Project Sheet

Croatian south connection

Project type	transmission
Project id	1056
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ENTSOE

Key Information

Internal Project
Onshore substation
New

Under Consideration

Description

Currently, the South of Croatia is connected with the rest of Croatia via the territory of the Republic only by one electric power line SS Komolac - SS Rudine - SS Ston - SS Ponikve - SS Blato with transmission capacities limited to 110 MVA by the transmission line between SS Komolac and SS Ston. The second 110 kV connection is between SS Opuzen and TS Ston and it goes through the territory of BA and is introduced into SS Neum (BA). The safe operation of that part of the power system is largely dependent on interconnections with BiH. The power systems of Croatia and Bosnia and Herzegovina are extremely well connected with a total of 21 interconnectors at 400, 220 and 110 kV voltage levels contributing to the safety of both countries. However, the shape of territory and transmission network of Croatia, the southernmost part of the Croatian power system is practically dependent on interconnections with BA.

To ensure the security of supply and enable additional integration of RES in that area following investments are necessary:

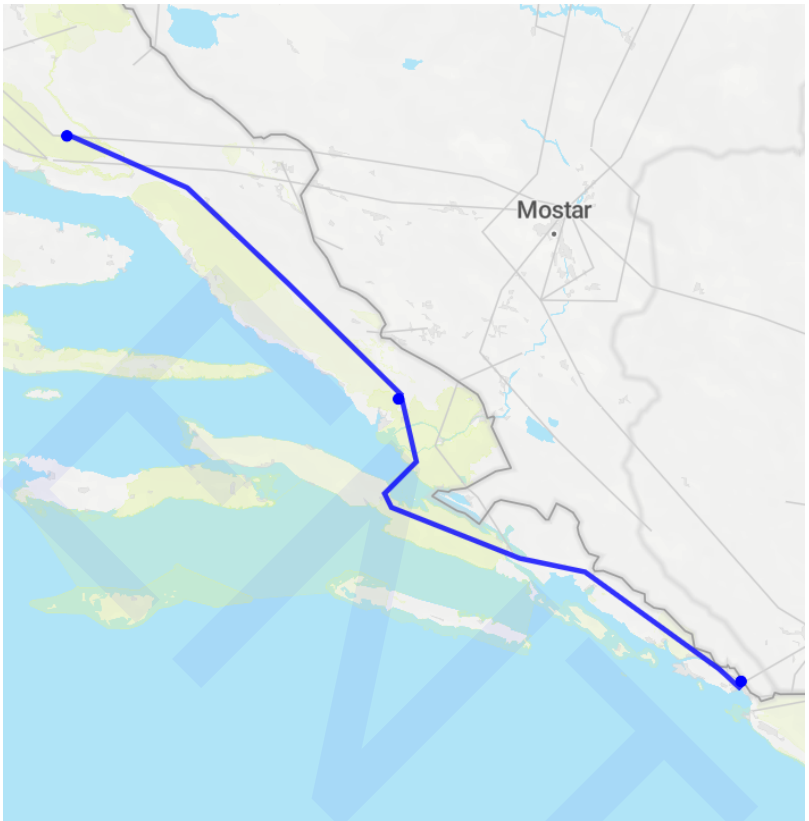
1. SS 400 kV ZONE 5,
2. SS 400/220 kV ZONE 6,
3. OHL 2x400 kV ZONE 5 - ZONE 6,
4. OHL 2x220 kV ZONE 6 – Plat,
5. SS 220/110 kV Plat

Project promoters

HOPS

Countries

Croatia



National development plan(s)

Additional information on the project

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 400 kV substation interpolated in existing 400 kV line Konjsko - Mostar

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
Onshore substation				Under Consideration	2035	New Investment	

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 400 kV substation for connetion of new generation and increase of security of supply in the southern area near city of Ploce	Onshore substation				Under Consideration	2035	New Investment	
Double 400 kV line connecting SS ZONE 5 and ZONE 6	AC transmission line	90	ZONE 5	ZONE 6	Under Consideration	2035	New Investment	
Double 220 kV line connecting SS ZONE 6 and SS Plat	AC transmission line	105	ZONE 6	Plat	Under Consideration	2035	New Investment	
Construction of two	Onshore		ZONE 6	Plat	Under Consid	2035	New Invest	

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
addiotional OHL bays for connection of OHL 220 kV ZONE 6 - Plat	substation				eration		ment	

Is the project in the reference grid?

