Project Sheet

Hansa PowerBridge II

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Key Information

Cross Border Project
Offshore DC transmission cable
New

Under Consideration

Description

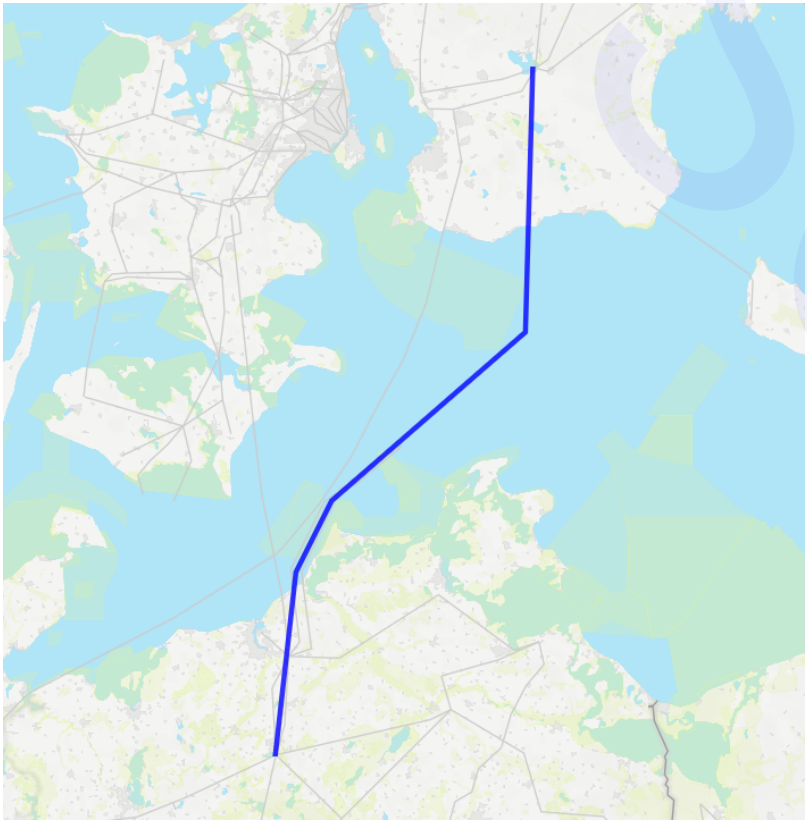
Possible second HVDC cable interconnector between southern Sweden (Bidding area SE4) and Germany (50Hertz). This project candidate is driven by market based target capacities found in the Common Planning Studies by Regional Group Baltic Sea.

Project promoters

Svenska Kraftnät
50HERTZ

Countries

Germany
Sweden



National development plan(s)

NEP2030, Germany, version 2019, page 527

https://www.netzentwicklungsplan.de/sites/default/files/paragraphs-files/NEP_2030_V2019_2_Entwurf_Teil2.pdf

Additional information on the project

The German national grid development plan was published in 2017 und is available under the following link:
https://netzentwicklungsplan.de/en/grid-development-plans/grid-de-vel-op-ment-plans-2030-2017
.

Svenska kraftnät has published a national development plan in 2017. The purpose of the plan is to be an investment plan for the following ten years, 2018-2027. The investment plan presents a detailed look of the projects Svenska kraftnät intends to realize under the stated time period. The plan is available in Swedish through the following link:

https://www.svk.se/siteassets/om-oss/rapporter/2017/svenska-kraftnats-systemutvecklingsplan-2018-2027.pdf
(Swedish)

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): Possible second HVDC cable interconnector between southern Sweden (Bidding area SE4) and Germany (50Hertz). This project candidate is driven by market based target capacities found in the Common Planning Studies by Regional Group Baltic Sea.

