Before going through the content of each specific Project Fiche, please read the introduction document.

Project Group EAST_07B - Alexandroupolis LNG terminal (with Kipi capacity capped)

Reasons for grouping [ENTSOG]

Project group is composed by the Alexandroupolis LNG terminal development in Greece. It includes:
> Alexandroupolis LNG terminal (LNG-N-62)
> The evacuation pipeline connecting the LNG facility to the transmission grid (TRA-N-63)
> The enabler project TRA-N-1090 Metering and regulating station at Alexandroupolis
> The enabler project TRA-N-128 Compressor Station Kipi, which enables flows from LNG Terminal in northern Greece by increasing the pressure of DESFA´s network. This assessment considers Turkish flows capped at Kipi CS, in order to better capture the impact of the LNG terminal.

Objective of the project(s) in the group [Promoter]

The group aims to provide an alternative source of gas supply to the markets of Greece, Bulgaria, Serbia, FYROM and onward to Hungary and Ukraine. The group aims to further integrate the gas supply of the SEE markets and will offer to the region security of supply, diversification of gas routes and sources, price flexibility and will enhance competition and liquidity.

Projects constituting the group

TYNDP Project Code	Project Name	Promoter	Hosting Country	Project Status	4th PCI List Code	First Comm Year	Last Comm. Year	Compared to TYNP 2018
TRA-N-0063	LNG terminal in northern Greece / Alexandroupolis - Pipeline Section	Gastrade S.A.	GR	Less-Advanced	6.9.1	2022	2022	Delayed
LNG-N-0062	LNG terminal in northern Greece / Alexandroupolis - LNG Section	Gastrade S.A.	GR	Less-Advanced	6.9.1	2022	2022	Delayed
TRA-N-0128	Compressor Station Kipi	DESFA S.A.	GR	Less-Advanced	6.8.1	2024	2024	-
TRA-N-1090	Metering and Regulating Station at Alexandroupoli	DESFA S.A.	GR	Less-Advanced	6.9.1	2022	2022	On time

Technical Information

TYNDP Project Code	Diameter [mm]	Length [km]	Compressor Power [MW]
TRA-N-0063	762	28	0
TRA-N-0128	0	0	18
TRA-N-1090	-	-	-

TYNDP Project Code	Yearly Volume [bcm/y]	Storage Capacity [m3 LNG]	Ship Size [m3 LNG]
LNG-N-0062	8.3	170000	170000

Capacity Increment

The capacity increment values for each project are provided at all related Interconnection points (IP), both for “exit” and “entry” directions, being indicated the operator of the IP as well as the associated commissioning years of the capacity increments.

This information is presented in the table below and should be read per each line as follows: a certain project, TRA-N-123, can bring at a specific “Point Name” operated by “Operator X” an “exit” capacity increment “From System Y” “To System Z” which has associated an “Increment Commissioning Year”. Equally, for the same “Point Name” and operated by the same “Operator X”, an “entry” (reverse) capacity increment can be available to system “Y” from system “Z” which at its turn has associated an “Increment Commissioning Year”.

TYNDP Project Code	Point Name	Operator	From System	Exit Capacity [GWh/d]	Increment Comm. Year	To System	Entry Capacity [GWh/d]	Increment Comm. Year
LNG-N-62	Alexandroupolis LNG	Gastrade S.A.	LNG Terminals Greece	253.1	2022	Transmission Greece (Alexandropolis LNG)	-	-
TRA-N-1090	Alexandroupolis Amphitriti	DESFA S.A.	Transmission Greece (Alexandropolis LNG)	-	-	Transmission Greece (Komotini)	268*	2022
TRA-N-128	Komotini (DESFA) - GR / IGB	DESFA S.A.	Transmission Greece (Komotini)	62.5	2024	Transmission Interconnector Greece-Bulgaria Bulgaria	0	-
TRA-N-128	Kipi (TR) / Kipi (GR)	DESFA S.A.	Transmission Turkey (Imports)	0	-	Transmission Greece (Komotini)	44	2024
TRA-N-128	Komotini (DESFA) Bottleneck	DESFA S.A.	Transmission Greece (Komotini)	0	-	Transmission Greece	44	2024