No

System Needs addressed by the project

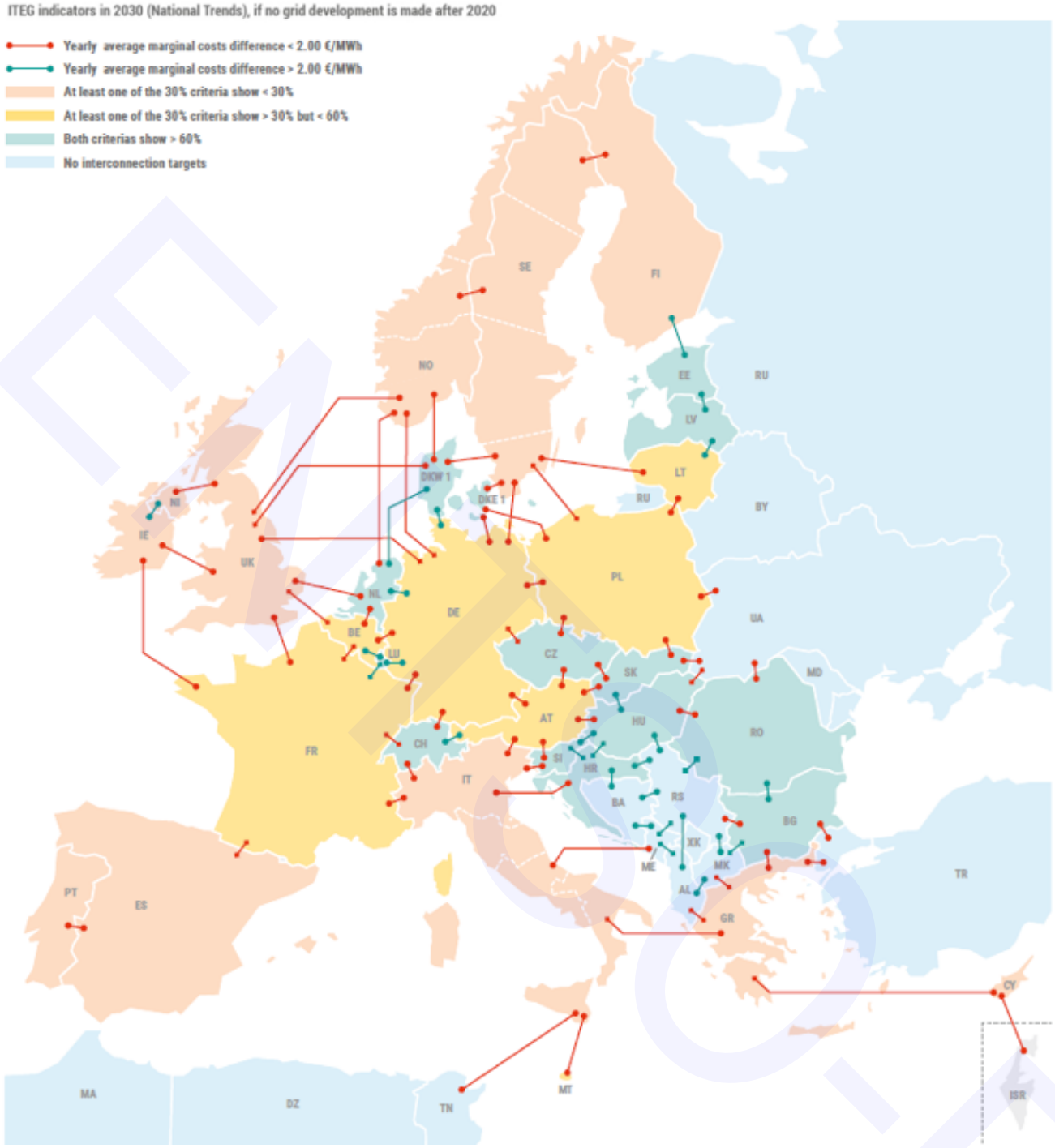
Project promoter(s) selected up to 4 system needs that are addressed by their project in a predefined list. Available needs ranged from reduction of price differentials between countries, improvement of system flexibility and stability, enabling cost-efficient connection of high volumes of RES, improvement 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.

