

Project Sheet

Lienz (AT) - Obersielach (AT)



Project type	transmission
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Project id	1052
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Created by	
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Key Information

Internal Project

AC transmission line

Mostly Upgrade

PCI number 3.28 (5th list)

Planned But Not Yet Permitting

Commissioning year estimated by the promoter(s): 2032

Description

The 380-kV-ring can be completed in Austria with the reinforcement of the Carinthia transmission grid. The advantages of a ring structure are only made possible by the project. Security of supply in Carinthia and Austria can be guaranteed in the long term. With the 380-kV-ring closure in the south, a redundant connection of the renewable energy feed-in centers in the east

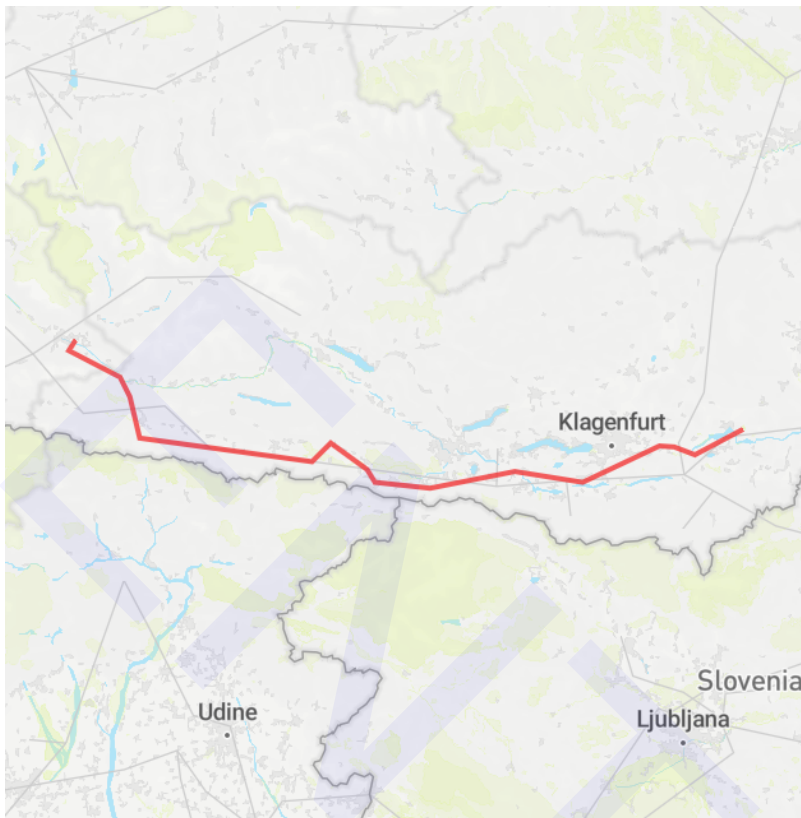
Austria (mainly wind and PV) and the load centers with the pumped storage power plants in the central Alpine region. The 380-kV-ring closure is essential for the grid integration of renewable energies and the Austrian Federal Government's climate and energy strategy, and its necessity will also be addressed in the Carinthian Government's 2018-2023 program. The project will also enable the development of additional transmission capacity to the neighboring countries

Project promoters

Austrian Power Grid

Countries

Austria



National development plan(s)

APG Netzentwicklungsplan 2021, AT, 2021, 11-14, 55,
<https://www.apg.at/en/Stromnetz/Netzentwicklung>

Additional information on the project

<https://www.apg.at/en/Stromnetz/Netzentwicklung>

Project's TYNDP history

This project was part of:



Project sheet backlog

14 December 2022: Addition of information on cross-border dNTC impact

29 July 2022: Publication for public consultation as part of TYNDP 2022 package

Project Description & Context

Project Investments

Investment ID	Investment name	Main investment of the project	upgrade from 220 kV to 380 kV			
1713	Lienz (AT) - Obersielach (AT)					
Type of Element	Total route length (km)	From substation 1	To substation 2	Nominal voltage (kV)	Capacity of the investment [MW]	MVA
AC transmission line	170	Lienz (AT)	Obersielach (AT)	380		
Type of converter	Mvar	Present status	Commissioning year	Progress of the investment	Explanation in case of delay, reclustering or cancellation	
		Planned But Not Yet Permitting	06-2032	Rescheduled	Revision of the grid expansion concept. Cascade effects due to project delays in projects ranked ahead.	

