviluppo.aspx

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 HVDC link between Salgareda (IT) and Bericevo/Divaca (SI)

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
DC transmission line	0	Salgareda (IT)	Bericevo (SI)	In Permitting	2028	Delayed	Project under consideration on SI side (permitting not started yet in Slovenia)

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	This project contributes to lowering the price differentials between Italian market zones and Slovenia
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%.	This project helps Italy to reach the 15% interconnection target by 2030

Need		How the project addresses each need (explanation provided by the project promoter(s))
	Infrastructure to improve system flexibility and stability e.g. improve system or local ramp rate, improve transient stability or RoCoF to meet system Needs.	This project will contribute to overcome flexibility/stability problems due to scarcely meshed grid
	Infrastructure designed to enable cost-efficient grid connection of high volumes of RES and/or reduce RES curtailment	This project will improve the integration of Italian RES generation

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)	Italy - Slovenia	1000	1000

Boundary capacity diagram

Network boundary the projects helps mitigate

Italian Peninsula integration

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	23 17 14	51 45 37	<	<	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	max average min	-7 -13 -20	-32 -47 -61	>	<	ENTSO-E assessment
B1_RES Annual Socio-Economic Welfare increase resulting from RES integration	max average min	0 0 0	2 2 1	<	<	ENTSO-E assessment

Reduction of CO2 and GHG emissions

B4 Non-CO2 emissions (kg/year)

B4a Nitrogen oxides	average	1671	10090	n/a	n/a	ENTSO-E assessment
B4b Ammonia	average	-32	132	n/a	n/a	ENTSO-E assessment
B4c Sulfur dioxide	average	2763	11614	n/a	n/a	ENTSO-E assessment
B4d Particular matter 5	average	-223	-27455	n/a	n/a	ENTSO-E assessment
B4e Particulate matter 10	average	61	538	n/a	n/a	ENTSO-E assessment
B4f Non-methane volatile organic compounds	average	-316	-28163	n/a	n/a	ENTSO-E assessment

B2a Annual CO2 variation from market simulation (ktonnes / year)		max average min	882 572 295	2190 1661 1150	< <<	>>>>

year)					

Security of supply

B6 Annual reduction in Energy Not Served (MWh / year)	max average min		333	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	3.33	>	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	21	31	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	average	-2	-64	ENTSO-E assessment
B1_RES Annual Socio-Economic Welfare increase resulting from RES integration	average	2	1	ENTSO-E assessment

Reduction of CO2 and GHG emissions

B2a Annual CO2 variation from market	average	38	1828	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	-46 -119 -282	ENTSO-E assessment

Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year)	average	43	15	ENTSO-E assessment
B3a Connected RES (MW)	-			ENTSO-E assessment

Benefits submitted by promoters based on scenarios other than the TYNDP2020 scenarios

	2025	2030	
B7 System Flexibility – Balancing Energy Exchange		++	Qualitative assessment by ENTSO-E, based on the study and values provided by the project 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 based on Decentralised (DEC) , in a study performed by Terna in 2020. The promoter(s) stated that the submitted value was computed in accordance with the CBA Guideline and explained it as follows:

The indicator B7, adopted in Italian NDP, defines the cost variation for dispatching services, with reference to reduction of internal congestion and ancillary services

The promoter(s) certified that the values submitted and assessed in the study relate to countries located within the ENTSO-E perimeter only.

Non scenario-dependent indicator(s)

B8.0 Stability (Transient, Voltage and Frequency Stability)	Transient stability	Voltage stability	Frequency stability	
Salgareda - Bericevo (New HVDC)	++	++	+ (between sync areas)	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.

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	8	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	0	ENTSO-E assessment
Reduction of CO2 and GHG emissions			
B2a Annual CO2 variation from market simulation (ktonnes / year)	average	145	ENTSO-E assessment
B2a_€ Annual Societal cost variation resulting from CO2 variation from market	CO2 price 60€/ton 100€/ton 189€/	-5 -10 -23	ENTSO-E assessment

simulation monetised (M€ / year) ton		

Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year) average	1	ENTSO-E assessment
B3a Connected RES (MW) -		ENTSO-E assessment

Comments on the CBA results by the project promoter(s)

About B2 - CO2 emissions:

Results relative to CO2 emissions are strictly dependent on scenario assumptions (especially lifetime of lignite and coal power plants, that should be assessed from a perspective consistent with considered time horizons 2030 and 2040).

About B6 - Annual Socio-Economic Welfare increase resulting from reduction in Energy Not Served monetised):

In Italy a different parameter is used for the monetization of the Expected Energy Not Served (EENS) variation due to this project, because the current parameter used by ENTSOE in this project sheet (10 k€/MWh) is not compliant with National regulations in force in Italy n°627/2016 ("Minimum Requirements for the preparation of the Ten Year Development Plan of the National Transmission Network" according to which benefits related to reduction of EENS is monetized through a Value of Lost Load (VOLL) in a range between 20 k€/MWh and 40 k€/MWh.

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
Salgareda - Bericevo	In Permitting	169	Other nature protection areas under national law
		2	-

Residual social impact

Investment	Investment status	Distance (km)	Type of sensitivity

Salgareda - Bericevo	In Permitting	174	Sensitivity regarding landscape - Other areas protected by national law
		2	-

Project Costs

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

	CAPEX (Meuro)	Uncertainty range (%)	OPEX
616. Salgareda - Bericevo	755	15	4
Total	755		4

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

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