TRA-N-63	Alexandroupolis Amphitriti	Gastrade S.A.	Transmission Greece (Alexandropolis LNG)	253.1	2022	Transmission Greece (Komotini)	0	-

* This is the maximum capacity, subject to the implementation of additional projects not yet included in DESFA's Development Plan. The maximum capacity (subject to restrictions applying to the distribution among exit points) amounts to 152 GWh/h

B. Project Cost Information

During the TYNDP 2020 Project Data Collection, promoters were asked to indicate whether their costs were confidential or not. The following tables display the costs provided by the promoters (as of June 2019, end of TYNDP 2019 project collection). The amounts provided can differ from the figures used by the project promoters in other contexts, where costs can be updated and/or evaluated using different methodologies or assumptions. For the purposes of this project fiche, in case promoters identified their costs as confidential, alternative costs have been provided by the promoter. The alternative costs are identified with "*".

	LNG-N-62	TRA-N-1090	TRA-N-128	TRA-N-63	Total Cost
CAPEX [min, EUR]	290	16	15	80	**401**
OPEX [min, EUR/y]	19	0.4	2.8	0.01	**22.21**
Range CAPEX (%)	10	25	10	10	-
Range OPEX (%)	15	25	25	0	-

Description of costs and range [Promoter]

- LNG-N-62 (LNG terminal in northern Greece / Alexandroupolis) and TRA-N-63 (LNG pipeline section)

The CAPEX costs for these sections have been estimated in the Front-End Engineering Design (FEED) study performed by the Wood Group Kenny LTD (completed in September 2017), at a total value of € 370 mil. and comprise the costs of the Floating Storage and Regasification Unit (FSRU), FSRU Mooring System and Integration Costs, Offshore EPCIC Contract, Onshore EPC Contract as well as CAPEX for Studies, Licenses and Other Costs. The OPEX costs include the personnel costs, energy costs, service boat costs, O&M costs, insurance, as well as general and administrative expenses.
The potential level of variability of the CAPEX cost is estimated at 10% for both sections and of the OPEX cost for LNG-N-62 at 15%. No OPEX cost variability is foreseen for TRA-N-63.

- TRA-N-128 (Compressor Station Kipi) and TRA-N-1090 (Metering and Regulating Station at Alexandroupoli)

CAPEX of TRA-N-128 is based on a design performed several years ago. It will be reassessed once the need to implement the project will be confirmed.
CAPEX of TRA-N-1090 has been estimated by comparison with similar projects.

C. Project Benefits

C.1 Summary of project benefits

This section provides a summarised analysis by ENTSOG of the main benefits stemming from the realisation of the overall group and according to the guidelines included in the ENTSOG 2nd CBA Methodology. More details on the indicators are available in sections D and E.

National Trends

Benefits explained (but Sustainability) [ENTSOG]

> **Security of Supply:**

The project group **provides additional remaining flexibility** in Greece under all climatic stress cases (2-weeks, 2-weeks dunkelflaute and peak-day) from 2025 for all infrastructure levels, reaching higher levels of remaining flexibility in the low and advanced infrastructure levels.

In **case of disruption of single largest infrastructure of Greece (SLID-GR)**, in the existing and low infrastructure levels, the project group **fully mitigates the risk of demand curtailment** from 2025 in Greece.

> **Competition:**

By increasing the access to LNG in Southern European countries, the project group **reduces the dependence of Russian gas** for Bulgaria, Greece, North Macedonia, and Serbia in the low infrastructure level in 2040 and additionally, the project group reduces the dependence of Russian gas for Greece in 2025 GBC. With the commissioning FID projects such as the interconnection between Bulgaria and Serbia, the increase of the capacity between Greece and Bulgaria and TAP project as well as the reduction of Greek demand being National Trends 2030 the demand scenario with lowest demand for this country, these combination of FID projects and low demand allows to increase the cooperation in the area and to further spread the benefits brought by new LNG terminal in the neighbouring countries.