Project Costs

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

	CAPEX (Meuro)	Uncertainty range (%)	Sustaining CAPEX (Meuro)	OPEX (Meuro/year)
1713. Lienz (AT) - Obersielach (AT)	500	10	0	1.4
Total	500		0	1.4

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

1713 Uncertainty regarding extra costs due to safety, environmental or legal requirements imposed during permit grating process.

Transfer capacity increase

ENTSO-E has verified the compliance of the cross-border dNTC computations with the CBA

Guidelines.

	Border	A B	B A
Transfer capacity increase (in MW)	Austria - Slovenia	1528	1084

Assessment modality of the project

The project is not included in the 2027 reference grid

The project is included in the 2035 reference grid

System Needs addressed by the project

Project promoter(s) were invited to select 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...

ENTSO-E also performed an identification of System Needs study, indicating where there is space to improve the economic efficiency of the pan-European power system in 2030 and 2040. Where relevant for each project, we publish the needs identified by our study that the project at hand could potentially help to address.

Need		How the project addresses each need (explanation provided by the project promoter(s))
	Improve system flexibility and stability e.g. improve system or local ramp rate, improve transient stability or RoCoF to meet system Needs.	Facilitation of capacities between RES and pump storages in Austria as well as optimisation of cross border flows.
	Infrastructure to facilitate and accommodate future scenarios, cross-border flows or loop flows.	Enabling future developments (load/generation).
	Infrastructure and/or market design to provide balancing flexibility (e.g. international pooling / sharing of reserves, coordinated development of reserve capacity)	Facilitation and optimisation of pump storage connections in the western part of Austria and therefore increasing flexibility.
	Infrastructure designed to enable cost-efficient grid connection of high volumes of RES and/or reduce RES curtailment	Connecting RES with pump storages.

Results of ENTSO-E's systemneeds study on relevant borders:

In 2030:

Border	Capacity increase needs in MW
Austria - Slovenia	1000

In 2040:

Border or country	Capacity increase needs in MW	Storage flexibility in MW	Peaking flexibility in MW
Austria - Slovenia	1500		
Austria		<1000	

Project Assessment

CBA results

ENTSO-E has assessed the benefits delivered by each project in 2030 and 2040. Projects' benefits must be understood as benefits for Europe as a whole, not for the promoters of the project.

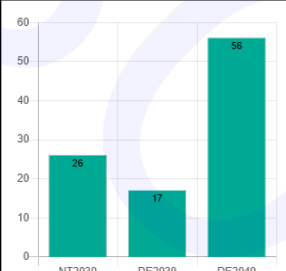
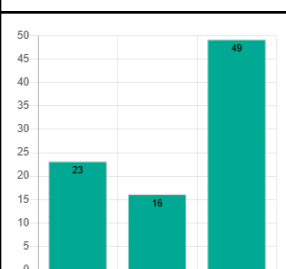
Indicators B1 to B6 were computed by ENTSO-E, while promoters had the possibility to compute and submit project-level benefits (B7 to B9). ENTSO-E's market simulations were performed with the total surplus approach.

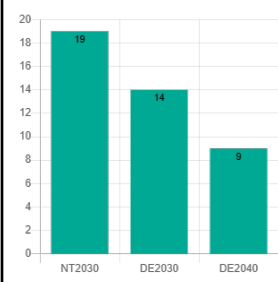
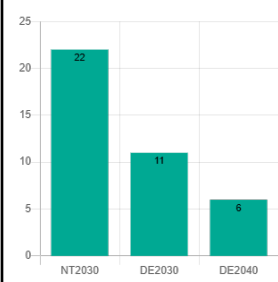
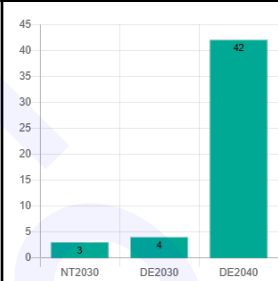
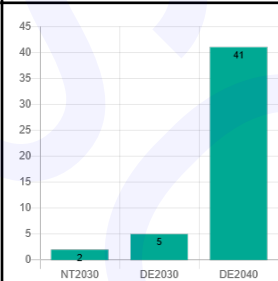
Central scenario: National Trends

