Project Sheet

DKW-DE, Westcoast

Project type	transmission
Project id	183
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Index

Key Information 3
Description 3
Project Description & Context 5
Project Investments 5
System Needs addressed by the project 5
Interconnection targets 6
Project Assessment 10
Transfer capacity increase (National Trends 2025) 10
CBA results 10
Central scenario: National Trends 10
Scenarios: Distributed Energy & Global Ambition 12
Sensitivity Study: Current Trends 13
Residual impact 15
Project Costs 15

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Key Information

Cross Border Project
AC transmission line
New

PCI number 1.3.1 (4th list, 31 Oct. 2019)
In Permitting

Description

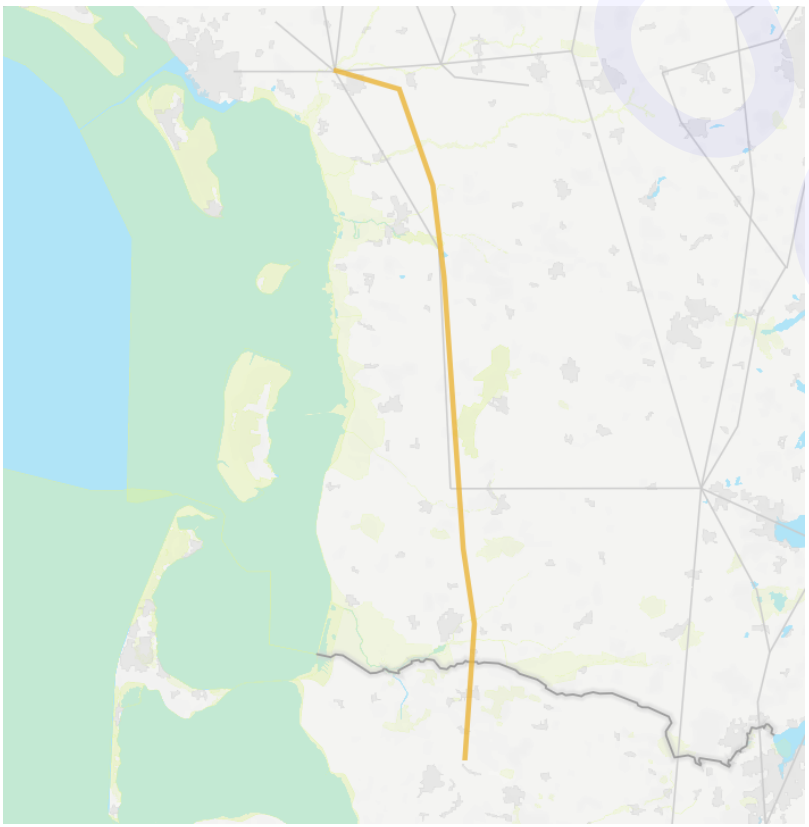
New 400 kV line from Endrup (DK) to Klixbüll (DE), increasing the transfer capacity at the West Coast between these countries. The project is labelled by the EC as project of common interest (PCI 1.3.1).

Project promoters

Energinet.dk
TenneT DE

Countries

Germany
Denmark



National development plan(s)

German NDP 2030 v2019: P25 M45 ; Denmark: RUS-plan 2018 p. 24 and 37

Additional information on the project

www.klixbuell-endrup.eu

http://www.tennet.eu/de/netz-und-projekte/onshore-projekte/westkuestenleitung.html
(in German)

In the scope of the TYNDP, this project is investigated with 500 MW, whereas on bilateral basis joint investigations consider a capacity of up to 1000 MW.

Project sheet backlog

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

ENTSO-E

Project Description & Context

Project Investments

Main investment(s): New 380 kV line DKW-DE between Klixbuell (DE) and Endrup (DKW) as part of connection Endrup-Brunsbüttel

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	92	Klixbüll (DE)	Endrup (DKW)	In Permitting	2023	Investment on time	

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.

