Project Sheet

SACOI3

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Index

Key Information 3
Description 3
Project Description & Context 5
Project Investments 5
System Needs addressed by the project 5
Interconnection targets 6
Project Assessment 10
Transfer capacity increase (National Trends 2025) 10
CBA results 10
Central scenario: National Trends 10
Scenarios: Distributed Energy & Global Ambition 12
Benefits submitted by promoters based on scenarios other than the TYNDP2020 scenarios 13
Non scenario-dependent indicator(s) 14
Sensitivity Study: Current Trends 15
Residual impact 16
Project Costs 16

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Key Information

Cross Border Project
DC transmission line
Upgrade

PCI number 2.4 (4th list, 31 Oct. 2019)
In Permitting

Description

New HVDC line between Italy mainland, Corsica and Sardinia replacing existing link SACOI2.

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

TERNA
EDF

Countries

France
Italy

National development plan(s)

Avanzamento Piani di Sviluppo precedenti 2015/Pag.436, Italy

Additional information on the project

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 triterminal link between Italy mainland, Corsica and Sardinia replacing existing link SACOI2

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	300	Codrongianos - Luccana	Suveretto	In Permitting	2024	Investment on time	

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	This project contributes to lowering the price differentials between Italian market zones and Corsica
	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
	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 scarsely

Need		How the project addresses each need (explanation provided by the project promoter(s))
		meshed grid
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

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)	Internal (Italy)	400	400

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	32 25 21	49 41 34	<	<	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	max average min	6 3 2	4 2 2	>	>	ENTSO-E assessment
B1_RES Annual Socio-Economic	max average	1 0	7 6	>	<	ENTSO-E assessment

Welfare increase resulting from RES integration	min	0	5			

Reduction of CO2 and GHG emissions

B4 Non-CO2 emissions (kg/year)

B4a Nitrogen oxides	average	-167	87	n/a	n/a	ENTSO-E assessment
B4b Ammonia	average	-27	-43	n/a	n/a	ENTSO-E assessment
B4c Sulfur dioxide	average	-11	382	n/a	n/a	ENTSO-E assessment
B4d Particular matter 5	average	-38	1513	n/a	n/a	ENTSO-E assessment
B4e Particulate matter 10	average	-20	0	n/a	n/a	ENTSO-E assessment
B4f Non-methane volatile organic compounds	average	-31	1486	n/a	n/a	ENTSO-E assessment

B2a Annual CO2 variation from market simulation (ktonnes / year)	max average min	-65 -141 -266	-55 -85 -141	< 	< 	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	5 11 23	3 6 14	< > >	< > >	ENTSO-E assessment
B2b Annual CO2 variation due to network losses (ktonnes / year)	average	37	96	n/a	n/a	ENTSO-E assessment
B2b_€ Annual Societal cost variation resulting from	CO2 price 60€/ ton 100€/	-1 -3 -6	-3 -7 -16	n/a	n/a	ENTSO-E assessment

CO2 variation from network simulation monetised (M € / year)	ton 189€/ ton					

Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year)	max average min	16 10 5	185 162 119	<	<	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	88	196	n/a	n/a	ENTSO-E assessment
B5_€ Variation of network losses monetised (M€ / year)	average	3	6	n/a	n/a	ENTSO-E assessment

Security of supply

B6 Annual reduction in Energy Not Served (MWh / year)	max average min		781	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	7.81	>	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	38	32	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	average	9	3	ENTSO-E assessment
B1_RES Annual Socio-Economic Welfare increase resulting from RES integration	average	7	3	ENTSO-E assessment

Reduction of CO2 and GHG emissions

B2a Annual CO2 variation from market simulation (ktonnes / year)	average	-173	-100	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 8 23	2 6 15	ENTSO-E assessment

Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year)	average	147	72	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 Piano Nazionale Integrato Energia e Clima (PNIEC) and Piano Nazionale Integrato Energia e Clima (PNIEC), 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)

	2030			
B9 Avoidance of the Renewal/ Replacement Costs of Infrastructure (Meuro)	20			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 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 B16, as defined in Italian NDP, evaluate benefits associated to avoidance costs of trasmission Infrastructure in Italy. For this reason Italian indicator B16 is compliant with indicator B9 of ENTSOE CBA 3.0 Guidelines
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**	
SACOI3 (New HVDC)	++	++	+ (betwe	Qualitative assessment by ENTSO-E based on information on the

B8.0 Stability (Transient, Voltage and Frequency Stability)	Transient stability	Voltage stability	Frequency stability	
			en sync areas)	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	28	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	average	5	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	-170	ENTSO-E assessment
B2a_€ Annual Societal cost variation resulting from CO2 variation from market simulation monetised (M€ /	CO2 price	60€/ ton 100€/ ton 189€/ ton	5 12 27	ENTSO-E assessment

year)		

Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year) average	2	ENTSO-E assessment
B3a Connected RES (MW) -		ENTSO-E assessment

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

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
SACOI3	In Permitting	1	-

Residual social impact

Investment	Investment status	Distance (km)	Type of sensitivity
SACOI3	In Permitting	3	-

Project Costs

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

	CAPEX (Meuro)	Uncertainty range (%)	OPEX
1458. SACOI3	900	10	7
Total	900		7

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

1458 costs are currently under review