The project promoter did not select any need.

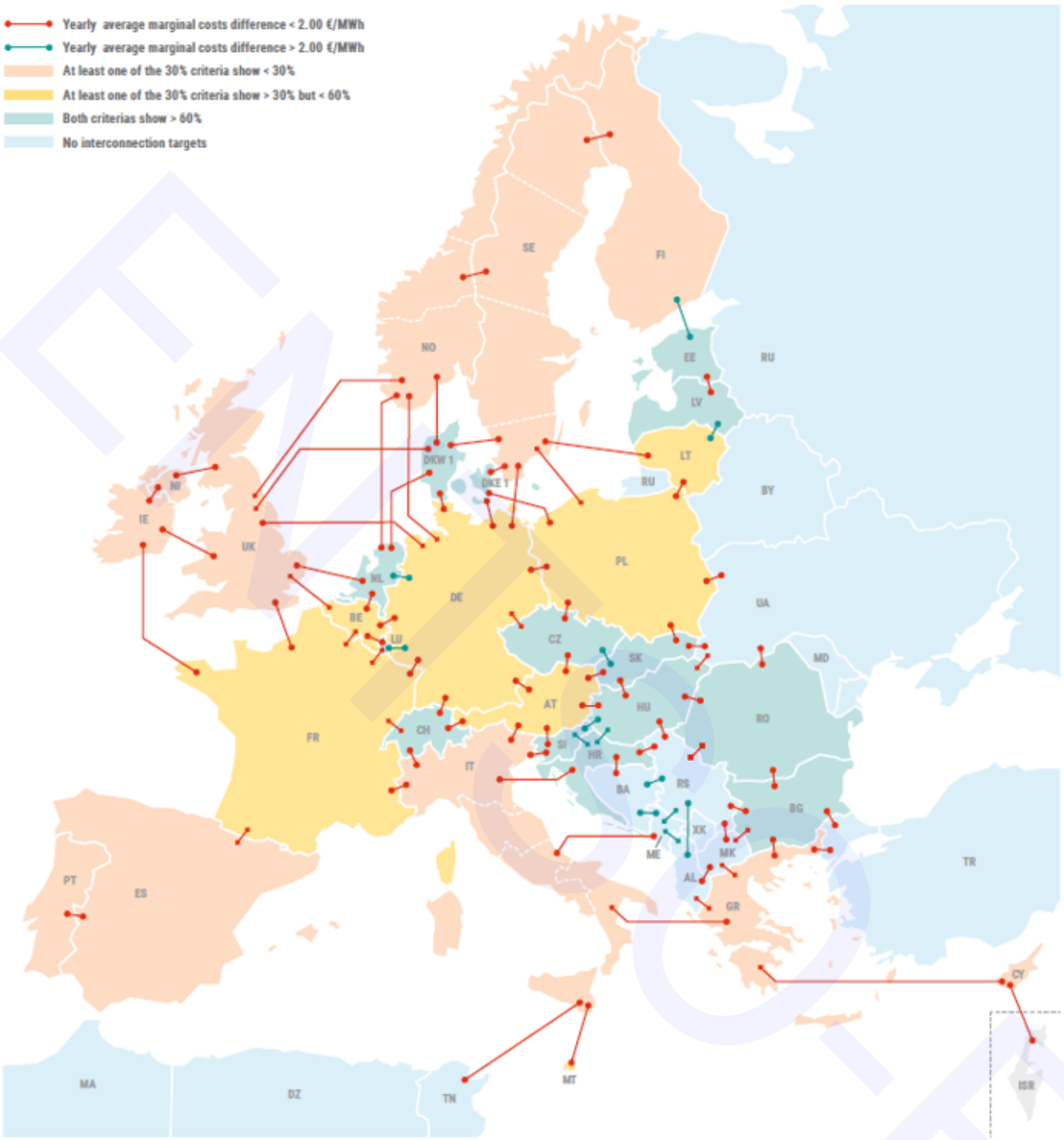
Interconnection targets

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%