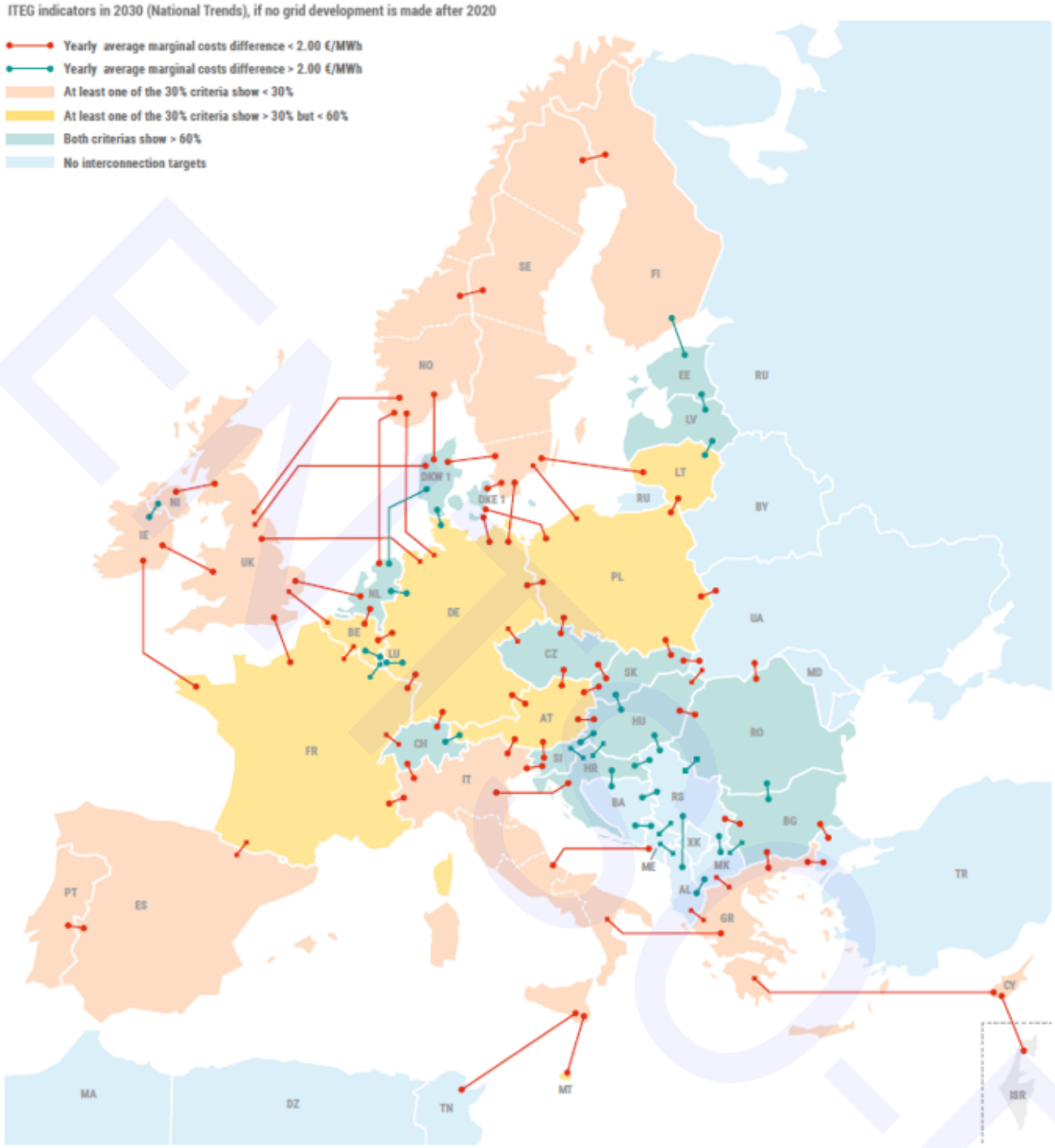
Need		How the project addresses each need (explanation provided by the project promoter(s))
	Infrastructure to reduce price differentials between EU and/or non-EU countries	contributes to reduction of price spread by 2040
	Infrastructure to address system adequacy deficiencies and/or mitigate the risk of power failures.	facilitates exchange of RES and reserves
	Infrastructure to improve system flexibility and stability e.g. improve system or local ramp rate, improve transient stability or RoCoF to meet system Needs.	increases system size, thus facilitates sharing of ancillary service
	Infrastructure designed to enable cost-efficient grid connection of high volumes of RES and/or reduce RES curtailment	high RES increase expected on both sides of the border - further connection via P167 connecting to low correlated RES area

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.