> **Market integration:**

The project group brings benefits in monetised terms as a **reduction of the cost of gas supply** of 2.6 MEur/y on average in the low infrastructure level, however, only under cheap LNG or expensive Russian gas price configurations. These are explained by the diversification of sources, routes and counterparts through the Alexandroupolis LNG terminal in northern Greece/ Alexandroupolis, allowing cheap LNG to arrive to Greece and Bulgaria.

These benefits are sensitivity to the level of tariffs assumptions showing no benefits with higher tariff, as LNG is replaced by “cheaper routes”.

Distributed Energy

Benefits explained (but Sustainability) [ENTSOG]

- **Security of Supply:**

The project group **provides additional remaining flexibility** in Greece under all climatic stress cases (2-weeks, 2-weeks dunkelflaute and peak-day) from 2025 for all infrastructure levels, reaching higher levels of remaining flexibility in the low and advanced infrastructure levels.
Regarding disruption of the main infrastructure:
In the case of **SLID-Greece**, the project **fully mitigates the risk of demand curtailment** in Greece in the existing infrastructure level from 2025 and only in 2025 and 2030 in the low infrastructure level.

- **Competition:**

The project group **reduces the dependence of Russian gas** for Bosnia Herzegovina, Bulgaria, Greece, North Macedonia and Serbia in the low infrastructure level in 2030 thanks to the commissioning of FID projects as the interconnection between Bulgaria and Serbia, the increase of the capacity between Greece and Bulgaria and TAP project. These projects help to integrate the area and allow to further spread the benefits brought by the project group. In 2040 there is almost no dependency to Russian gas in for any of the infrastructure levels thanks to the high indigenous production considered in this scenario coming from renewables gases such as biomethane and power-to-gas.

- **Market integration:**

The project group brings benefits in monetised terms as a **reduction of the cost of gas supply** of 1 MEur/y on average in the low and advanced infrastructure levels, however only for cheap LNG and expensive Russian gas supply price configuration. These are explained by the diversification of sources, routes and counterparts through the Alexandroupolis LNG terminal in northern Greece/ Alexandroupolis allowing additional LNG flows to Greece and Bulgaria. These benefits are sensitivity to the level of tariffs assumptions showing no benefits with higher tariff, as LNG is replaced by “cheaper routes”.

Global Ambition

Benefits explained (but Sustainability) [ENTSOG]

> **Security of Supply:**

The project group **reduces the risk of demand curtailment** under peak day climatic stress condition and **fully mitigates the risk of demand curtailment** during 2-week dunkelflaute climatic stress case in Greece in 2030 in the existing infrastructure level. This situation improves in the low infrastructure level, with the implementation of FiD projects, the project group **fully mitigates the risk of demand curtailment** in Greece during in peak day in 2030. Additionally, in the advanced infrastructure level, the project group fully mitigates the risk of demand curtailment during peak day in 2030 in Greece and North Macedonia, as the interconnection between these two countries included in this infrastructure level allows for further cooperation

In addition, the project group **increases remaining flexibility** in Greece in 2025 and from 2030 in cases that is not facing demand curtailment.

The risk of demand disruption in Greece is higher for Global Ambition (GA) demand scenario when Compared to National Trends or Distributed Energy demand scenarios where the project group increases remaining flexibility for all climatic stress conditions, in GA Greece has a higher gas demand mainly due to the lower level of electrification assumed for this demand scenario.

Regarding disruption of the main infrastructure:

In the case of **SLID-Greece**, the project **fully mitigates the risk of demand curtailment** in Greece in all infrastructure levels and in North Macedonia in the advanced infrastructure level thanks to the interconnection between these two countries included in the advanced infrastructure level that allows the cooperation between North Macedonia and Greece.