National Trends is designed to reflect EU member state's National Energy and Climate Plans (NECP) and other long-term strategies. The following tables present results in the ENTSO-E area and in the full study area (ENTSO-E area plus Algeria, Egypt, Israel, Libya, Morocco, Moldova, Malta, Palestine, Tunisia, Turkey, Ukraine and the United Kingdom). Results in the EU area are available at this link: https://eepublicdownloads.blob.core.windows.net/public-cdn-container/tyndp-documents/TYNDP2022/CBA-results/TYNDP2022_CBA_EU27_all-scenarios.xlsx

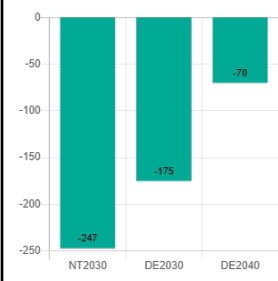
	NT2030	Comparison of the average results for National Trends and Distributed Energy	
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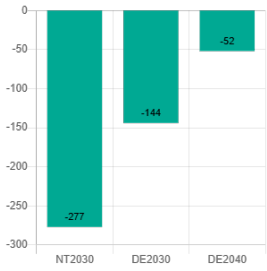
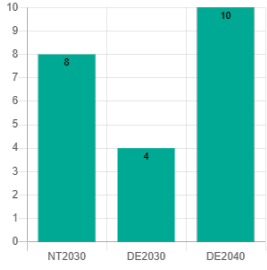
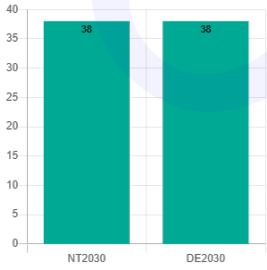
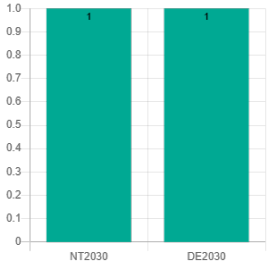
Increase in socio-economic welfare

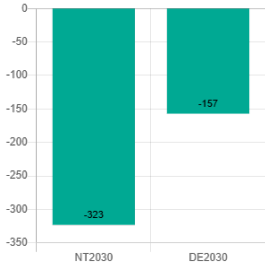
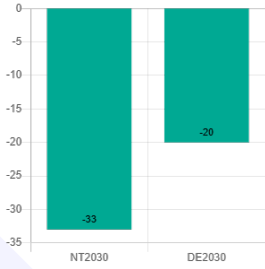
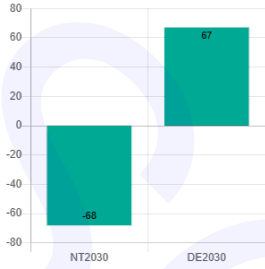
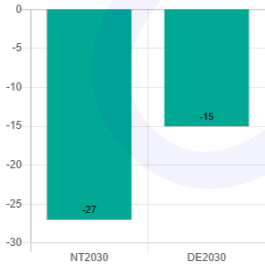
B1 Annual Socio-Economic Welfare (SEW) increase (M€ / year) in the entire area covered by the study	max average min	28 26 23		ENTSO-E assessment
B1 Annual Socio-Economic Welfare (SEW) increase (M€ / year) in the ENTSO-E area	max average min	26 23 20		ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase	max average min	24 19 15		ENTSO-E assessment