ENTSO-E


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
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ES
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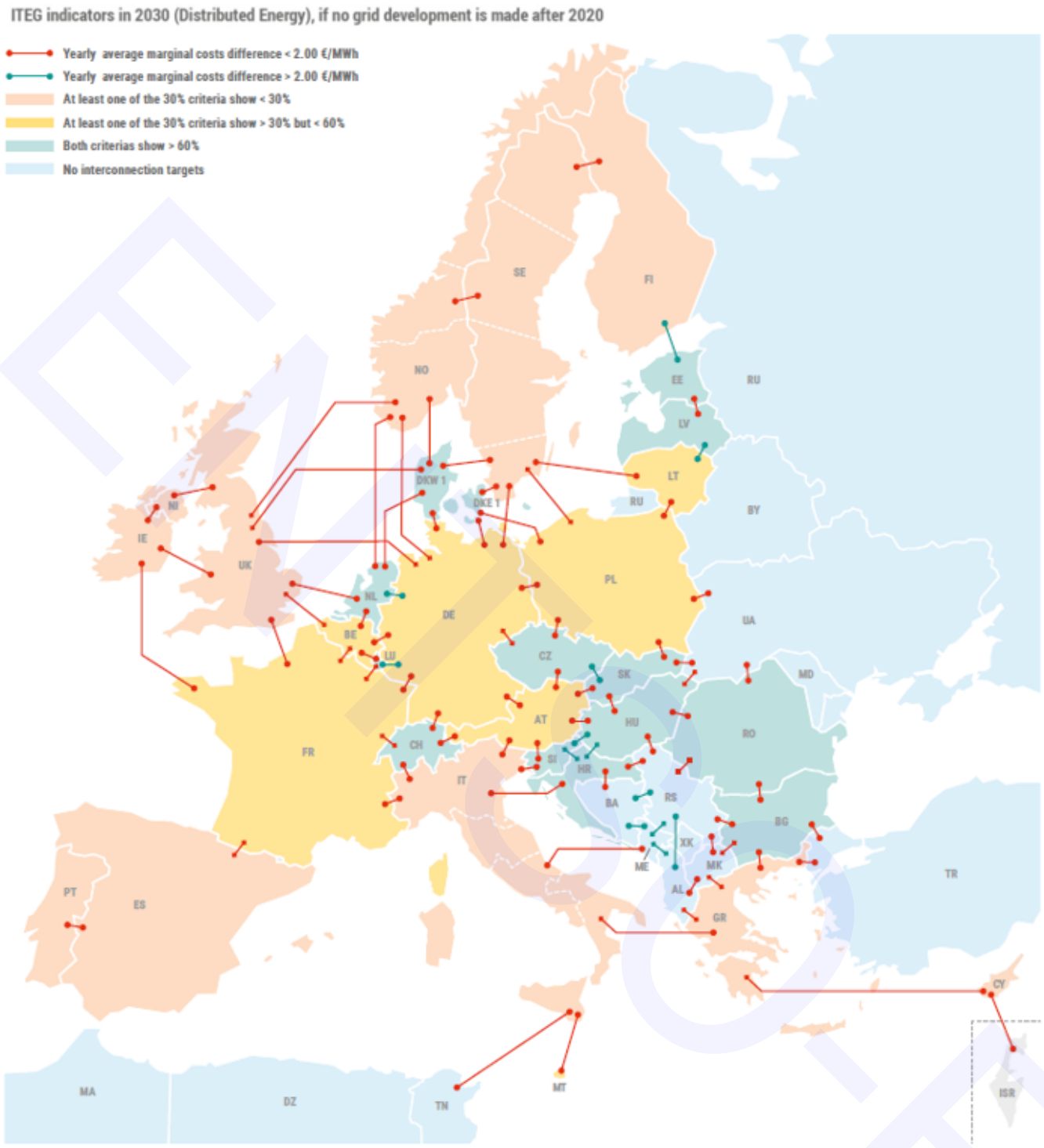
CY
MA
DZ
TN
MT
ISR


