Project Sheet

Wullenstetten - Border Area (DE-AT)

Project type	transmission
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Key Information

Internal Project
AC transmission line
Upgrade

Planned But Not Yet Permitting

Description

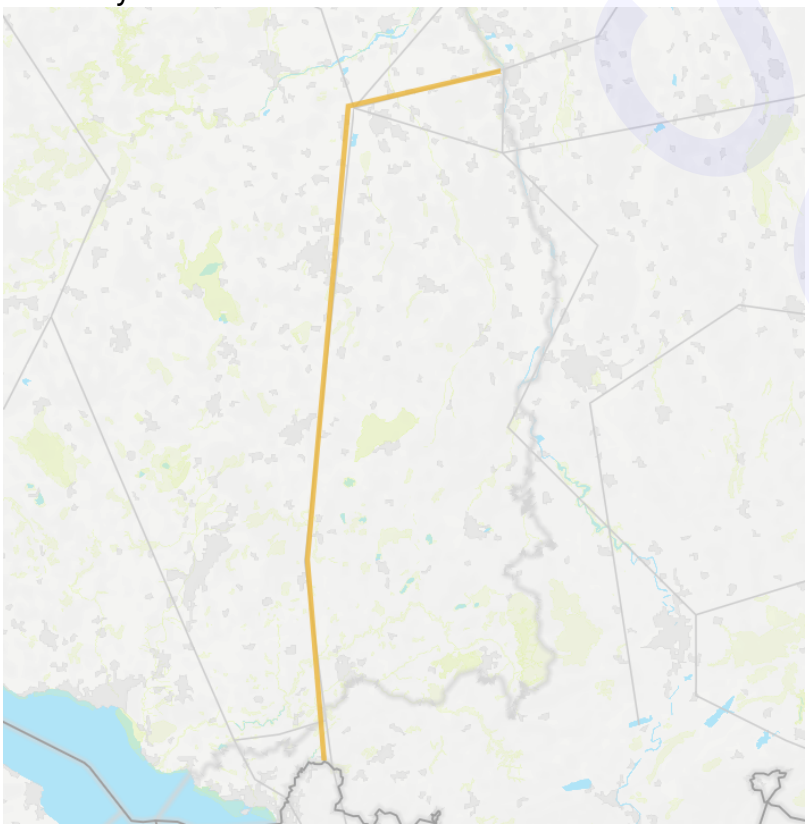
Between point Wullenstetten and point border area (DE-AT) as well as between Herbertingen and Point Neuravensburg, an upgrade of an existing 380-kV-line is necessary (grid enhancement). Furthermore, between switching point Neuravensburg and Austrian National border (AT) a new line with a significantly higher transmission capacity will be constructed in an existing corridor (grid enhancement). Thereby, a significantly higher transmission capacity is realized.

Project promoters

AMPRION
VUEN

Countries

Germany



National development plan(s)

NDP1, Germany, Netzentwicklungsplan 2030 Version 2019, Project 52, p. 445

Additional information on the project

https://www.apg.at/-/media/B1CF20C3D97B4496AE3E06AF5B351AB7.pdf

http://www.vuen.at/de/html/uebertragungsnetz_netzentwicklung_2019.html

https://www.netzentwicklungsplan.de/sites/default/files/paragraphs-files/Basispraesentation_NEP_2030_V2019_2_Entwurf.pdf

The project was part of the previous TYNDP 2018, Link to the Website: https://tyndp.entsoe.eu/tyndp2018/projects/projects/322

Project sheet backlog

25 Jan. 2021 - Addition of results for indicator B10 for scenarios DE2030 and GA2030

5 Jan. 2021 - Addition of CBA results for the DE2030 scenario

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

Project Description & Context

Project Investments

Main investment(s): Between point Wullenstetten and point border area (DE-AT) an upgrade of an existing 380-kV-line is necessary (grid enhancement). Thereby, a significantly higher transmission capacity is realized. Between switching point Neuravensburg and Austrian National border (AT) a new line with a significantly higher transmission capacity will be constructed in an existing corridor (grid enhancement).

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	95	Wullenstetten (DE)	Austrian National border (AT)	In Permitting	2025	Delayed	Scope of the project changed due to technical reasons.

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))
ITEG	Infrastructure to tackle a Need identified by one of the European ITEG indicators referring to the 15% interconnection target for 2030:1. Reduce the price differential between EU countries to below 2EUR/MWh.2. Contribute to pushing ratio between nominal transmission capacity and installed RES capacity past 30%.3. Contribute to pushing ratio between nominal	The project increases the German interconnection level to Austria.

Need		How the project addresses each need (explanation provided by the project promoter(s))
	transmission capacity and peak load past 30%.	
	Infrastructure designed to enable cost-efficient grid connection of high volumes of RES and/or reduce RES curtailment	The project helps connecting German RES power with pump storages in Austria and therefore improves the accomodation of 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)	Internal (Germany)	0	0

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.

This project is assessed with the internal redispatch methodology. Because this project was assessed with only one tool for the NT scenario, there is no variation between min, max and average values.

