Project Sheet

Italy-Tunisia

Project type	transmission
Project id	29
Created by	
Created on	Feb 8, 2021 2:38:11 PM

Index

Key Information 3
Description 3
Project Description & Context 5
Project Investments 5
System Needs addressed by the project 5
Interconnection targets 5
Project Assessment 9
Transfer capacity increase (National Trends 2025) 9
Boundary capacity diagram 9
CBA results 10
Central scenario: National Trends 10
Scenarios: Distributed Energy & Global Ambition 14
Benefits submitted by promoters based on scenarios other than the TYNDP2020 scenarios 15
Non scenario-dependent indicator(s) 16
Sensitivity Study: Current Trends 16
Residual impact 18
Project Costs 19

ENTSOE

Key Information

Cross Border Project
DC transmission line
New

PCI number 3.27 (4th list, 31 Oct. 2019)
In Permitting

Description

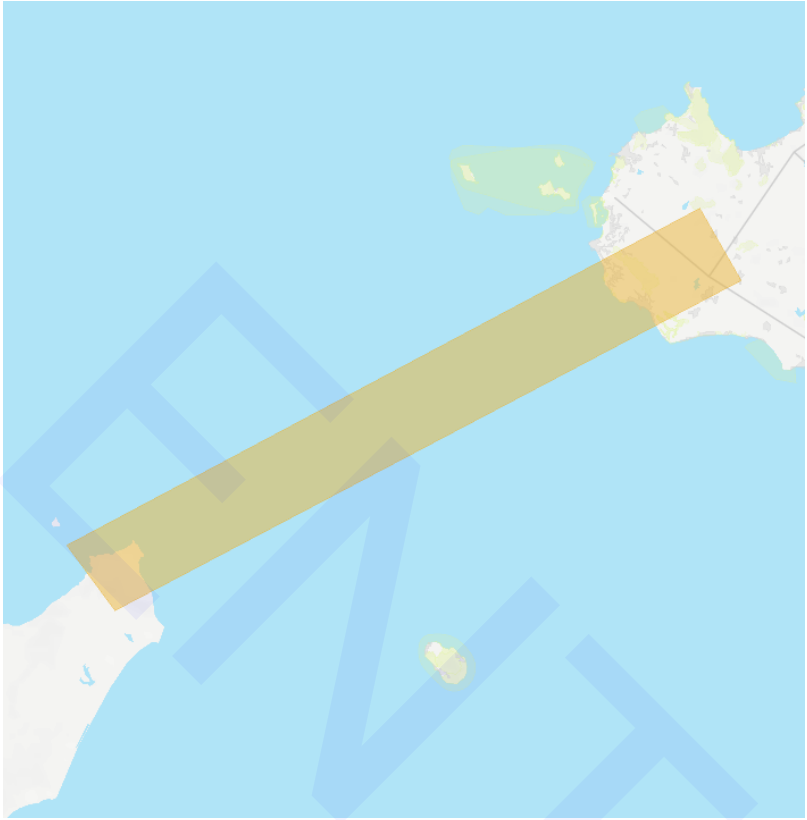
The project consists in a new interconnection between Tunisia and Sicily to be realized through an HVDC submarine cable. The realization of the project is supported by the Italian and Tunisian Governments to increase the interconnection capacity of the Euro-Mediterranean system. Moreover, the project will contribute to reduce, under specific conditions, present and future limitations to the power exchanges on the northern Italian border, with France, Switzerland, Austria and Slovenia, and therefore it will allow to significantly increase the transmission capacity and its exploitation by at least 500 MW on that boundary.

Project promoters

TERNA
STEG

Countries

Italy
Tunisia



National development plan(s)

Avanzamento Piani di Sviluppo precedenti 2015/Pag.13, Italy

Additional information on the project

The project has recently received funds for detailed design necessary for the permitting phase

Link to the last release of the Italian National Development Plan

http://www.terna.it/en-gb/sistemaelettrico/pianodisviluppodellarete.aspx

Project sheet backlog

19 Jan. 2021 - Addition of results in third countries for indicator B2a_€

15 Jan. 2021 - Correction of results for CBA indicator B3 in third countries for all scenarios

5 Jan. 2021 - Correction of results for CBA indicator B2a_€ in third countries for all scenarios

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

Project Description & Context

Project Investments

Main investment(s): New interconnection between Italy and Tunisia - new HVDC submarine cable

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	200	Sicily Area (IT)	Tunisia node	In Permitting	2027	Investment on time	

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 Tunisia
	Infrastructure to address system adequacy deficiencies and/or mitigate the risk of power failures.	This project will contribute to reduce system adequacy deficiencies by increasing transmission capacity
	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.

ENTSO-E

ENTSOE

ENTSOE

Project Assessment

Transfer capacity increase (National Trends 2025)

	Border	A B	B A
Transfer capacity increase (in MW)	Italy - Tunisia	600	600

Boundary capacity diagram

Network boundary the projects helps mitigate

Italy - North Africa

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	26 18 12	52 46 41	<	<	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	max average min	-13 -18 -26	-37 -41 -43	<	>	ENTSO-E assessment
B1_RES Annual Socio-Economic Welfare increase resulting from RES integration	max average min	1 1 0	8 4 0	>	>	ENTSO-E assessment

This project involves countries outside of the ENTSO-E area.