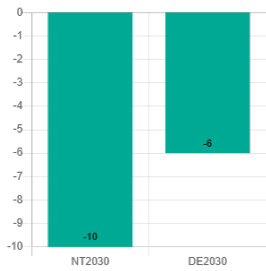
resulting from CO2 emissions reduction (M€ / year) in the entire area covered by the study			 <table><tr><th>Scenario</th><th>Value (M€/year)</th></tr><tr><td>NT2030</td><td>19</td></tr><tr><td>DE2030</td><td>14</td></tr><tr><td>DE2040</td><td>9</td></tr></table>	Scenario	Value (M€/year)	NT2030	19	DE2030	14	DE2040	9	
Scenario	Value (M€/year)											
NT2030	19											
DE2030	14											
DE2040	9											
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction (M€ / year) in the ENTSO-E area	max average min	24 22 17	 <table><tr><th>Scenario</th><th>Value (M€/year)</th></tr><tr><td>NT2030</td><td>22</td></tr><tr><td>DE2030</td><td>11</td></tr><tr><td>DE2040</td><td>6</td></tr></table>	Scenario	Value (M€/year)	NT2030	22	DE2030	11	DE2040	6	ENTSO-E assessment
Scenario	Value (M€/year)											
NT2030	22											
DE2030	11											
DE2040	6											
B1_RES Annual Socio-Economic Welfare increase resulting from RES integration (M€ / year) in the entire area covered by the study	max average min	6 3 0	 <table><tr><th>Scenario</th><th>Value (M€/year)</th></tr><tr><td>NT2030</td><td>3</td></tr><tr><td>DE2030</td><td>4</td></tr><tr><td>DE2040</td><td>42</td></tr></table>	Scenario	Value (M€/year)	NT2030	3	DE2030	4	DE2040	42	ENTSO-E assessment
Scenario	Value (M€/year)											
NT2030	3											
DE2030	4											
DE2040	42											
B1_RES Annual Socio-Economic Welfare increase resulting from RES integration (M€ / year) in the ENTSO-E area	max average min	5 2 0	 <table><tr><th>Scenario</th><th>Value (M€/year)</th></tr><tr><td>NT2030</td><td>2</td></tr><tr><td>DE2030</td><td>5</td></tr><tr><td>DE2040</td><td>41</td></tr></table>	Scenario	Value (M€/year)	NT2030	2	DE2030	5	DE2040	41	ENTSO-E assessment
Scenario	Value (M€/year)											
NT2030	2											
DE2030	5											
DE2040	41											

Reduction of CO2 and GHG emissions

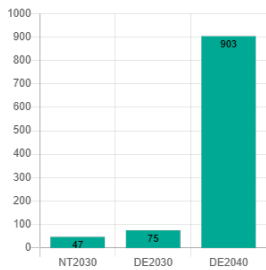
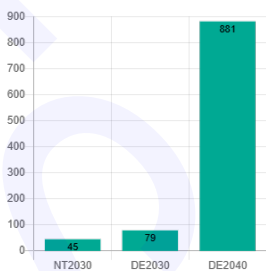
B2a Annual CO2 variation from market simulation (ktonnes / year) in the entire area covered by the study	max average min	-184 -247 -337	 <table><thead><tr><th>Scenario</th><th>Value (ktonnes/year)</th></tr></thead><tbody><tr><td>NT2030</td><td>-247</td></tr><tr><td>DE2030</td><td>-175</td></tr><tr><td>DE2040</td><td>-79</td></tr></tbody></table>	Scenario	Value (ktonnes/year)	NT2030	-247	DE2030	-175	DE2040	-79	ENTSO-E assessment
Scenario	Value (ktonnes/year)											
NT2030	-247											
DE2030	-175											
DE2040	-79											
B2a Annual CO2 variation from market simulation (ktonnes / year) in the ENTSO-E	max average min	-236 -277 -346		ENTSO-E assessment								

area					
B2a_€ Annual Societal cost variation resulting from CO2 variation from market simulation monetised (M€ / year) in the entire area covered by the study	CO2 price	60€/ton 100€/ton 189€/ton	0 8 33		ENTSO-E assessment
B2a_€ Annual Societal cost variation resulting from CO2 variation from market simulation monetised (M€ / year) in the ENTSO-E area	CO2 price	60€/ton 100€/ton 189€/ton	0 9 37		ENTSO-E assessment
B2b Annual CO2 variation due to network losses (ktonnes / year) in the ENTSO-E area	average		38		ENTSO-E assessment
B2b_€ Annual Societal cost variation resulting from CO2 variation from network simulation monetised (M€ /	CO2 price	60€/ton 100€/ton 189€/ton	0 1 5		ENTSO-E assessment

