# Project Sheet

Tarchon Energy Ltd

| | |
|---|---|
| Project type | transmission |
| Project id | 1050 |
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| Created on | Feb 11, 2021 5:14:58 PM |

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# Key Information

## Cross Border Project
## Offshore DC transmission cable
## New

## Under Consideration

### Description

Tarchon Energy Ltd ("Tarchon") is permitting a 1400MW DC Bipole VSC interconnector between England and Germany. The project started in 2017 and has obtained a legally binding grid connection agreement with National Grid at Corringham in the UK for rights to construct, connect and operate an interconnector. The management team of Tarchon has a successful track record in developing and operating interconnectors and transmission projects as well as large-scale grid connected power stations in the UK and Europe and has been involved in over 40GW of transmission power station and interconnector projects in Europe. Our mandated technical advisor for electrical engineering, infrastructure and power systems is WSP Ltd, our mandated financial advisor is EY (Ernst & Young). The interconnector is expected to reach commercial operations in late 2026 and the permitting and construction timetables are attached in Microsoft Excel format. Tarchon has commenced the planning and environmental work as well as having undertaken detailed work on the undersea cable route and onshore works. Tarchon is committed to the project and has detailed knowledge of interconnector permitting, regulatory regimes, energy contracting, project financing and construction and operations including O&M.

### Project promoters

Tarchon Energy Ltd

### Countries

Germany
United Kingdom

## National development plan(s)

## Additional information on the project

Tarchon Energy is happy to supply any further info requested

## Project sheet backlog

13 Jan. 2021 - Correction of project promoters

6 Nov. 2020 - Publication as part of the draft TYNDP 2020 package for consultation

# Project Description & Context

## Project Investments

**Main investment(s): 1.4 GW HVDC electricity interconnector between UK and Germany Voltage Source Converter (VSC)/Bipolar Grid connection point (substations name): Corringham (UK) and near Emden (Germany), exact substation location subject to grid study in Germany. Total cable length (substation to substation) 610km (35km in UK and 25km in Germany) Two cables (XLPE) 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. The annual Availability is 98.1% availability, with 1.8% planned outages, and 0.1% forced outages. The maximum single failure according to the design is 1.4GW. The project will enable the reduction of CO2 emissions by substituting electricity from fossil fuels by generation from RES and nuclear power. There are no material anticipated environmental impacts during construction and operation**

| 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 | 610 | corrignham | emden | Under Consideration | 2028 | New Investment | |