ITEG indicators in 2030 (Distributed Energy), 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
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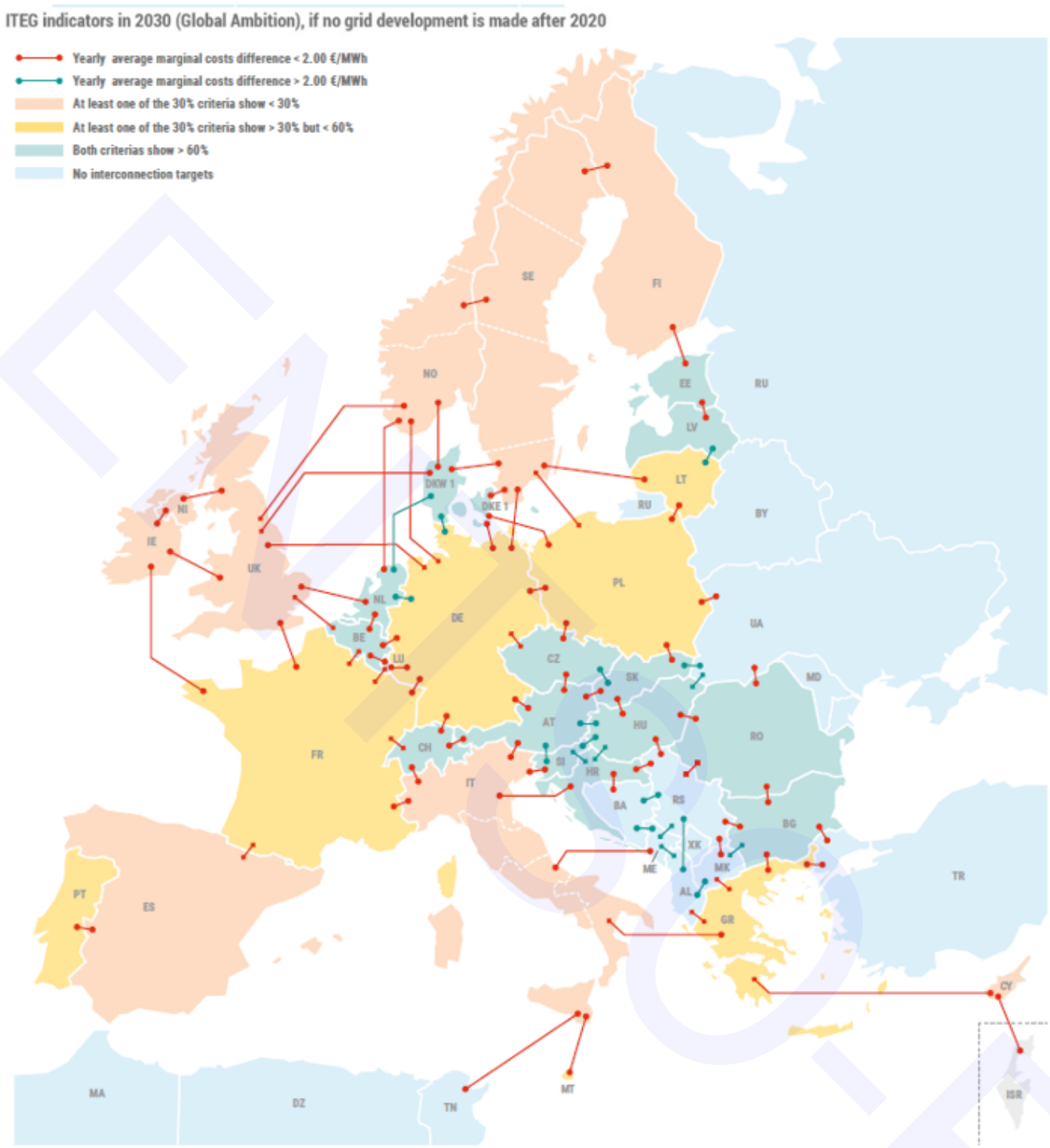
ES
GR
CY
MA
DZ
TN
MT
ISR