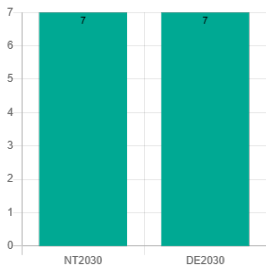
year) in the ENTSO-E area									
B4 Non-CO2 emissions (ton/year) in the entire area covered by the study									
B4a Nitrogen oxides average	-323	 <table border="1"><thead><tr><th>Scenario</th><th>Value</th></tr></thead><tbody><tr><td>NT2030</td><td>-323</td></tr><tr><td>DE2030</td><td>-157</td></tr></tbody></table>	Scenario	Value	NT2030	-323	DE2030	-157	ENTSO-E assessment
Scenario	Value								
NT2030	-323								
DE2030	-157								
B4b Ammonia average	-33	 <table border="1"><thead><tr><th>Scenario</th><th>Value</th></tr></thead><tbody><tr><td>NT2030</td><td>-33</td></tr><tr><td>DE2030</td><td>-20</td></tr></tbody></table>	Scenario	Value	NT2030	-33	DE2030	-20	ENTSO-E assessment
Scenario	Value								
NT2030	-33								
DE2030	-20								
B4c Sulfur dioxide average	-68	 <table border="1"><thead><tr><th>Scenario</th><th>Value</th></tr></thead><tbody><tr><td>NT2030</td><td>-68</td></tr><tr><td>DE2030</td><td>67</td></tr></tbody></table>	Scenario	Value	NT2030	-68	DE2030	67	ENTSO-E assessment
Scenario	Value								
NT2030	-68								
DE2030	67								
B4d Particular matter average 5	-27	 <table border="1"><thead><tr><th>Scenario</th><th>Value</th></tr></thead><tbody><tr><td>NT2030</td><td>-27</td></tr><tr><td>DE2030</td><td>-15</td></tr></tbody></table>	Scenario	Value	NT2030	-27	DE2030	-15	ENTSO-E assessment
Scenario	Value								
NT2030	-27								
DE2030	-15								
B4e Particulate matter 10									

compounds		 <table><tr><th>Scenario</th><th>Value</th></tr><tr><td>NT2030</td><td>-10</td></tr><tr><td>DE2030</td><td>-5</td></tr></table>	Scenario	Value	NT2030	-10	DE2030	-5	
Scenario	Value								
NT2030	-10								
DE2030	-5								

Integration of renewable energy sources

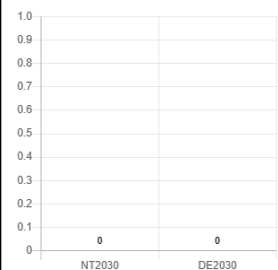
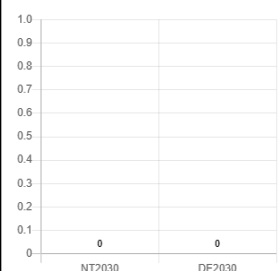
B3 Annual avoided curtailment (RES integration) (GWh / year) in the entire area covered by the study	max average min	105 47 5	 <table><thead><tr><th>Scenario</th><th>Value</th></tr></thead><tbody><tr><td>NT2030</td><td>47</td></tr><tr><td>DE2030</td><td>75</td></tr><tr><td>DE2040</td><td>993</td></tr></tbody></table>	Scenario	Value	NT2030	47	DE2030	75	DE2040	993	ENTSO-E assessment
Scenario	Value											
NT2030	47											
DE2030	75											
DE2040	993											
B3 Annual avoided curtailment (RES integration) (GWh / year) in the ENTSO-E area	max average min	96 45 5	 <table><thead><tr><th>Scenario</th><th>Value</th></tr></thead><tbody><tr><td>NT2030</td><td>45</td></tr><tr><td>DE2030</td><td>79</td></tr><tr><td>DE2040</td><td>881</td></tr></tbody></table>	Scenario	Value	NT2030	45	DE2030	79	DE2040	881	ENTSO-E assessment
Scenario	Value											
NT2030	45											
DE2030	79											
DE2040	881											
B3a Connected RES (MW) -		0	none	ENTSO-E assessment								

