Project Sheet

North South Interconnector

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Key Information

Cross Border Project
AC transmission line
New

PCI number PCI 2.13.1 (4th list, 31 Oct. 2019)
In Permitting

Description

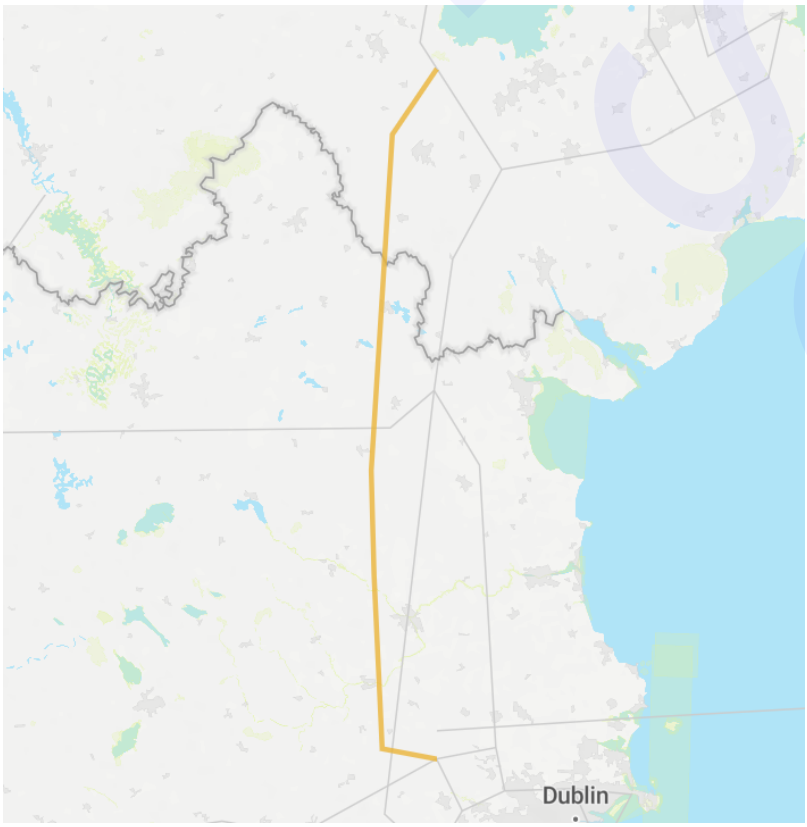
A new 400 kV interconnector between Woodland in Ireland and Turleenan in Northern Ireland.

Project promoters

EIRGRID
SONI

Countries

United Kingdom
Ireland



National development plan(s)

- Transmission Development Plan Northern Ireland 2019-2028, page 71: http://www.soni.ltd.uk/media/documents/SONI-TDPNI-2019-2028.pdf

- Transmission Development Plan Ireland 2019-2028, page 40:
https://www.eirgridgroup.com/site-files/library/EirGrid/TDP-2019-2028-Final-For-Publication.pdf

Additional information on the project

Project website:

http://www.eirgridgroup.com/the-grid/projects/north-south/the-project/

This circuit will establish a second interconnector between Ireland and Northern Ireland, effectively eliminating the ongoing risk of system separation, thus allowing an increased transfer capacity. The project has received the required consents in both jurisdictions. The project will be implemented by the respective transmission asset owners with an expected completion date of 2024.

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): A new 138 km single circuit 400 kV 1500 MVA OHL from Turleenan 400/275 kV in Northern Ireland to Woodland 400/220 kV in Ireland. This is a new interconnector project between Ireland and Northern Ireland.

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
AC transmission line	138	Woodland (IE)	Turleenan (NI)	In Permitting	2023	Delayed	Investment delayed due to judicial reviews of planning consent in IE and delayed approval of planning consent in NI.

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 designed to enable cost-efficient grid connection of high volumes of RES and/or reduce RES curtailment	The increased transfer capacity and reduction of system separation risk results in a reduction in must run thermal unit requirements, thus allowing additional renewable generation to be dispatched across the island of Ireland.
€	Infrastructure to reduce price differentials between EU and/or non-EU countries	The project establishes a second interconnector between Ireland and Northern Ireland, effectively eliminating the ongoing risk of system separation, thus allowing an increased transfer capacity. This allows a more efficient generation dispatch across the island, resulting in production cost savings.
	Infrastructure to address system adequacy	With only one interconnector between IE and NI, the transfer capacity is limited, to reduce the risk of power

Need		How the project addresses each need (explanation provided by the project promoter(s))
	deficiencies and/or mitigate the risk of power failures.	failures in the event of the loss of the interconnector. This project resolves the issue by providing security against loss of one interconnector, therefore removing restrictions on cross border energy flows

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)	Ireland - Northern Ireland	950	900

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	22 14 11	64 50 39	<	<	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	max average min	2 1 1	10 8 6	>	>	ENTSO-E assessment
B1_RES Annual Socio-Economic	max average	4 3	23 18	>	>	ENTSO-E assessment

Welfare increase resulting from RES integration	min	3	14			

Reduction of CO2 and GHG emissions

B4 Non-CO2 emissions (kg/year)

