Project Sheet

Sea-Socket

Project type	transmission
Project id	1082
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Key Information

Internal Project
Offshore substation
New

Under Consideration

Description

Sea-Socket - Connection of up to 700MW of additional offshore wind in Ireland. The Project aims to facilitate and leverage the substantial wind resources available on the West Coast of Ireland, estimated between 25 GWh – 27GWh. The project provides for innovative offshore grid infrastructure to include a high voltage substation platform centrally linking up to four offshore floating wind parks connecting a total of 700MW of new offshore wind. The size of the initial platform is 700-MW and will facilitate multiple connections points. The collected energy will be transmitted via 220kV subsea AC cables to onshore substation(s) located along the Shannon Estuary. Sea-Socket aims to mitigate the main the development constraints for the deployment of offshore wind capacity by efficiently reducing investment costs, the impact on the environment and streamlining the permitting process to connect new offshore generation facilities to the grid for use and export to other markets in the EU. Sea-Socket can make a substantial contribution to facilitating RES integration, and potentially supporting the realisation of emerging industrial opportunities in the production of hydrogen using offshore wind resources.

Project promoters

Siga Hydro Limited

Countries

Ireland

National development plan(s)

Additional information on the project

www.sea-socket.ie

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): Floating substation platform facilitating 700-MW multiple offshore wind connections and transmitted via 220kV subsea AC cables to onshore substation(s) located along the Shannon Estuary

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
Offshore substation		New substation connection to 400kV/220kV lines in the Shannon Estuary	Not applicable - offshore connection point at Sea-Socket Platform	Under Consideration	2035	New Investment	

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.

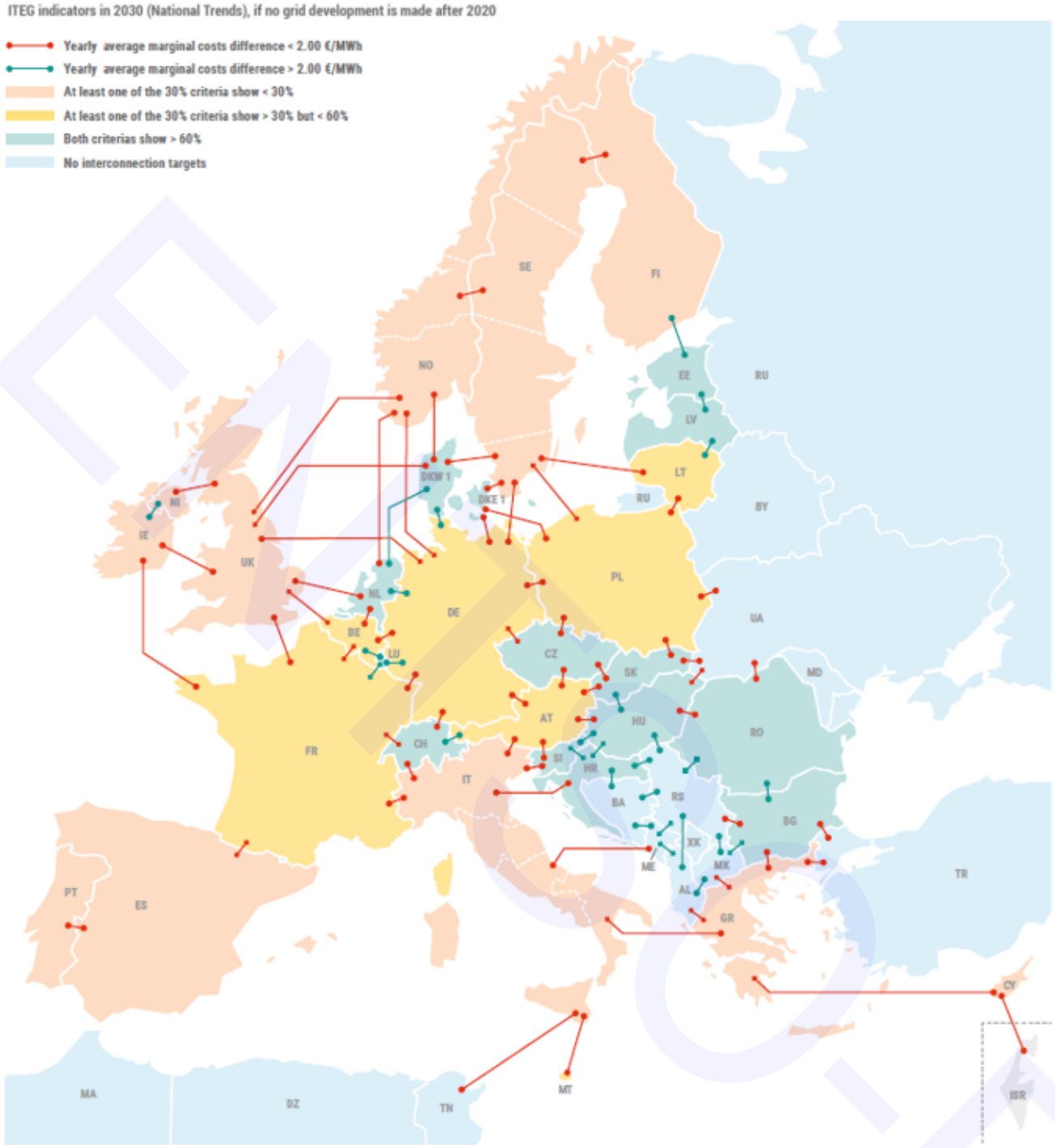
Need		How the project addresses each need (explanation provided by the project promoter(s))
	Infrastructure designed to enable cost-efficient grid connection of high volumes of RES and/or reduce RES curtailment	The Project aim is to deliver high volumes of RES by the deployment of innovative offshore grid infrastructure (i.e. a floating substation/connection platform) to exploit the significant wind resources on the west coast of Ireland. The use of innovative and emerging floating technologies will enable the cost-efficient connection of multiple wind parks