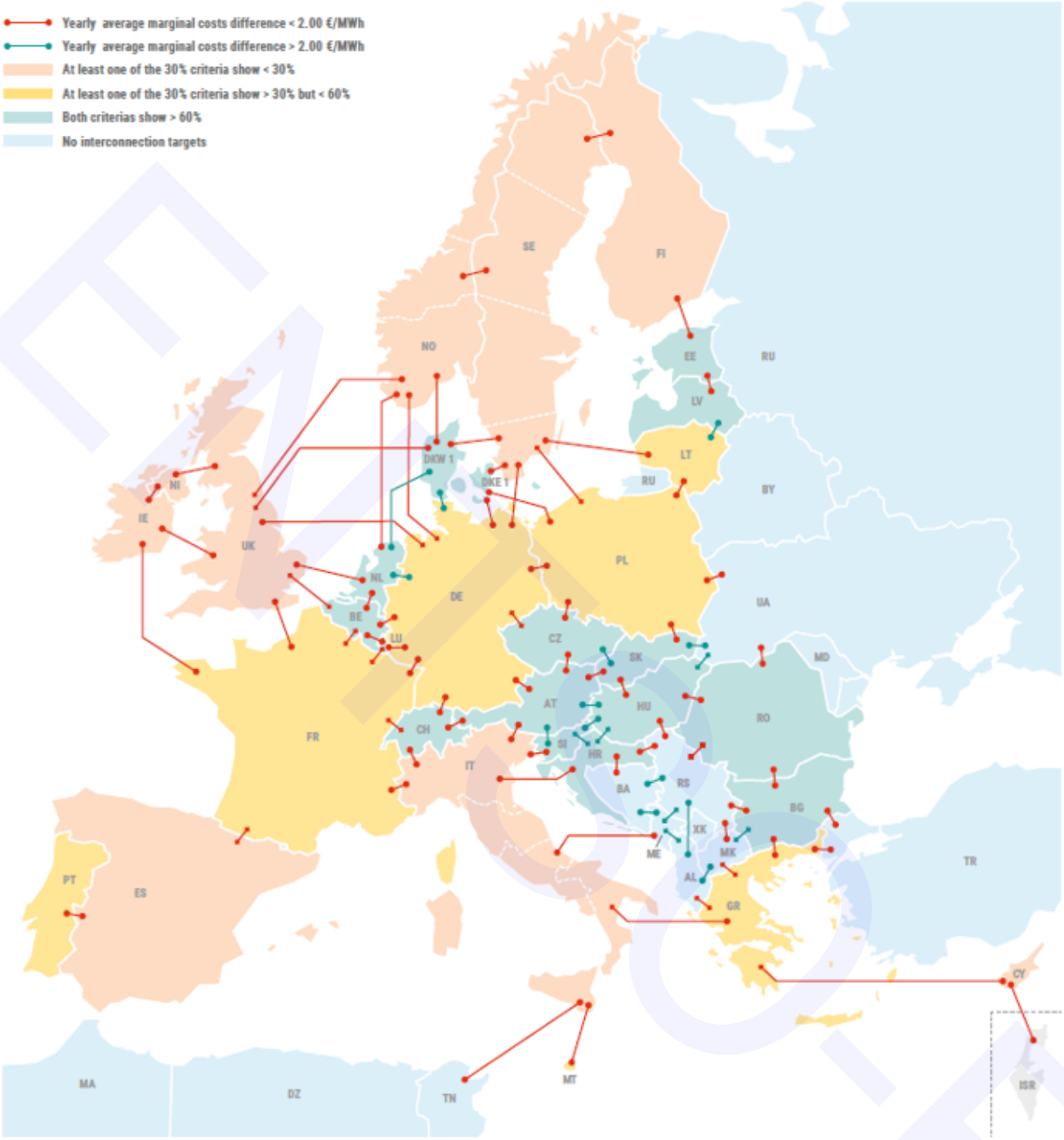
The following maps show the ITEG methodology applied to the TYNDP 2030 scenarios, with the 2020 grid.