> **Competition:**

The project group **reduces the dependence of Russian gas** for Bosnia Herzegovina, Bulgaria, Greece, North Macedonia and Serbia in the low infrastructure level in 2030 and 2040 thanks to the commissioning of FID projects as the interconnection between Bulgaria and Serbia, the increase of the capacity between Greece and Bulgaria and the TAP project. These projects help to integrate the area and to further spread the benefits brought by the project group. Additionally, the project group **slightly reduces the dependency of LNG** supply for Greece in the existing infrastructure level in 2040.

The project group provides an alternative supply route and gives access to LNG supply from additional sources to markets with limited supply options such as the markets of SE Europe, while it also enables an **increase in the number of supply sources** that Greece has access to (Azeri gas) in the existing infrastructure level. The latter is linked to the fact that such group, with the creation of capacity in Kipi (at the border with Turkey), enables the connection of Europe with Turkey region, allowing Europe to access new sources through Turkey.

> **Market integration:**

The project group brings benefits in monetised terms as a **reduction of the cost of gas supply** of 1 MEur/y on average in the low infrastructure level, however only for cheap LNG and expensive Russian gas supply price configuration. These are explained by the diversification of sources, routes and counterparts through the Alexandroupolis LNG terminal in northern Greece/ Alexandroupolis allowing additional LNG flows to Greece and Bulgaria. These benefits are sensitivity to the level of tariffs assumptions showing no benefits with higher tariff, as LNG is replaced by "cheaper routes".

Sustainability benefits explained [ENTSOG]

The lower benefits of project groups EAST_07B compared to project group EAST_07A reflect the lower flows already observed also in the "market integration" section.

The ENTSOG analysis shows that, in the yearly assessment, the projects group realisation enhances the replacement of more polluting fuels with natural gas, which enables fuel switch savings in Greece between 0.1-0.7 MEUR/y under low infrastructure level and between 0.1-0.3 MEUR/y under advanced infrastructure levels. The table below shows the related reduction in terms of CO2eq/y for each scenario and infrastructure level and over the 25-years assessment period of the project group. The contribution of the project group to the CO2eq/y emissions (positive number indicate reduction in CO2eq/y emissions) is also displayed for the three simulation configurations that consider different level of tariffs for the project group.

Sustainability		EXISTING			LOW			ADVANCED		
CO2 and Other externalities (KtCO2 eq/y)	Reference	0 / 0	0 / 0	0 / 0	2 / 7	11 / 13	9 / 9	-1 / 3	2 / 2	5 / 5
	Lower Tariff Sensitivity	6 / 18	18 / 30	23 / 34	11 / 37	26 / 50	76 / 98	2 / 3	1 / 2	5 / 5
	Higher Tariff Sensitivity	3 / 3	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	-4 / 0	0 / 0	0 / 0

The minimum and the maximum values displayed in the table above refer respectively to the CO2eq/y savings in case emissions from the additional gas demand increase not replacing other more polluting fuels are counted in the overall CO2eq emissions assessment or they are considered neutral. For more information, please consult the Project Fiche introduction document and the TYNDP 2020 Annex D.
Savings have been allocated to the project group based on the flows resulting from ENSTOG simulations under the reference supply price configurations and according to the methodology described in TYNDP 2020 Annex D. Such methodology is also based on the assumption that the use of the infrastructures already included in the different infrastructure levels (versus which the project group is assessed) is always prioritised. Therefore, the highest contribution of the project is observed under the existing infrastructure level.
In line with the analysis described in the "market integration" section, the sensitivity on tariffs shows that the contribution of the project to the savings varies when the project group tariffs change, particularly under low and advanced infrastructure levels.
Observing the evolution of benefits among the assessed years (section C.3), in National Trends scenarios it can be noted that most of the benefits materialise in the period 2023-2030 with the project group contributing to fuel switch towards natural gas in Greece (especially in the power sector). The project is assessed by ENTSOG from its first full year of operation, in this case year 2023.
In addition to the benefits observed in the period 2023-2030, in DE and GA scenarios the project group further contributes to fuel switch in Greece beyond 2030 (fuel switch happening mostly in the transport sector).
TYNDP 2020 ENTSOG and ENTSO-E scenario storylines have identified for Distributed Energy and Global Ambition scenarios the need for hydrogen imports to satisfy the hydrogen demand that cannot be covered by European production of hydrogen (e.g. through power-to-gas). In the future, hydrogen demand not satisfied by locally produced hydrogen could be covered by directly imported hydrogen through hydrogen-compatible infrastructures and/or by natural gas through natural gas pipelines or LNG terminal. In TYNDP 2020 ENTSOG has considered fuel switch benefits from hydrogen import in the form of natural gas import then converted into hydrogen in Europe. For project group EAST_06A, such benefits represent, on average, 60% of the benefits from fuel switch in Distributed Energy and Global Ambition scenarios in 2030 and 2040. This also explains the difference when compared to the benefits observed in National Trend scenario.