Need		How the project addresses each need (explanation provided by the project promoter(s))
		and reduce project constraints in fully realising Ireland's wind resources for use and export to EU Member States.
€	Infrastructure to reduce price differentials between EU and/or non-EU countries	The Project will enable and deliver up to 700MW of floating offshore wind capacity in Ireland for export to other EU countries utilising existing and new interconnection (EWIC and PCIs North-South Line, Greenlink 286, Celtic 107 and storage PCI Silvermines Hydro 2.29). It will support the price differentials and trading capabilities between EU countries.

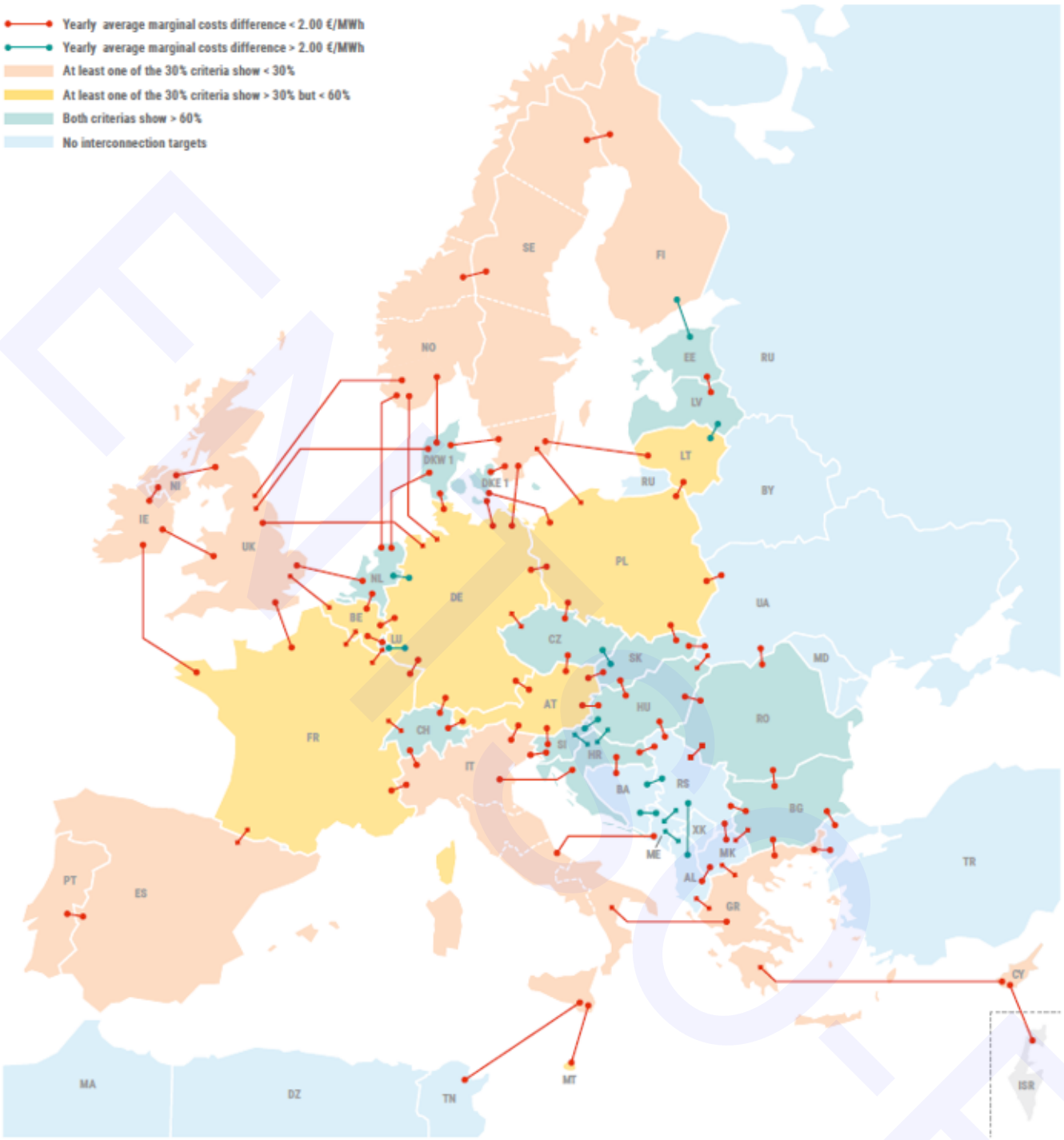
Interconnection targets

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%

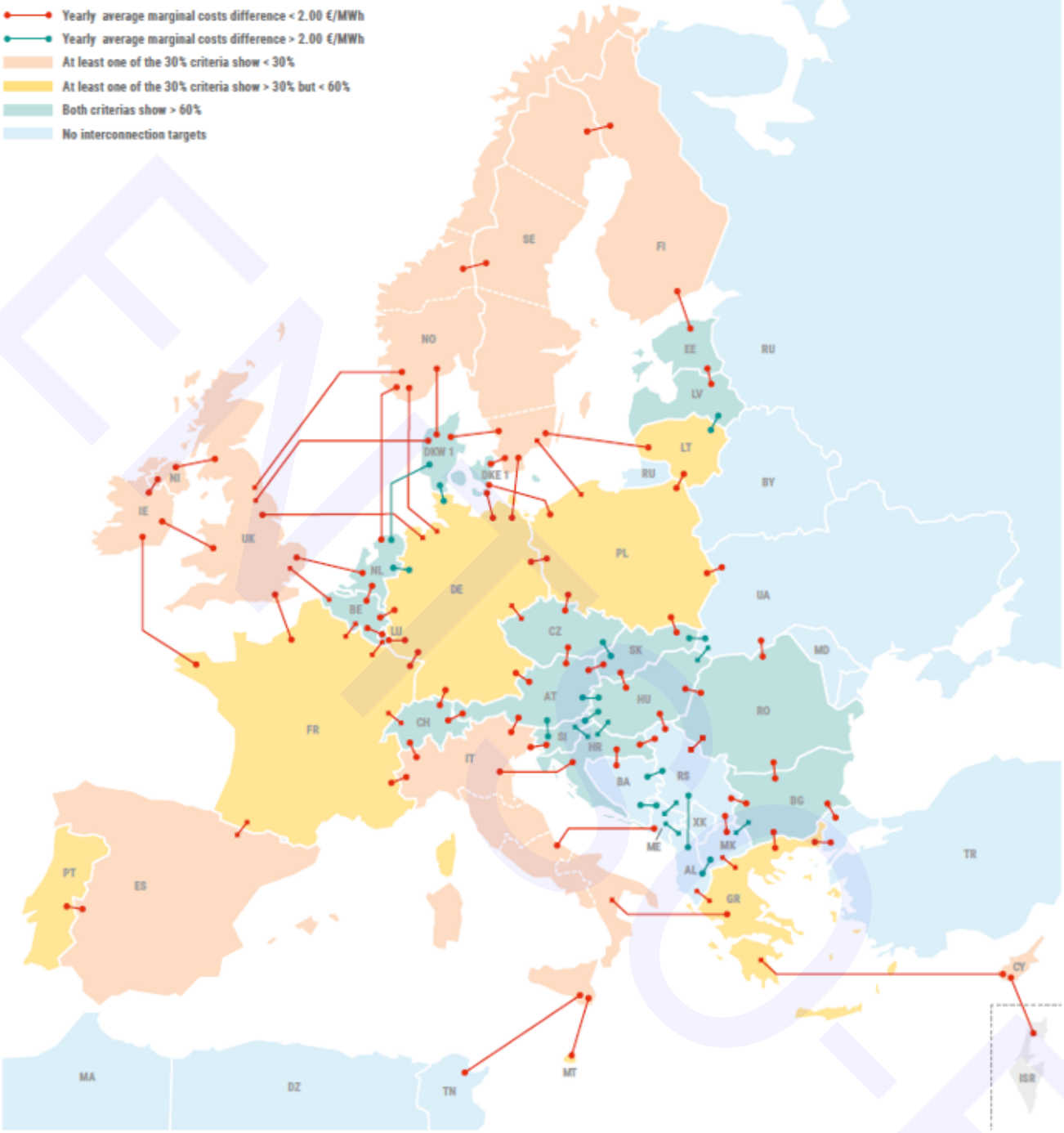
The following maps show the ITEG methodology applied to the TYNDP 2030 scenarios, with the 2020 grid.


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
AL
TR
PT
ES
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 (Ireland)	700	700