B1 SEW (Meuro/ year) in third country/ies	max average min	22 14 7	65 35 6	<	<	ENTSO-E assessment
B1_RES (Meuro/ year) in third country/ies	max average min	0 0 0	0 0 0	<	<	ENTSO-E assessment
B1_CO2 (Meuro/ year) in third country/ies	max average min	25 23 20	51 47 43	>	<	ENTSO-E assessment

Reduction of CO2 and GHG emissions

B4 Non-CO2 emissions (kg/year)

B4a Nitrogen oxides	average	-218	-573	n/a	n/a	ENTSO-E assessment
B4b Ammonia	average	-31	-115	n/a	n/a	ENTSO-E assessment
B4c Sulfur dioxide	average	13	-291	n/a	n/a	ENTSO-E assessment
B4d Particular matter 5	average	-22	-18	n/a	n/a	ENTSO-E assessment
B4e Particulate matter 10	average	-19	-57	n/a	n/a	ENTSO-E assessment
B4f Non-methane volatile organic compounds	average	-11	-36	n/a	n/a	ENTSO-E assessment

B2a Annual CO2 variation from market simulation (ktonnes / year)		max average min	1123 791 550	1546 1453 1322	< 	< 	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	-29 -61 -131	-47 -105 -234	>> >> >>	>> >> >>	ENTSO-E assessment
B2b Annual CO2 variation due to network losses (ktonnes / year)		average	97	32	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	-3 -6 -14	-1 -1 -3	n/a	n/a	ENTSO-E assessment

This project involves countries outside of the ENTSO-E area.

B2a (ktonnes/year) in third country/ies		average	-981	-1679	>	>	ENTSO-E assessment
B2a_€ (M€/ year) in third country/ies	CO2 price	60€/ ton 100€/ ton 189€/ ton	36 76 163	54 121 270	n/a	n/a	ENTSO-E assessment

Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year)		max average min	21 14 1	177 89 0	>	>	ENTSO-E assessment
B3a Connected RES (MW)		-			n/a	n/a	ENTSO-E assessment

This project involves countries outside of the ENTSO-E area.

B3 (GWh / year) in third countries		max average min	0 0 0	0 0 0	<	<	ENTSO-E assessment

Impact on grid losses

B5 Variation of network losses (GWh / year)		average	162	64	n/a	n/a	ENTSO-E assessment
B5_€ Variation of network losses monetised (M€ / year)		average	8	2	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-			n/a	N/A	>	n/a	ENTSO-E

Economic Welfare increase resulting from reduction in Energy Not Served monetised (M€ / year)	average					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	30	29	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	average	-43	-38	ENTSO-E assessment
B1_RES Annual Socio-Economic Welfare increase resulting from RES integration	average	21	12	ENTSO-E assessment

This project involves countries outside of the ENTSO-E area.

B1 SEW (Meuro/year) in third country/ies	average	29	29	ENTSO-E assessment
B1_RES (Meuro/year) in third country/ies	average	0	0	ENTSO-E assessment
B1_CO2 (Meuro/year) in third country/ies	average	62	41	ENTSO-E assessment

Reduction of CO2 and GHG emissions

B2a Annual CO2	average	807	1082	ENTSO-E assessment

variation from market 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	-6 -38 -110	-27 -70 -167	ENTSO-E assessment

This project involves countries outside of the ENTSO-E area.

B2a (ktonnes/year) in third country/ies	average	-1177	-1165	ENTSO-E assessment
B2a_€ (M€/ year) in third country/ies	CO2 price	60€/ ton 100€/ ton 189€/ ton	8 55 160	29 76 179	ENTSO-E assessment

Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year)	average	410	268	ENTSO-E assessment
B3a Connected RES (MW)	-			ENTSO-E assessment

This project involves countries outside of the ENTSO-E area.

B3 (GWh / year) in third countries	average	-23	0	ENTSO-E assessment

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

	2025	2030	
B7 System Flexibility –		++	Qualitative assessment by ENTSO-

	2025	2030	
Balancing Energy Exchange			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	
Elmed Project (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	7	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting average	-31	ENTSO-E assessment

from CO2 emissions reduction			
B1_RES Annual Socio-Economic Welfare increase resulting from RES integration	average	0	ENTSO-E assessment

This project involves countries outside of the ENTSO-E area.

B1 SEW (Meuro/year) in third country/ies	average	21	ENTSO-E assessment

B1_RES (Meuro/year) in third country/ies	average	0	ENTSO-E assessment

B1_CO2 (Meuro/year) in third country/ies	average	36	ENTSO-E assessment

Reduction of CO2 and GHG emissions

B2a Annual CO2 variation from market simulation (ktonnes / year)	average	1090	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	-35 -79 -176	ENTSO-E assessment

This project involves countries outside of the ENTSO-E area.

B2a (ktonnes/year) in third country/ies	average	-1289	ENTSO-E assessment

B2a_€ (M€/ year) in third country/ies	CO2 price 60€/ ton 100€/ ton 189€/	41 93 208	ENTSO-E assessment

ton		

Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year)	average	3	ENTSO-E assessment
B3a Connected RES (MW)	-		ENTSO-E assessment

This project involves countries outside of the ENTSO-E area.

B3 (GWh / year) in third countries	average	0	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
Elmed Project	In Permitting	9	-

Residual social impact

Investment	Investment status	Distance (km)	Type of sensitivity
Elmed Project	In Permitting	0	

Project Costs

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

	CAPEX (Meuro)	Uncertainty range (%)	OPEX
635. Elmed Project	600		3
Total	600		3

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

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

ENTSO-E