## Is the project in the reference grid?

No

## System Needs addressed by the project

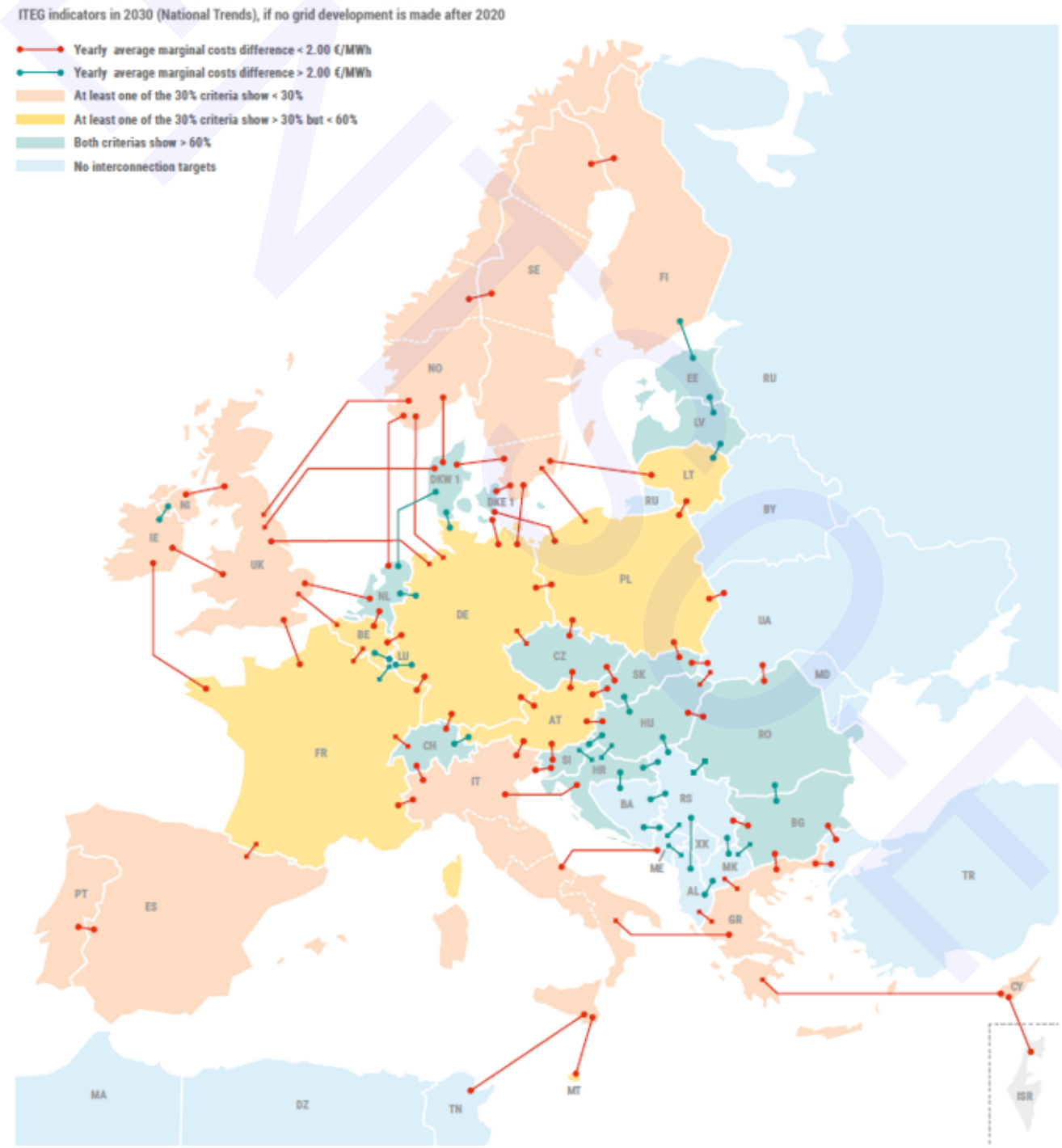
Project promoter(s) selected up to 4 system needs that are addressed by their project in a predefined list. Available needs ranged from reduction of price differentials between countries, improvement of system flexibility and stability, enabling cost-efficient connection of high volumes of RES, improvement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

The project promoter did not select any need.