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 it is a Future project, addressing system needs and with a planned commissioning date after 2025, this project has only been assessed in the 2030 scenarios and based on a subset of CBA indicators.

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		50 47 45	n/a	n/a	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2	max average min		10 10 9	n/a	n/a	ENTSO-E assessment

emissions reduction						
B1_RES Annual Socio-Economic Welfare increase resulting from RES integration		max average min		41 39 38	n/a	n/a	ENTSO-E assessment

Reduction of CO2 and GHG emissions

B2a Annual CO2 variation from market simulation (ktonnes / year)		max average min		-336 -348 -356	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		11 25 56	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	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	n/a	n/a	ENTSO-E assessment

B4 Non-CO2 emissions (kg/year)

B4a Nitrogen oxides		average		1520	n/a	n/a	ENTSO-E assessment
B4b Ammonia		average		87	n/a	n/a	ENTSO-E assessment
B4c Sulfur dioxide		average		2219	n/a	n/a	ENTSO-E assessment

B4d Particular matter 5	average		-1705	n/a	n/a	ENTSO-E assessment
B4e Particulate matter 10	average		134	n/a	n/a	ENTSO-E assessment
B4f Non-methane volatile organic compounds	average		-1755	n/a	n/a	ENTSO-E assessment

Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year)	max average min		1065 1050 1035	n/a	n/a	ENTSO-E assessment
B3a Connected RES (MW)	-		700	n/a	n/a	ENTSO-E assessment

Impact on grid losses

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

Residual impact

Information on the residual impact of the project was provided by the project promoter(s).

Project Costs

	CAPEX (Meuro)	Uncertainty range (%)	OPEX
1750. Sea-Socket	375	25%	12
Total	375		12

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

1750 The project status is under consideration; therefore there are significant uncertainties in relation to the CAPEX estimations. These uncertainties are estimated based on comparable projects, sector experience and referencing current uncertainties regarding choice of technology solutions and related to design, material/resources costs

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