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	1 1 1	0 0 0	<	<	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2	max average min	0 0 0	-2 -2 -2	>	<	ENTSO-E assessment

emissions reduction						
B1_RES Annual Socio-Economic Welfare increase resulting from RES integration	max average min	0 0 0	-15 -15 -15	>	>	ENTSO-E assessment

Reduction of CO2 and GHG emissions

B4 Non-CO2 emissions (kg/year)

B4a Nitrogen oxides	average	-45481	110792	n/a	n/a	ENTSO-E assessment
B4b Ammonia	average	909	8435	n/a	n/a	ENTSO-E assessment
B4c Sulfur dioxide	average	-86186	515693	n/a	n/a	ENTSO-E assessment
B4d Particular matter 5	average	-1144	-13815	n/a	n/a	ENTSO-E assessment
B4e Particulate matter 10	average	-790	-11425	n/a	n/a	ENTSO-E assessment
B4f Non-methane volatile organic compounds	average	160	4142	n/a	n/a	ENTSO-E assessment

B2a Annual CO2 variation from market simulation (ktonnes / year)	max average min	14 14 14	53 53 53	< <	>>>>	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 -1 -2	-2 -4 -9	>>>	<<<	ENTSO-E assessment
B2b Annual CO2 variation due to network losses (ktonnes / year)	average	-12	-27	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 1 2	1 2 4	n/a	n/a	ENTSO-E assessment

Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year)	max average min	-11 -11 -11	-347 -347 -347	>	>	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	-21	-97	n/a	n/a	ENTSO-E assessment
B5_€ Variation of network losses monetised (M€ / year)	average	-1	-2	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

B10 Reduction of Necessary Reserve for Redispatch Power Plants	NT2025	NT2030	
In Meuro/year	1	4	This indicator was submitted by the promoter(s). ENTSO-E confirms the consistency of the proposed indicator with the CBA Guideline 3.0. About the computation of this indicator by the project promoter(s)
In MW	58	186	

This indicator was computed based on NT2025 and NT2030, in a study performed by 50Hertz, Amprion, TenneT DE, TransnetBW in 2020. The promoter(s) stated that the submitted value was computed in accordance with the CBA Guideline and explained it as follows:

As the assessment described in this document in each step follows the guidance given in the 3rd CBA Guideline the compliance with it is given. Furthermore, as demanded within the Implementation Guideline for Redispatch Assessment, the German TSOs participated within the 'Sanity check for minimum modelling requirements' coordinated by ENTSO-E. The quality of the study carried out using the IAEW Redispatch tool has therefore been ensured.

The promoter(s) certified that the values submitted and assessed in the study relate to countries located within the ENTSO-E perimeter only.

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	-7	-16	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction average	0	-2	ENTSO-E assessment
B1_RES Annual Socio-Economic Welfare increase resulting average	365	-11	ENTSO-E assessment

from RES integration			

Reduction of CO2 and GHG emissions

B2a Annual CO2 variation from market simulation (ktonnes / year)	average	2	76	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	0 0 0	-2 -5 -12	ENTSO-E assessment

Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year)	average	-68	-225	ENTSO-E assessment
B3a Connected RES (MW)	-			ENTSO-E assessment

Security of supply

B10 Reduction of Necessary Reserve for Redispatch Power Plants	**DE2030**	**GA2030**	
In Meuro/year	8	-1	This indicator was submitted by the promoter(s). ENTSO-E confirms the consistency of the proposed indicator with the CBA Guideline 3.0. About the computation of this indicator by the project promoter(s)
In MW	391	-39	

This indicator was computed based on DE2030 and GA2030, in a study performed by 50Hertz, Amprion, TenneT DE, TransnetBW in 2020. The promoter(s) stated that the submitted value was computed in accordance with the CBA Guideline and explained it as follows:

As the assessment described in this document in each step follows the guidance given in the 3rd

CBA Guideline the compliance with it is given. Furthermore, as demanded within the Implementation Guideline for Redispatch Assessment, the German TSOs participated within the 'Sanity check for minimum modelling requirements' coordinated by ENTSO-E. The quality of the study carried out using the IAEW Redispatch tool has therefore been ensured.

The promoter(s) certified that the values submitted and assessed in the study relate to countries located within the ENTSO-E perimeter only.

Non scenario-dependent indicator(s)

B8.0 Stability (Transient, Voltage and Frequency Stability)	Transient stability	Voltage stability	Frequency stability	
Wullenstetten - Border Area (DE-AT) (AC line high temperature conductor/ conductor replacement (e.g., duplex to triplex))	-	-	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	-20	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	-9	ENTSO-E assessment

Reduction of CO2 and GHG emissions

B2a Annual CO2	average	45	ENTSO-E assessment

variation from market 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	N/A N/A N/A	ENTSO-E assessment

Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year)	average	-174	ENTSO-E assessment
B3a Connected RES (MW)	-		ENTSO-E assessment

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

According to the CBA indicators for the scenarios NT2025 and NT2030 the project has only a small impact which is not positive for all indicators. The reason for this is the fact that the project is only one fragment preparing the German side of the grid for project 263 (Lake Constance East) which foresees a complete restructuring of the grid in the area around Lake Constance. The joint projects will increase the transmission capacity between Germany and Austria even more and therefore the whole effect of the project will only show significantly in combination with project 263.

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
1476. Wullenstetten - Border Area (DE-AT)	113.5	10%	0.9
Total	113.5		0.9

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

1476 Uncertainty range is needed due to uncertainties in material costs, permitting issues and unknown final routing in case of project in early planning status.