Sustainability benefits explained [Promoter]

In addition to ENTSOG analysis on Sustainability, the promoter complements this analysis with the following country-specific information.
The promoter The promoter estimates that the project group's sustainability benefits are considerably higher, specifically 198.4 MEUR/y on average (in undiscounted value), for the six ENTSOG scenarios examined (National Trends – GBC, National Trends – CBG, Distributed Energy – GBC, Distributed Energy – CBG, Global Ambition – GBC, Global Ambition – CBG). The assumptions used in the analysis are the following:

- Estimation of natural gas volumes associated with examined sustainability benefits based on the difference between natural gas consumption per sector in each year and the base year (set as 2019).
- Examination of sustainability benefits in Greece and Bulgaria with respect to: (ii) 'CO2 emissions reduction' (i.e. gas replacing more polluting fuels); and (ii) 'fuel savings' (i.e. gas replacing more expensive fuels).

The alternative fuels that the incremental natural gas consumption replaces are assumed to be:

- Lignite in the power sector;
- Heavy fuel oil in the industrial sector;
- Light fuel oil in the residential/ commercial sector.

The incremental gas consumption due to replacement of other fuels that is associated with the project group is proxied by the following estimation in two steps:

1. Estimation of total natural gas consumption linked to gas replacing other fuels, by calculating the difference between natural gas consumption per sector in each year and the base year (set as 2019).
2. Multiplying the project group's share of total natural gas supplies in the country (Greece & Bulgaria) for each year with the total national natural gas consumption linked to replacement of other fuels per sector in that year.

Key assumptions of the analysis:

- Consideration of all FID gas infrastructure projects in the analysis, including TAP and IGB interconnection (equivalent to ENTSOG LOW Infrastructure Scenario).
- As per Gastrade's demand projections:
  - Annualized Compound Annual Growth Rate (CAGR) of natural gas demand per annum in Greece of 4.30% between 2020 and 2029 and decreasing at an annual rate of -0.04% thereafter.
  - Natural gas demand projections for Bulgaria for the period 2020-2029, sourced from the 2020 – 2029 Ten-Year Network Development Plan of Bulgartransgaz EAD; from 2029 onwards, natural gas demand growth of 3.1% per annum, equal to the CAGR of Bulgartransgaz EAD projections for the period 2020-2029.
- Unit price projections of natural gas at the border, of heavy oil and light oil at the point of consumption, sourced from the ENTSO 2020 TYNDP Scenario Report: https://www.entsos-tyndp2020-scenarios.eu/fuel-commodities-and-carbon-prices/.
- Unit price of lignite at the point of consumption sourced from the Public Power Corporation (PPC) of Greece and assumed to remain constant throughout the analysis period.
- CO2 price projections for the six ENTSO scenarios in line with ENTSO 2020 TYNDP Scenario Report: https://www.entsos-tyndp2020-scenarios.eu/fuel-commodities-and-carbon-prices/
- Social Discount Rate (SDR) of 4%, in line with ENTSOG assumption (Note: the analysis is carried out in real/ constant prices)
- CO2 emission factors of fuel oil (heavy/ light) at 0.267 tCO2/MWh, of natural gas at 0.202 tCO2/MWh and of lignite assumed at 0.483 t CO2/MWh (based on PPC figures).
- Net savings in capital and O&M costs of CCGT gas-fired power plant vs. lignite-fired plant of € 0.85/ GJ of lignite or € 3.1/ MWh of lignite.
- The analysis considers gas network charges for the distribution and transmission networks, based on historic values in Greece and Bulgaria, as well as an estimated charge for usage of the IGB interconnection concerning Bulgaria.