Impact on grid losses

B5 Variation of network losses (GWh / year) in the ENTSO-E area	average	128	none	ENTSO-E assessment						
B5_€ Variation of network losses monetised (M€ / year) in the ENTSO-E area	average	7	 <table><thead><tr><th>Scenario</th><th>Value</th></tr></thead><tbody><tr><td>NT2030</td><td>7</td></tr><tr><td>DE2030</td><td>7</td></tr></tbody></table>	Scenario	Value	NT2030	7	DE2030	7	ENTSO-E assessment
Scenario	Value									
NT2030	7									
DE2030	7									

Security of supply

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B6 Annual reduction in Energy Not Served (MWh / year) in the entire area covered by the study	max average min	0 0 0		ENTSO-E assessment
B6_€ Annual Socio-Economic Welfare increase resulting from reduction in Energy Not Served monetised (M€ / year) in the entire area covered by the study	average	0		ENTSO-E assessment

Distributed Energy

Distributed Energy is a scenario created in line with the COP21 targets to understand the impact on infrastructure needs against different pathways reducing EU-27 emissions to net-zero by 2050. The following tables present results in the ENTSO-E area and in the full study area (ENTSO-E area plus Algeria, Egypt, Israel, Libya, Morocco, Moldova, Malta, Palestine, Tunisia, Turkey, Ukraine and the United Kingdom). Results in the EU area are available at this link: https://eepublicdownloads.blob.core.windows.net/public-cdn-container/tyndp-documents/TYNDP2022/CBA-results/TYNDP2022_CBA_EU27_all-scenarios.xlsx

	DE2030	DE2040	
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Increase in socio-economic welfare

B1 Annual Socio-Economic Welfare (SEW) increase (M€ / year) in the entire area covered by the study	min average max	16 17 20	52 56 61	ENTSO-E assessment
B1 Annual Socio-Economic Welfare (SEW) increase (M€ / year) in the ENTSO-E area	min average max	13 16 17	43 49 54	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase	min average	10 14 17	6 9 13	ENTSO-E assessment

resulting from CO2 emissions reduction (M€ / year) in the entire area covered by the study	max			
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction (M€ / year) in the ENTSO-E area	min average max	10 11 14	5 6 8	ENTSO-E assessment
B1_RES Annual Socio-Economic Welfare increase resulting from RES integration (M€ / year) in the entire area covered by the study	min average max	3 4 6	34 42 49	ENTSO-E assessment
B1_RES Annual Socio-Economic Welfare increase resulting from RES integration (M€ / year) in the ENTSO-E area	min average max	3 5 6	32 41 48	ENTSO-E assessment

Reduction of CO2 and GHG emissions

B2a Annual CO2 variation from market simulation (ktonnes / year) in the entire area covered by the study	min average max	-214 -175 -126	-104 -70 -52	ENTSO-E assessment
B2a Annual CO2 variation from market simulation (ktonnes / year) in the ENTSO-E area	min average max	-173 -144 -128	-68 -52 -42	ENTSO-E assessment
B2a_€ Annual Societal cost variation resulting from CO2 variation	CO2 price 60€/ton 100€/ton	0 4 19	2 10 26	ENTSO-E assessment

from market simulation monetised (M€ / year) in the entire area covered by the study	189€/ton			
B2a_€ Annual Societal cost variation resulting from CO2 variation from market simulation monetised (M€ / year) in the ENTSO-E area	CO2 price 60€/ton 100€/ton 189€/ton	0 3 16	2 8 20	ENTSO-E assessment
B2b Annual CO2 variation due to network losses (ktonnes / year) in the ENTSO-E area	average	38	n/a	ENTSO-E assessment
B2b_€ Annual Societal cost variation resulting from CO2 variation from network simulation monetised (M€ / year) in the ENTSO-E area	CO2 price 60€/ton 100€/ton 189€/ton	0 1 4	n/a n/a n/a	ENTSO-E assessment