ITEG indicators in 2030 (Global Ambition), 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
NI
IE
UK
BY
PL
NL
DE
BE
LU
UA
CZ
SK
MD
AT
HU
RO
CH
FR
SI
HR
IT
BA
RS
BG
XK
ME
MK
AL
TR
PT
ES
GR
CY
MA
DZ
TN
MT
ISR

Project Assessment

Transfer capacity increase (National Trends 2025)

	Border	A B	B A
Transfer capacity increase (in MW)	Germany - Denmark	1000	1000

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	4 3 3	14 11 5	>	>	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	max average min	1 1 1	9 6 3	>	>	ENTSO-E assessment
B1_RES Annual Socio-Economic	max average	1 1	6 5	>	<	ENTSO-E assessment

Welfare increase resulting from RES integration	min	1	4			

Reduction of CO2 and GHG emissions

B4 Non-CO2 emissions (kg/year)

B4a Nitrogen oxides	average	1260	-185	n/a	n/a	ENTSO-E assessment
B4b Ammonia	average	63	-17	n/a	n/a	ENTSO-E assessment
B4c Sulfur dioxide	average	3026	270	n/a	n/a	ENTSO-E assessment
B4d Particular matter 5	average	940	3185	n/a	n/a	ENTSO-E assessment
B4e Particulate matter 10	average	219	-32	n/a	n/a	ENTSO-E assessment
B4f Non-methane volatile organic compounds	average	892	3229	n/a	n/a	ENTSO-E assessment

B2a Annual CO2 variation from market simulation (ktonnes / year)	max average min	-23 -38 -48	-91 -202 -337	>	<	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	1 3 6	6 15 33	< < <	>>>>	ENTSO-E assessment
B2b Annual CO2 variation due to network losses (ktonnes / year)	average	19	149	n/a	n/a	ENTSO-E assessment
B2b_€ Annual Societal cost variation resulting from	CO2 price 60€/ ton 100€/	-3 -1 -3	-5 -11 -24	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	22 21 19	145 135 116	<	<	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	39	205	n/a	n/a	ENTSO-E assessment
B5_€ Variation of network losses monetised (M€ / year)	average	2	8	n/a	n/a	ENTSO-E assessment

Security of supply

B6 Annual reduction in Energy Not Served (MWh / year)	max average min		0	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	0	>	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	13	18	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	average	10	15	ENTSO-E assessment
B1_RES Annual Socio-Economic Welfare increase resulting from RES integration	average	6	3	ENTSO-E assessment
Reduction of CO2 and GHG emissions				
B2a Annual CO2 variation from market simulation (ktonnes / year)	average	-196	-415	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	1 9 27	10 27 64	ENTSO-E assessment
Integration of renewable energy sources				
B3 Annual avoided curtailment (RES integration) (GWh / year)	average	108	59	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	4	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	average	1	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	-35	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	1 2 6	ENTSO-E assessment

Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year)	average	21	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).

Residual environmental impact

Investment	Investment status	Distance (km)	Type of sensitivity
DKW-DE, Westcoast, TYNDP ID 183.1018	In Permitting	5	Other nature protection areas under national law

Additional information by the project promoter(s)

Geographic information is only indicatve. More detailed information is used during public consultations when discussing the respective sections.

Project Costs

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

	CAPEX (Meuro)	Uncertainty range (%)	OPEX
1018. DKW-DE, Westcoast, TYNDP ID 183.1018	210		2
Total	210		2

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

1018