The estimated sustainability benefits with respect to 'fuel savings' (i.e. gas replacing more expensive fuels) are EUR 123.6/ year on average (in undiscounted values) and EUR 1,533m in total (in net present value), in all of the six ENTSO scenarios.

The estimated sustainability benefits with respect to 'CO_2 emissions reduction' (i.e. gas replacing more polluting fuels) as well as the aggregate sustainability benefits (i.e. 'CO_2 emissions reduction' + 'Fuel savings' benefits) in each of the six ENTSO scenarios examined (National Trends – GBC, National Trends – CBG, Distributed Energy – GBC, Distributed Energy – CBG, Global Ambition – GBC, Global Ambition – CBG) are shown below:

Scenario	*Average Annual **'CO_2 emissions reduction' Benefit** (EUR m) (in undiscounted values)*	*Total **'CO_2 emissions reduction' Benefit** (EUR m) (in Present Value)*	*Average Annual **Aggregate Benefit (CO_2 emissions reduction + Fuel savings)** (EUR m) (in undiscounted values)*	*Total **Aggregate Benefit (CO_2 emissions reduction + Fuel savings)** (EUR m) (in Present Value)*
National Trends – GBC	68.9	944	192.5	2,478
National Trends – CBG	58.9	759	182.6	2,292
Distributed Energy – GBC	94.7	1,276	218.4	2,810
Distributed Energy – CBG	84.8	1,091	208.5	2,624
Global Ambition – GBC	75.5	1,032	199.1	2,565
Global Ambition – CBG	65.6	846	189.2	2,380

Even in case the above analysis is performed **using ENTSO demand projections** ('average values') for the six scenarios (National Trends – GBC, National Trends – CBG, Distributed Energy – GBC, Distributed Energy – CBG, Global Ambition – GBC, Global Ambition – CBG), the estimated aggregate sustainability benefits in the 'National Trends – GBC' scenario are EUR 26.2m/ year on average (in undiscounted values) and EUR 454.5m in total (in present value) as shown in the table below, thus resulting in a positive ENPV of EUR 33.7m, when added to ENTSOG's estimated values of EU Bill (EUR 265.1m), SLID (EUR 21.9m) and Costs (EUR -707.8m) in the LOW Infrastructure scenario.

Average Annual Benefit (in undiscounted values)	***EUR m***
'CO_2 emissions reduction'	*20.8*
'Fuel savings'	*5.4*
Aggregate	***26.2***

Total Benefit (in Present Value)	*EUR m*
'CO_2 emissions reduction'	*361.5*
'Fuel savings'	*93.0*
Aggregate	***454.5***

C.2 Quantitative benefits [ENTSOG]

The following tables display all the benefits quantified by ENTSOG through specific indicators and stemming from the realisation of the considered project group. Some of those benefits are measured through quantitative indicators (i.e. SLID and Curtailment rate) and monetised ex-post. Their monetised value is displayed in section E. When assessing those type of benefits, it is important to avoid any double counting considering them both in quantitative and monetised terms.

EXISTING Infrastructure Level – National Trends

Sum of Value	Column Labels											
	2025						2030			2040		
	CBG			GBC			NT			NT		
Row Labels	WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA
Security of Supply												
Remaining Flexibility 2-Week Cold Spell (%)												
Greece				42%	59%	17%	67%	87%	20%	51%	69%	18%
Remaining Flexibility 2-Week Cold Spell (%) --- DF												
Greece				36%	53%	16%	34%	50%	16%	28%	43%	15%
Remaining Flexibility Peak day (%)												
Greece	47%	65%	17%	20%	34%	14%	26%	41%	15%	22%	37%	15%
Single Largest Infrastructure Disruption (SLID)-Greece												
Greece	34%	0%	-34%	46%	0%	-46%	43%	0%	-43%	45%	0%	-45%