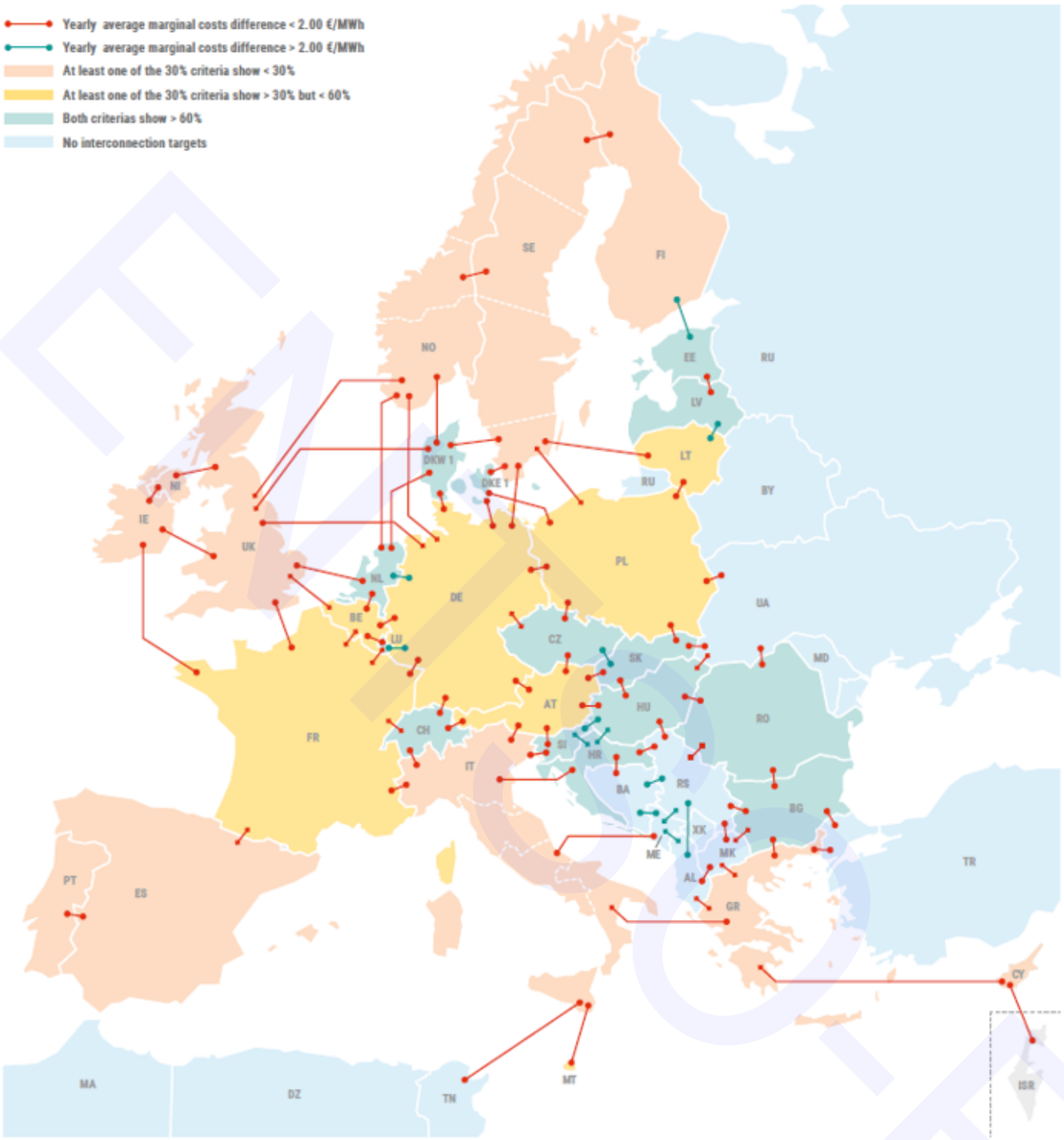
## Interconnection targets

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%

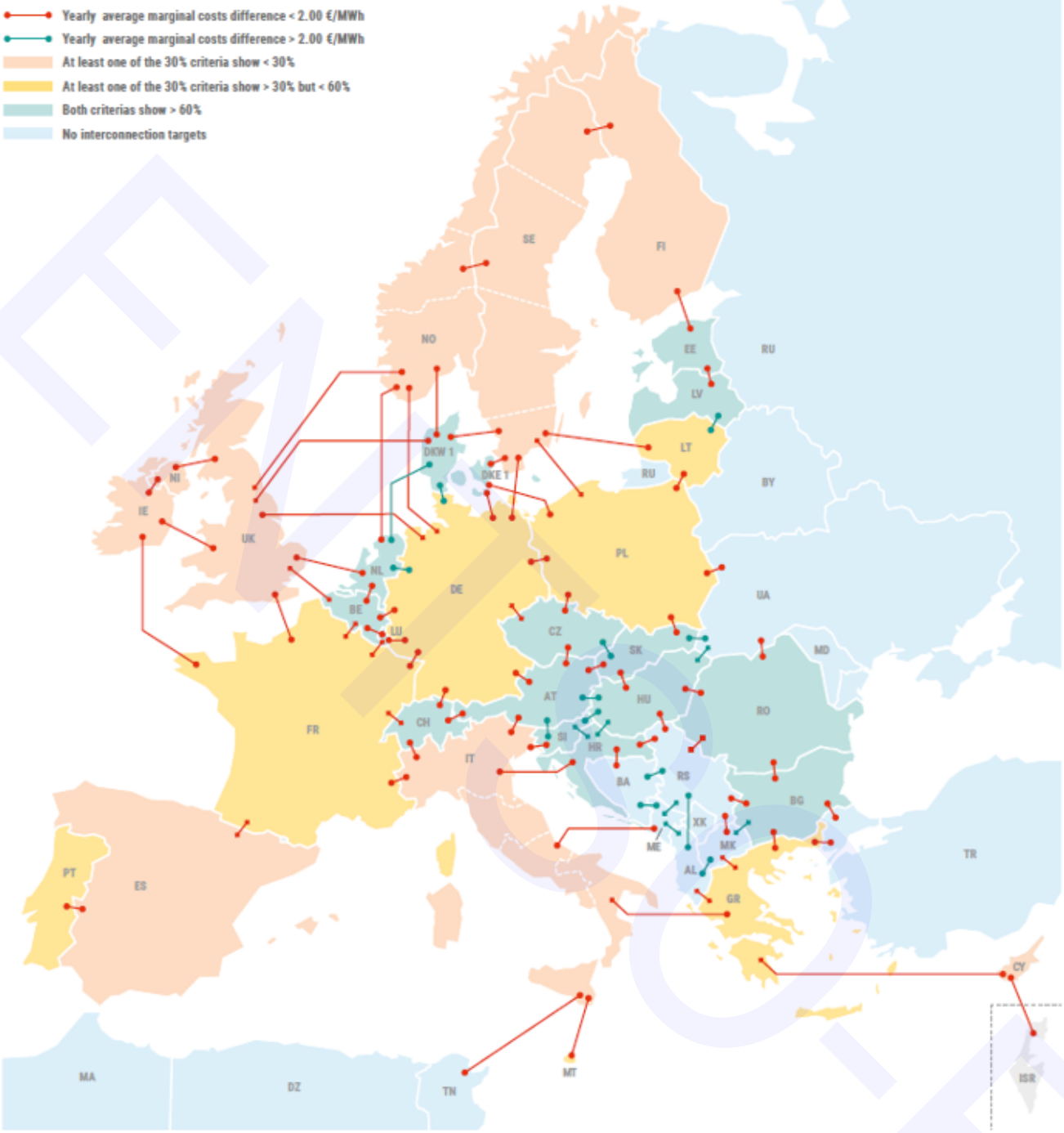
The following maps show the ITEG methodology applied to the TYNDP 2030 scenarios, with the 2020 grid.



ITEG indicators in 2030 (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)

