Project Sheet

EuroAsia Interconnector

Project type	transmission
Project id	219
Created by	
Created on	Feb 9, 2021 9:59:20 AM

Index

Key Information 3
Description 3
Project Description & Context 5
Project Investments 5
System Needs addressed by the project 7
Interconnection targets 7
Project Assessment 11
Transfer capacity increase (National Trends 2025) 11
CBA results 11
Central scenario: National Trends 11
Scenarios: Distributed Energy & Global Ambition 14
Sensitivity Study: Current Trends 16
Residual impact 18
Project Costs 18

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Key Information

Cross Border Project
Offshore DC transmission cable
New

PCI number 3.10 (4th list, 31 Oct. 2019)
In Permitting

Description

The Euro Asia Interconnector consists of a 500 kV DC underwater electric cable and any essential equipment and/or installation for interconnecting the Cypriot, Israeli and the Greek transmission networks (offshore). The Interconnector will have a capacity of 2000 MW and a total length of around 1200 km (approx. 310 km between CY and IL, 898 km between CY and Crete) and allow for reverse transmission of electricity.

Project promoters

EuroAsia Interconnector
Interconnector

Countries

Cyprus
Greece
Israel

National development plan(s)

ΔΕΚΑΕΤΕΣ ΠΡΟΓΡΑΜΜΑ ΑΝΑΠΤΥΞΗΣ ΣΥΣΤΗΜΑΤΟΣ ΜΕΤΑΦΟΡΑΣ 2019-2028. (Transmission System Ten year development plan 2019-2028), Cyprus, 2019 Project number: Paragraph 3.1.1, Page 7

Additional information on the project

Project sheet backlog

19 Jan. 2021 - Addition of results in third countries for indicator B2a_€

6 Jan. 2021 - Correction of results in third countries for indicator B2a

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

Project Description & Context

Project Investments

Main investment(s):

The Euro Asia Interconnector consists of a 500 kV DC underwater electric cable and any essential equipment and/or installation for interconnecting the Cypriot, Israeli and the Greek transmission networks (offshore). The Interconnector will have a capacity of 2000 MW and a total length of around 820 nautical miles/around 1200 km (approx. 329 km between CY and IL, 879 km between CY and Crete) and allow for reverse transmission of electricity.

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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	310	Hadera Site	Kofinou Site	In Permitting	2023	Rescheduled	The National Regulatory Authorities of Greece and Cyprus approved the submitted Investment Request for the Project and agreed on the CBCA between them. The decision "Cross-Border Cost Allocation Between the Hellenic Regulatory Authority for Energy (RAE) and the Cyprus Energy Regulatory Authority (CERA)" provided on 10th of October 2017 concerned the implementation of PCIs 3.10.2 & 3.10.3. With the corresponding decision for PCI 3.10.1 not yet received, and to avoid delays in the implementation of the Project and to be in line with the obligations and commitments arising from the CBCA approval, the Project Promoter decided to amend the order of implementation of the three

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							PCIs consisting PCI 3.10 as follows, with PCIs 3.10.2 & 3.10.3 implemented concurrently: PCI 3.10.3 Interconnection between Korakia, Crete and Attica region(EL) PCI 3.10.2 Interconnection between Kofinou (CY) and Korakia, Crete (EL) PCI 3.10.1 Interconnection between Hadera (IL) and Kofinou (CY)
Offshore DC transmission cable	898	Kofinou Site	Korakia (Crete) Site	In Permitting	2023	Rescheduled	The National Regulatory Authorities of Greece and Cyprus approved the submitted Investment Request for the Project and agreed on the CBCA between them. The decision "Cross-Border Cost Allocation Between the Hellenic Regulatory Authority for Energy (RAE) and the Cyprus Energy Regulatory Authority (CERA)" provided on 10th of October 2017 concerned the implementation of PCIs 3.10.2 & 3.10.3. With the corresponding decision for PCI 3.10.1 not yet received, and to avoid delays in the implementation of the Project and to be in line with the obligations and commitments arising from the CBCA approval, the Project Promoter decided to amend the order of implementation of the three PCIs consisting PCI 3.10 as follows, with PCIs 3.10.2 & 3.10.3 implemented concurrently: PCI 3.10.3 Interconnection between Korakia, Crete and Attica region(EL) PCI 3.10.2 Interconnection between

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
							Kofinou (CY) and Korakia, Crete (EL) PCI 3.10.1 Interconnection between Hadera (IL) and Kofinou (CY)

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.

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Project Assessment

Transfer capacity increase (National Trends 2025)

	Border	A B	B A
Transfer capacity increase (in MW)	Cyprus - Greece	1000	1000
Transfer capacity increase (in MW)	Cyprus - Israel	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	166 126 92	153 136 115	<	<	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	max average min	-3 -6 -8	-65 -78 -90	>	<	ENTSO-E assessment
B1_RES Annual	max	1	1			ENTSO-E

Socio-Economic Welfare increase resulting from RES integration	average min	0 0	0 0	>	>	assessment

This project involves countries outside of the ENTSO-E area.