ITEG indicators in 2030 (National Trends), if no grid development is made after 2020
Yearly average marginal costs difference < 2.00 €/MWh
Yearly average marginal costs difference > 2.00 €/MWh
At least one of the 30% criteria show < 30%
At least one of the 30% criteria show > 30% but < 60%
Both criterias show > 60%
No interconnection targets
SE
FI
NO
EE
RU
LV
LT
DKW 1
DKE 1
RU
BY
NI
IE
UK
PL
NL
DE
UA
BE
LU
CZ
SK
MD
AT
HU
RO
FR
CH
SI
HR
IT
BA
RS
BG
XK
ME
MK
TR
PT
ES
AL
GR
CY
MA
DZ
TN
MT
ISR

ITEG indicators in 2030 (Distributed Energy), if no grid development is made after 2020



ITEG indicators in 2030 (Global Ambition), if no grid development is made after 2020



Project Assessment

Transfer capacity increase (National Trends 2025)

	Border	A B	B A
Transfer capacity increase (in MW)	Internal (Croatian)	0	0

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.

Because its planned commissioning date is in 2035 or later, this project has only been assessed in the 2030 scenarios and based on a subset of CBA indicators. This project is assessed with the redispatch methodology.

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	N/A N/A N/A		n/a	n/a	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2	max average min	N/A N/A N/A		n/a	n/a	ENTSO-E assessment

emissions reduction					
B1_RES Annual Socio-Economic Welfare increase resulting from RES integration	max average min	N/A N/A N/A		n/a	n/a	ENTSO-E assessment

Reduction of CO2 and GHG emissions

B4 Non-CO2 emissions (kg/year)

B4a Nitrogen oxides	average	N/A		n/a	n/a	ENTSO-E assessment
B4b Ammonia	average	N/A		n/a	n/a	ENTSO-E assessment
B4c Sulfur dioxide	average	N/A		n/a	n/a	ENTSO-E assessment
B4d Particular matter 5	average	N/A		n/a	n/a	ENTSO-E assessment
B4e Particulate matter 10	average	N/A		n/a	n/a	ENTSO-E assessment
B4f Non-methane volatile organic compounds	average	N/A		n/a	n/a	ENTSO-E assessment

B2a Annual CO2 variation from market simulation (ktonnes / year)	max average min	N/A N/A N/A		n/a	n/a	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	N/A N/A N/A		n/a n/a n/a	n/a n/a n/a	ENTSO-E assessment
B2b Annual CO2 variation due to network losses (ktonnes / year)	average	N/A	0	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	N/A N/A N/A	0 0 0	n/a	n/a	ENTSO-E assessment

Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year)	max average min	N/A N/A N/A		n/a	n/a	ENTSO-E assessment
B3a Connected RES (MW)	-	N/A		n/a	n/a	ENTSO-E assessment

Impact on grid losses

B5 Variation of network losses (GWh / year)	average	N/A	0	n/a	n/a	ENTSO-E assessment
B5_€ Variation of network losses monetised (M€ / year)	average	N/A	0	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-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	N/A	N/A	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction average	N/A	N/A	ENTSO-E assessment
B1_RES Annual Socio-Economic Welfare increase resulting from RES integration average	N/A	N/A	ENTSO-E assessment
Reduction of CO2 and GHG emissions			
B2a Annual CO2 variation from market simulation (ktonnes / year) average	N/A	N/A	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	N/A N/A N/A	N/A N/A N/A	ENTSO-E assessment
Integration of renewable energy sources			
B3 Annual avoided curtailment (RES integration) (GWh / year) average	N/A	N/A	ENTSO-E assessment
B3a Connected RES (MW) -			ENTSO-E assessment

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	N/A	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	average	N/A	ENTSO-E assessment
B1_RES Annual Socio-Economic Welfare increase resulting from RES integration	average	N/A	ENTSO-E assessment

Reduction of CO2 and GHG emissions

B2a Annual CO2 variation from market simulation (ktonnes / year)	average	N/A	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	N/A N/A N/A	ENTSO-E assessment

Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year)	average	N/A	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).

Project Costs

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

	CAPEX (Meuro)	Uncertainty range (%)	OPEX
1718. SS 400 kV ZONE 5	8	10	0.0112
1719. SS 400/220 kV ZONE 6	17.5	10	0.0245
1723. OHL 2x400 kV ZONE 5 - ZONE 6	45		0.063
1724. OHL 2x220 kV ZONE 6 – Plat	36.75	10	0.05145
1725. SS 220/110 kV Plat	2	10	0.0028
Total	109.25		0.15295

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

1718

1719

1723

1724

1725