B4 Non-CO2 emissions (ton/year) in the entire area covered by the study

B4a Nitrogen oxides	average	-157	N/A	ENTSO-E assessment
B4b Ammonia	average	-20	N/A	ENTSO-E assessment
B4c Sulfur dioxide	average	67	N/A	ENTSO-E assessment
B4d Particular matter 5	average	-15	N/A	ENTSO-E assessment
B4e Particulate matter 10	average	-4	N/A	ENTSO-E assessment

B4f Non-methane volatile organic compounds	average	-6	N/A	ENTSO-E assessment
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Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year) in the entire area covered by the study	min average max	56 75 110	755 903 1025	ENTSO-E assessment
B3 Annual avoided curtailment (RES integration) (GWh / year) in the ENTSO-E area	min average max	60 79 114	702 881 1009	ENTSO-E assessment
B3a Connected RES (MW) -		0	0	ENTSO-E assessment

Impact on grid losses

B5_€ Variation of network losses monetised (M€ / year) in the ENTSO-E area	average	7	n/a	ENTSO-E assessment
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Security of supply

B6 Annual reduction in Energy Not Served (MWh / year) in the entire area covered by the study	min average max	0 0 0	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) in the entire area covered by the study	min average max	0 0 0	N/A N/A N/A	ENTSO-E assessment

Gas price sensitivity

This sensitivity on the Distributed Energy 2030 scenario considers a gas price of 12.16 euro/GJ (versus 5.91 euro/GJ in Distributed Energy 2030). The following tables present results in the ENTSO-E area and in the full study area (ENTSO-E area plus Algeria, Egypt, Israel, Libya, Morocco, Moldova, Malta, Palestine, Tunisia, Turkey, Ukraine and the United Kingdom). Results in the EU area are available at this link: https://eepublicdownloads.blob.core.windows.net/public-cdn-container/tyndp-documents/TYNDP2022/CBA-results/TYNDP2022_CBA_EU27_all-scenarios.xlsx

	DE2030GS	
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Increase in socio-economic welfare

B1 Annual Socio-Economic Welfare (SEW) increase (M€ / year) in the entire area covered by the study	max average min	40 39 37	ENTSO-E assessment
B1 Annual Socio-Economic Welfare (SEW) increase (M€ / year) in the ENTSO-E area	max average min	36 31 24	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction (M€ / year) in the entire area covered by the study	max average min	20 15 12	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction (M€ / year) in the ENTSO-E area	max average min	19 13 10	ENTSO-E assessment
B1_RES Annual Socio-Economic Welfare increase resulting from RES integration (M€ / year) in the entire area covered by the study	max average min	14 9 5	ENTSO-E assessment
B1_RES Annual Socio-	max	14	ENTSO-E assessment

Economic Welfare increase resulting from RES integration (M€ / year) in the ENTSO-E area	average min	8 4	
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Reduction of CO2 and GHG emissions

B2a Annual CO2 variation from market simulation (ktonnes / year) in the entire area covered by the study	max average min	-155 -190 -256	ENTSO-E assessment
B2a Annual CO2 variation from market simulation (ktonnes / year) in the ENTSO-E area	max average min	-122 -165 -248	ENTSO-E assessment
B2a_€ Annual Societal cost variation resulting from CO2 variation from market simulation monetised (M€ / year) in the entire area covered by the study	CO2 price 60€/ton 100€/ton 189€/ton	0 4 21	ENTSO-E assessment
B2a_€ Annual Societal cost variation resulting from CO2 variation from market simulation monetised (M€ / year) in the ENTSO-E area	CO2 price 60€/ton 100€/ton 189€/ton	0 4 18	ENTSO-E assessment

Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year) in the entire area	max average min	175 115 60	ENTSO-E assessment
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covered by the study		
B3 Annual avoided curtailment (RES integration) (GWh / year) in the ENTSO-E area	max 175 average 108 min 58	ENTSO-E assessment
B3a Connected RES (MW) -	0	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
Lienz (AT) - Obersielach (AT)	Planned But Not Yet Permitting	4	

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.

Residual social impact

Investment	Investment status	Distance (km)	Type of sensitivity
Lienz (AT) - Obersielach (AT)	Planned But Not Yet Permitting	81	

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.

Other residual impact

The project promoter(s) did not specify any other residual impact