B1 SEW (Meuro/ year) in third country/ies	max average min	3 2 0	5 3 2	>	>	ENTSO-E assessment
B1_RES (Meuro/ year) in third country/ies	max average min	0 0 0	0 0 0	<	<	ENTSO-E assessment
B1_CO2 (Meuro/ year) in third country/ies	max average min	44 22 0	64 34 1	>	>	ENTSO-E assessment

Reduction of CO2 and GHG emissions

B4 Non-CO2 emissions (kg/year)

B4a Nitrogen oxides	average	1268	22014	n/a	n/a	ENTSO-E assessment
B4b Ammonia	average	-53	108	n/a	n/a	ENTSO-E assessment
B4c Sulfur dioxide	average	388	22142	n/a	n/a	ENTSO-E assessment
B4d Particular matter 5	average	1335	-167591	n/a	n/a	ENTSO-E assessment
B4e Particulate matter 10	average	115	1282	n/a	n/a	ENTSO-E assessment
B4f Non-methane volatile organic compounds	average	1067	-169587	n/a	n/a	ENTSO-E assessment
B2a Annual CO2 variation from market simulation (ktonnes / year)	max average min	355 243 131	3230 2780 2328	<	>	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	-89 -200 -448	> > >	> > >	ENTSO-E assessment
B2b Annual CO2 variation due to network losses (ktonnes / year)	average	513	510	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	-18 -37 -81	-16 -35 -79	n/a	n/a	ENTSO-E assessment

This project involves countries outside of the ENTSO-E area.

B2a (ktonnes/year) in third country/ies	average	-932	-1197	<	<	ENTSO-E assessment
B2a_€ (M€/ year) in third country/ies	CO2 price 60€/ ton 100€/ ton 189€/ ton	34 72 155	38 86 193	n/a	n/a	ENTSO-E assessment

Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year)	max average min	12 5 1	21 8 0	>	>	ENTSO-E assessment
B3a Connected RES (MW)	-			n/a	n/a	ENTSO-E assessment

This project involves countries outside of the ENTSO-E area.

B3 (GWh / year) in third countries	max average min	0 0 0	0 0 0	<	<	ENTSO-E assessment

Impact on grid losses

B5 Variation of network losses (GWh / year)	average	817	927	n/a	n/a	ENTSO-E assessment
B5_€ Variation of network losses monetised (M€ / year)	average	38	43	n/a	n/a	ENTSO-E assessment

Security of supply

B6 Annual reduction in Energy Not Served (MWh / year)	max average min		1191.14285714285	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	11.91142857	>14285	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	109	103	ENTSO-E assessment

B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	average	-64	-102	ENTSO-E assessment
B1_RES Annual Socio-Economic Welfare increase resulting from RES integration	average	25	13	ENTSO-E assessment

This project involves countries outside of the ENTSO-E area.

B1 SEW (Meuro/year) in third country/ies	average	8	10	ENTSO-E assessment
B1_RES (Meuro/year) in third country/ies	average	0	0	ENTSO-E assessment
B1_CO2 (Meuro/year) in third country/ies	average	72	65	ENTSO-E assessment

Reduction of CO2 and GHG emissions

B2a Annual CO2 variation from market simulation (ktonnes / year)		average	1207	2901	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	-8 -57 -164	-73 -189 -447	ENTSO-E assessment

This project involves countries outside of the ENTSO-E area.

B2a (ktonnes/year) in third country/ies		average	-1364	-1865	ENTSO-E assessment
B2a_€ (M€/ year) in third country/ies	CO2 price	60€/ ton 100€/	10 64 186	47 121 287	ENTSO-E assessment

	ton 189€/ ton			

Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year)	average	504	289	ENTSO-E assessment
B3a Connected RES (MW)	-			ENTSO-E assessment

This project involves countries outside of the ENTSO-E area.

B3 (GWh / year) in third countries	average	0	0	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	88	ENTSO-E assessment
B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction	average	-5	ENTSO-E assessment
B1_RES Annual Socio-Economic Welfare increase resulting from RES integration	average	0	ENTSO-E assessment

This project involves countries outside of the ENTSO-E area.

B1 SEW (Meuro/year) in third country/ies	average	2	ENTSO-E assessment

B1_RES (Meuro/year) in third country/ies	average	0	ENTSO-E assessment

B1_CO2 (Meuro/year) in third country/ies	average	24	ENTSO-E assessment

Reduction of CO2 and GHG emissions

B2a Annual CO2 variation from market simulation (ktonnes / year)		average	189	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	-6 -14 -30	ENTSO-E assessment

This project involves countries outside of the ENTSO-E area.

B2a (ktonnes/year) in third country/ies		average	-864	ENTSO-E assessment
B2a_€ (M€/ year) in third country/ies	CO2 price	60€/ ton 100€/ ton 189€/ ton	28 62 139	ENTSO-E assessment

Integration of renewable energy sources

B3 Annual avoided curtailment (RES integration) (GWh / year)		average	6	ENTSO-E assessment
B3a Connected RES (MW)		-		ENTSO-E assessment

This project involves countries outside of the ENTSO-E area.

B3 (GWh / year) in third countries average	0	ENTSO-E assessment

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

The lower gas price of Israel is not considered, so the benefit from the gas price differential is not calculated in the results. The benefit due to the implementation of the EuroAsia Interconnector will increase if the gas price of Israel is taken based on the projections of the Israeli Authorities.

Additionally, the NT scenario considers Lignite a cheap technology however ignoring the fact that it increases the CO2 emissions, this fact makes all transmission investments in areas where Lignite exists have a negative impact towards decarbonization.

Maybe the above can be rectified by other means such as increasing the price of CO2, by imposing carbon taxes, or by aiming to reduce generation from high-emission sources. Concluding the way the NT scenario is structured it does not encourage developments and reinforcements of the network.

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
1407. EuroAsia Interconnector	1922		17.8
1409. EuroAsia Interconnector	1922		17.8
Total	3844		35.6

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

1407

1409