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	300	Hurva (SE4)	Guestrow (DE)	Under Consideration	2030	Investment on time	

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 to reduce price differentials between EU and/or non-EU countries	The main driver is market integration of the Nordic hydro/nuclear/RES dominated system with the German thermal/RES based system. The infrastructure will reduce price differentials between EU countries.
⚖	Infrastructure to address system adequacy deficiencies and/or mitigate the risk of power failures.	The system adequacy is enhanced in Germany which will increase the import potential in period of low wind and solar generation. Also the system adequacy in southern Sweden is enhanced since it given more import capacity in a future with less available nuclear generation capacity.
	Infrastructure designed to enable cost-efficient grid	Increase of RES in both countries leads to higher need for trade with high surplus during high wind power

Need		How the project addresses each need (explanation provided by the project promoter(s))
	connection of high volumes of RES and/or reduce RES curtailment	production. Flows are to be balanced with southbound flow during peak hours and when hydro inflow in Sweden are high and northbound in periods of high German RES generation by night

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)	Germany - Sweden	700	700

Boundary capacity diagram

Network boundary the projects helps mitigate

Nordics - Continental Europe West

Boundary capacity diagram

ENTSO-E

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 its planned commissioning date is in 2035 or later, 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	25 25 25	73 72 71	<	>	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	max average min	6 6 6	29 29 29	<	>	ENTSO-E assessment
B1_RES Annual Socio-Economic Welfare increase resulting from RES integration	max average min	8 8 8	25 23 21	<	<	ENTSO-E assessment

Reduction of CO2 and GHG emissions

B4 Non-CO2 emissions (kg/year)

B4a Nitrogen oxides	average	N/A	-2070	n/a	n/a	ENTSO-E assessment
B4b Ammonia	average	N/A	-68	n/a	n/a	ENTSO-E assessment
B4c Sulfur dioxide	average	N/A	-2207	n/a	n/a	ENTSO-E assessment
B4d Particular matter 5	average	N/A	12847	n/a	n/a	ENTSO-E assessment
B4e Particulate matter 10	average	N/A	-115	n/a	n/a	ENTSO-E assessment

B4f Non-methane volatile organic compounds		average	N/A	12970	n/a	n/a	ENTSO-E assessment
B2a Annual CO2 variation from market simulation (ktonnes / year)		max average min	-244 -244 -244	-1022 -1023 -1025	>	<	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	9 19 40	33 74 165	< < <	< > >	ENTSO-E assessment
B2b Annual CO2 variation due to network losses (ktonnes / year)		average	0	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	0 0 0	N/A N/A N/A	n/a	n/a	ENTSO-E assessment

Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year)		max average min	163 163 163	630 592 554	<	<	ENTSO-E assessment
B3a Connected RES (MW)	-				n/a	n/a	ENTSO-E assessment

Impact on grid losses

B5 Variation of network losses		average	N/A	N/A	n/a	n/a	ENTSO-E assessment

(GWh / year)						
B5_€ Variation of network losses monetised (M€ / year)	average	N/A	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	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	70	101	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	average	28	42	ENTSO-E assessment
B1_RES Annual Socio-Economic Welfare increase resulting from RES integration	average	14	14	ENTSO-E assessment

Reduction of CO2 and GHG emissions

B2a Annual CO2 variation from market simulation (ktonnes / year)	average	-530	-1194	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	4 25 72	30 78 184	ENTSO-E assessment

Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year)	average	254	312	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	
Hansa PowerBridge II (New HVDC)	++	++	+ (between sync areas)	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	25	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	average	4	ENTSO-E assessment
B1_RES Annual Socio-Economic Welfare increase resulting from RES integration	average	8	ENTSO-E assessment

Reduction of CO2 and GHG emissions

B2a Annual CO2 variation from market simulation (ktonnes / year)	average	-133	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	4 10 21	ENTSO-E assessment

Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year)	average	149	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

Note based on CBA Guideline 3.0: Given that the actual route of the project might not be defined due to the low degree of maturity of its investment(s), an environmental assessment is not yet available.

Additional information by the project promoter(s)

This information is not available yet as the project is in a very early phase.

Residual social impact

Investment	Investment status	Distance (km)	Type of sensitivity

Note based on CBA Guideline 3.0: Given that the actual route of the project might not be defined yet because of the low degree of maturity of its investment(s), a residual social impact assessment is not yet available.

Additional information by the project promoter(s)

This information is not available yet as the project is in a very early phase.

Project Costs

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

	CAPEX (Meuro)	Uncertainty range (%)	OPEX
1262. Hansa PowerBridge II	660	+-10%	1
Total	660		1

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

1262 It is still in an early stage