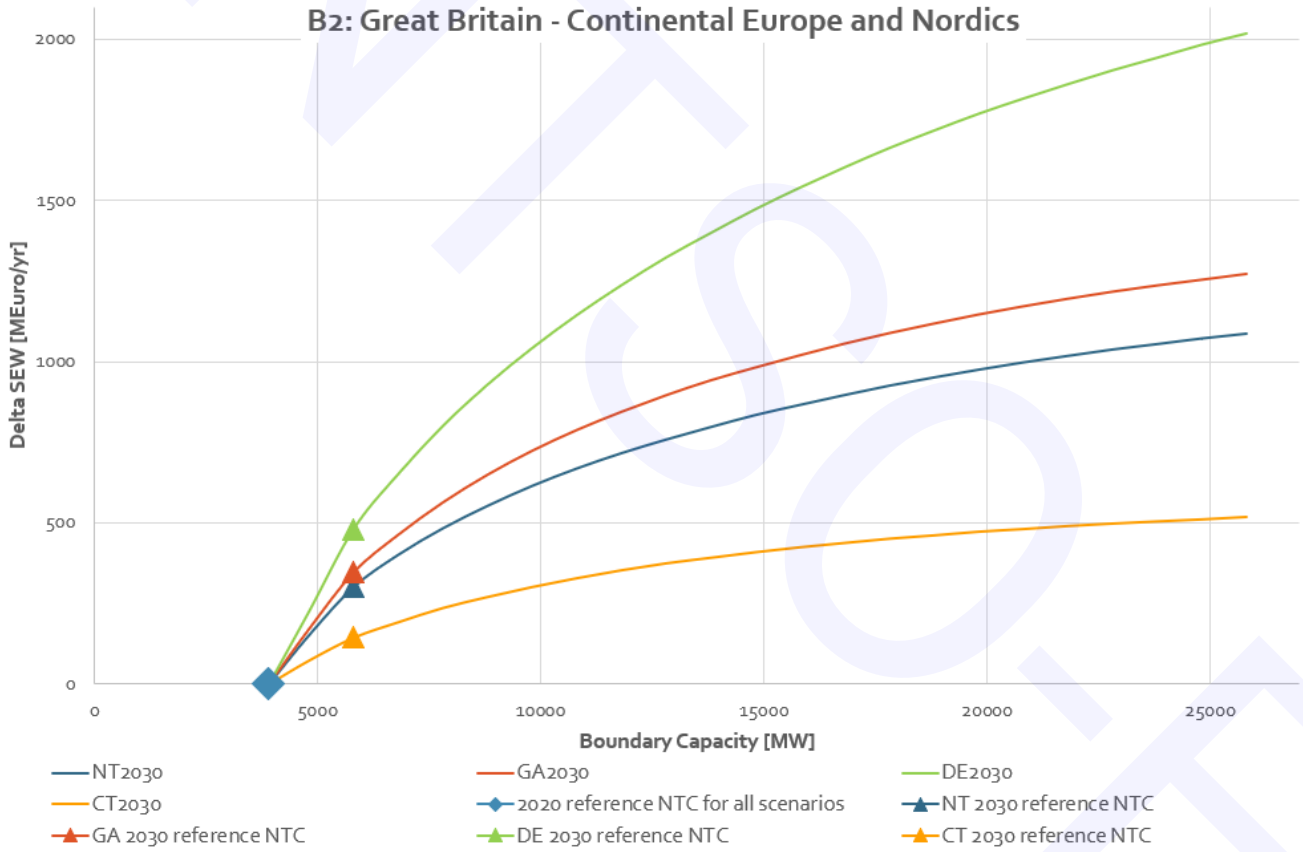
| | Border | A B | B A |
|---|---|---|---|
| Transfer capacity increase (in MW) | Germany - United Kingdom | 1400 | 1400 |

## Boundary capacity diagram

### Network boundary the projects helps mitigate

Great Britain – Continental Europe and Nordics

### Boundary capacity diagram




## 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<br>average<br>min | 21<br>18<br>13 | 61<br>58<br>55 | > | > | ENTSO-E assessment |
| B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction | max<br>average<br>min | 5<br>3<br>-1 | 16<br>15<br>13 | > | > | ENTSO-E assessment |
| B1_RES Annual Socio-Economic Welfare increase resulting from RES integration | max<br>average<br>min | 16<br>14<br>13 | 42<br>38<br>37 | < | < | ENTSO-E assessment |

