Project Sheet

GridLink

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Key Information

Cross Border Project
Offshore DC transmission cable
New

PCI number 1.7.5 (4th list, 31 Oct. 2019)
In Permitting

Description

1.4 GW HVDC electricity interconnector between UK and France

Voltage Source Converter (VSC)

Grid connection point (substations name): Kingsnorth (UK) and Warande (France)

Total cable length (substation to substation) 160km (112km in UK and 48km in France)

Two cables (MI) laid in a single trench

Nominal voltage: ±525 kV

Thermal limit (Imax): 1330 A

Mvar capability range at terminals: 460 MVAr

Bus-bar to bus-bar losses profile over MW range: 2.3% (33 MW) full load; 0% (0 MW) at zero load

Annual Availability: 98% availability, 2% planned outages, 0% forced outages.

Maximum single failure according to the design: 1.4GW

UK Transmission network reinforcement required: Uses spare bay with minimum works at Kingsnorth substation

France transmission network reinforcement: Extension to Warande substation

Main environmental impact: reduction of CO2 emissions by substituting electricity from fossil fuels by generation from RES and nuclear power. No material environmental impacts during construction and operation.

Project promoters

Elan Energy Ltd
National Grid
RTE

Nationalgrid ESO

Countries

France
United Kingdom

National development plan(s)

2016 2018 TYNDP, RTE's 2018 Schéma décennal de dévelopement du réseau and National Grid ESO Electricity Ten Year Statement 2018 (Appendix H)

Additional information on the project

Project web-site:
www.gridlinkinterconnector.com/

Statement on unbundling pursuant to Appendix 6.1.1 of the Practical Implementation Guide dated 2 October 2017: "GridLink Interconnector will abide by the European rules governing unbundling pursuant to the 3rd Energy Package."

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): UK-France, 1.5GW HVDC Interconnector

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 DC transmission cable	156	Kingsnorth (UK)	Warande (Gravelines, France)	Planned But Not Yet Permitting	2022		

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.

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Project Assessment

Transfer capacity increase (National Trends 2025)

	Border	A B	B A
Transfer capacity increase (in MW)	France - United Kingdom	1400	1400

Boundary capacity diagram

Network boundary the projects helps mitigate

Great Britain – Continental Europe and Nordics

Boundary capacity diagram

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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 29 27	109 105 99	>	>	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	max average min	11 9 7	40 39 38	>	>	ENTSO-E assessment
B1_RES Annual Socio-Economic Welfare increase resulting from RES integration	max average min	2 1 1	15 11 3	<	<	ENTSO-E assessment

Reduction of CO2 and GHG emissions

B4 Non-CO2 emissions (kg/year)

B4a Nitrogen oxides	average	-1099	-2180	n/a	n/a	ENTSO-E assessment
B4b Ammonia	average	-56	-96	n/a	n/a	ENTSO-E assessment
B4c Sulfur dioxide	average	-1325	-2148	n/a	n/a	ENTSO-E assessment
B4d Particular matter 5	average	6387	31376	n/a	n/a	ENTSO-E assessment
B4e Particulate matter 10	average	-69	-138	n/a	n/a	ENTSO-E assessment
B4f Non-methane volatile organic compounds	average	6431	31506	n/a	n/a	ENTSO-E assessment

B2a Annual CO2 variation from market simulation (ktonnes / year)		max average min	-317 -371 -458	-1365 -1390 -1433	< 	>>>>	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	14 29 62	44 100 224	<<<<<<>>>>>>	ENTSO-E assessment
B2b Annual CO2 variation due to network losses (ktonnes / year)		average	213	440	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	-11 -16 -35	-12 -32 -71	n/a	n/a	ENTSO-E assessment

Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year)		max average min	41 30 19	426 308 92	<<<<<

year)					

Security of supply

B6 Annual reduction in Energy Not Served (MWh / year)	max average min		3660	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	36.6	>	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	259	134	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	average	109	44	ENTSO-E assessment
B1_RES Annual Socio-Economic Welfare increase resulting from RES integration	average	1	7	ENTSO-E assessment

Reduction of CO2 and GHG emissions

B2a Annual CO2 variation from market	average	-2064	-1259	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	14 97 281	31 82 194	ENTSO-E assessment

Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year)	average	37	162	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	47	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	average	13	ENTSO-E assessment
B1_RES Annual Socio-Economic Welfare increase resulting from RES integration	average	1	ENTSO-E assessment

Reduction of CO2 and GHG emissions

B2a Annual CO2 variation from market simulation (ktonnes / year)	average	-465	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	15 33 75	ENTSO-E assessment

Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year)	average	12	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
1383. GridLink	906		23.9
Total	906		23.9

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

1383