B4a Nitrogen oxides	average	-95	516	n/a	n/a	ENTSO-E assessment
B4b Ammonia	average	-10	3	n/a	n/a	ENTSO-E assessment
B4c Sulfur dioxide	average	-2	1112	n/a	n/a	ENTSO-E assessment
B4d Particular matter 5	average	261	1102	n/a	n/a	ENTSO-E assessment
B4e Particulate matter 10	average	-5	40	n/a	n/a	ENTSO-E assessment
B4f Non-methane volatile organic compounds	average	266	1087	n/a	n/a	ENTSO-E assessment

B2a Annual CO2 variation from market simulation (ktonnes / year)	max average min	-22 -53 -83	-198 -280 -366	>	>	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	2 4 9	9 20 45	< < <	< < <	ENTSO-E assessment
B2b Annual CO2 variation due to network losses (ktonnes / year)	average	-1	9	n/a	n/a	ENTSO-E assessment
B2b_€ Annual Societal cost variation resulting from	CO2 price 60€/ ton 100€/	0 0 0	0 -1 -1	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	93 72 59	605 478 397	>	>	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	6	44	n/a	n/a	ENTSO-E assessment
B5_€ Variation of network losses monetised (M€ / year)	average	0	1	n/a	n/a	ENTSO-E assessment

Security of supply

B6 Annual reduction in Energy Not Served (MWh / year)	max average min		5076.28571428571	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	50.7628571428571	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	33	45	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	average	15	9	ENTSO-E assessment
B1_RES Annual Socio-Economic Welfare increase resulting from RES integration	average	29	28	ENTSO-E assessment

Reduction of CO2 and GHG emissions

B2a Annual CO2 variation from market simulation (ktonnes / year)	average	-276	-271	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	2 13 37	7 18 42	ENTSO-E assessment

Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year)	average	560	633	ENTSO-E assessment
B3a Connected RES (MW)	-			ENTSO-E assessment

Non scenario-dependent indicator(s)

B8.0 Stability (Transient, Voltage and Frequency Stability)	Transient stability	Voltage stability	Frequency stability	
462 (New AC line)	++	++	0	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	17	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	average	3	ENTSO-E assessment
B1_RES Annual Socio-Economic Welfare increase resulting from RES integration	average	9	ENTSO-E assessment

Reduction of CO2 and GHG emissions

B2a Annual CO2 variation from market simulation (ktonnes / year)	average	-96	ENTSO-E assessment
B2a_€ Annual Societal cost variation resulting from CO2 variation from market	CO2 price 60€/ton 100€/ton 189€/	3 7 15	ENTSO-E assessment

simulation monetised (M€ / year) ton		

Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year) average	177	ENTSO-E assessment
B3a Connected RES (MW) -		ENTSO-E assessment

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

The project benefits are driven by a number of factors. The project allows for the efficient functioning of the Single Electricity Market (SEM), allowing a more efficient dispatch of generation capacity across the island of Ireland which would otherwise not have access due to network and operation restrictions. This project allows for a lower must run thermal generation requirement in the SEM and, as a consequence, allows for integration of RES generation that would otherwise have been dispatched down. This is reflected in the results, where the project allows for the integration of between 480 GWh and 560 GWh of renewable generation per year on the island of Ireland by 2030. This RES integration, and associated reduction in thermal generation requirements, results in CO2 savings of between 280 kT and 340 kT per year. The increased cross border capacity the project provides between Ireland and Northern Ireland leads to an improved security of supply within the SEM. The resulting benefits are estimated to be €50m per year by 2030. The north-east area of Ireland in particular has long term security of supply needs that are accommodated by this project, as a result of the increased ability to share generation capacity across the island.

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
462	In Permitting		

Additional information by the project promoter(s)

An Appropriate Assessment (Stage 2) of the part of the overall development located in Ireland was undertaken by the competent authority in Ireland and the conclusion was that “the proposed development, individually or in combination with other plans or projects would not adversely affect the integrity of any European site, in particular the River Boyne and River Blackwater Special Area of Conservation (site code 002299) or the River Boyne and River Blackwater Special Protection Area (site code 004232), in view of the sites’ conservation objectives”. This decision can be found on page 18 of An Bord Pleanála Board Order (Ref: 02.VA0017) dated 19 December 2016 which is available at: http://www.pleanala.ie/documents/orders/VA0/DVA0017.pdf.

In Northern Ireland the full Environmental Impact Assessment is underway on the section of the route within the jurisdiction and it is expected to be completed in 2020.

Residual social impact

Investment	Investment status	Distance (km)	Type of sensitivity
462	In Permitting		

Additional information by the project promoter(s)

An Environmental Impact Assessment which included an assessment of the social impact of the part of the overall development located in Ireland was undertaken by the competent authority in Ireland and the conclusion was that “the proposed development would be in accordance with the proper planning and sustainable development of the area”. This decision can be found on page 24 of An Bord Pleanála Board Order (Ref: 02.VA0017) dated 19 December 2016 which is available at: http://www.pleanala.ie/documents/orders/VA0/DVA0017.pdf.

In Northern Ireland the full Environmental Impact Assessment is underway on the section of the route within the jurisdiction and it is expected to be completed in 2020.

Project Costs

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

	CAPEX (Meuro)	Uncertainty range (%)	OPEX
462. 462	363		0.6
Total	363		0.6

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

462