## Reduction of CO2 and GHG emissions

B4 Non-CO2 emissions (kg/year)

| | | | | | | |
|---|---|---|---|---|---|---|
| B4a Nitrogen oxides | average | -603 | -1083 | n/a | n/a | ENTSO-E assessment |
| B4b Ammonia | average | -27 | -60 | n/a | n/a | ENTSO-E assessment |
| B4c Sulfur dioxide | average | -800 | -1277 | n/a | n/a | ENTSO-E assessment |
| B4d Particular matter 5 | average | -1417 | -849 | n/a | n/a | ENTSO-E assessment |
| B4e Particulate | | -26 | -68 | n/a | n/a | ENTSO-E |

| | | | | | | |
|---|---|---|---|---|---|---|
| matter 10 | average | | | | | assessment |
| B4f Non-methane volatile organic compounds | average | -1403 | -809 | n/a | n/a | ENTSO-E assessment |
| B2a Annual CO2 variation from market simulation (ktonnes / year) | max<br>average<br>min | 45<br>-113<br>-222 | -482<br>-540<br>-584 | < | < | ENTSO-E assessment |
| B2a_€ Annual Societal cost variation resulting from CO2 variation from market simulation monetised (M € / year) | CO2 price 60€/ ton<br>100€/ ton<br>189€/ ton | 4<br>9<br>19 | 17<br>39<br>87 | <<br>><br>> | <<br>><br>> | ENTSO-E assessment |
| B2b Annual CO2 variation due to network losses (ktonnes / year) | average | 89 | 254 | 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<br>100€/ ton<br>189€/ ton | -2<br>-7<br>-15 | -8<br>-18<br>-41 | n/a | n/a | ENTSO-E assessment |

## Integration of renewable energy sources

| | | | | | | |
|---|---|---|---|---|---|---|
| B3 Annual avoided curtailment (RES integration) (GWh / year) | max<br>average<br>min | 339<br>300<br>252 | 1051<br>1009<br>976 | < | < | 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 | 145 | 833 | n/a | n/a | ENTSO-E assessment |
| B5_€ Variation of network losses monetised (M€ / year) | average | 8 | 32 | n/a | n/a | ENTSO-E assessment |

### Security of supply

| | | | | | | |
|---|---|---|---|---|---|---|
| B6 Annual reduction in Energy Not Served (MWh / year) | max<br>average<br>min | | 1575 | 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 | 15.75 | > | 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 | 86 | 64 | ENTSO-E assessment |
| B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction | average | 53 | 22 | ENTSO-E assessment |
| B1_RES Annual Socio-Economic Welfare increase resulting | average | 34 | 37 | ENTSO-E assessment |

| | | | |
|---|---|---|---|
| from RES integration | | | |

### Reduction of CO2 and GHG emissions

| | | | | |
|---|---|---|---|---|
| B2a Annual CO2 variation from market simulation (ktonnes / year) | average | -993 | -632 | ENTSO-E assessment |
| B2a_€ Annual Societal cost variation resulting from CO2 variation from market simulation monetised (M€ / year) | CO2 price<br>60€/ ton<br>100€/ ton<br>189€/ ton | 7<br>47<br>135 | 16<br>41<br>97 | ENTSO-E assessment |

### Integration of renewable energy sources

| | | | | |
|---|---|---|---|---|
| B3 Annual avoided curtailment (RES integration) (GWh / year) | average | 656 | 855 | 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 | 30 | | ENTSO-E assessment |
| B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction | average | 7 | | ENTSO-E assessment |
| | | | | |

| | | | |
|---|---|---|---|
| B1_RES Annual Socio-Economic Welfare increase resulting from RES integration | average | 20 | ENTSO-E assessment |

### Reduction of CO2 and GHG emissions

| | | | |
|---|---|---|---|
| B2a Annual CO2 variation from market simulation (ktonnes / year) | average | -251 | ENTSO-E assessment |
| B2a_€ Annual Societal cost variation resulting from CO2 variation from market simulation monetised (M€ / year) | CO2 price | 60€/ ton<br>100€/ ton<br>189€/ ton | 8<br>18<br>40 | ENTSO-E assessment |

### Integration of renewable energy sources

| | | | |
|---|---|---|---|
| B3 Annual avoided curtailment (RES integration) (GWh / year) | average | 367 | 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 |
|---|---|---|---|
| 1707. Converter stations and Subsea Cabling | 1260 | 3% | 23 |
| Total | 1260 | | 23 |

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

1707