LOW Infrastructure Level – National Trends

Sum of Value	Column Labels											
	2025						2030			2040		
	CBG			GBC			NT			NT		
Row Labels	WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA
Competition												
MASD-RU												
Bosnia Herzegovina										13%	10%	-3%
Bulgaria										13%	9%	-4%
Greece				16%	11%	-5%						
North Noth Macedonia										13%	10%	-3%
Serbia										13%	10%	-3%
Security of Supply												
Remaining Flexibility 2-Week Cold Spell (%)												
Greece				76%	93%	17%				86%	100%	14%
Remaining Flexibility 2-Week Cold Spell (%) --- DF												
Greece				68%	85%	16%	66%	82%	16%	58%	73%	15%
Remaining Flexibility Peak day (%)												
France				48%	51%	3%				73%	76%	3%
Germany	36%	38%	2%	27%	29%	2%	37%	38%	1%	26%	27%	1%
Greece	82%	99%	17%	48%	62%	14%	56%	71%	15%	51%	66%	15%
Netherlands				47%	49%	3%				67%	69%	3%
Single Largest Infrastructure Disruption (SLID)-Greece												
Greece				18%	0%	-18%	14%	0%	-14%	16%	0%	-16%

ADVANCED Infrastructure Level – National Trends

Sum of Value	Column Labels											
	2025						2030			2040		
	CBG			GBC			NT			NT		
Row Labels	WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA
Security of Supply												
Remaining Flexibility 2-Week Cold Spell (%)												
Greece				76%	93%	17%				69%	87%	18%
Remaining Flexibility 2-Week Cold Spell (%) --- DF												
Greece				68%	85%	16%	62%	78%	16%	37%	53%	15%
Remaining Flexibility Peak day (%)												
Greece	82%	99%	17%	48%	62%	14%	51%	66%	15%	30%	45%	15%

EXISTING Infrastructure Level – Distributed Energy

Sum of Value	Column Labels											
	2025						2030			2040		
	CBG			GBC			DE			DE		
Row Labels	WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA
Security of Supply												
Remaining Flexibility 2-Week Cold Spell (%)												
Greece				42%	59%	17%	16%	28%	12%			
Remaining Flexibility 2-Week Cold Spell (%) --- DF												
Greece				36%	53%	16%	6%	17%	12%	26%	39%	13%
Remaining Flexibility Peak day (%)												
Greece	47%	65%	17%	20%	34%	14%	5%	17%	11%	47%	59%	13%
Single Largest Infrastructure Disruption (SLID)-Greece												
Greece	34%	0%	-34%	46%	0%	-46%	47%	0%	-47%	13%	0%	-13%

LOW Infrastructure Level – Distributed Energy

Sum of Value / Row Labels	2025 CBG WITHOUT	2025 CBG WITH	2025 CBG DELTA	2025 GBC WITHOUT	2025 GBC WITH	2025 GBC DELTA	2030 DE WITHOUT	2030 DE WITH	2030 DE DELTA	2040 DE WITHOUT	2040 DE WITH	2040 DE DELTA
Competition												
MASD-RU												
Bosnia Herzegovina							16%	8%	-8%			
Bulgaria							15%	9%	-6%			
Greece				16%	11%	-5%						
North Noth Macedonia							16%	9%	-7%			
Serbia							15%	9%	-7%			
Security of Supply												
Remaining Flexibility 2-Week Cold Spell (%)												
Greece				76%	93%	17%	41%	53%	12%			
Remaining Flexibility 2-Week Cold Spell (%) --- DF												
Greece				68%	85%	16%	29%	41%	12%	52%	65%	13%
Remaining Flexibility Peak day (%)												
France				48%	51%	3%						
Germany	36%	38%	2%	27%	29%	2%	52%	54%	2%			
Greece	82%	99%	17%	48%	62%	14%	28%	39%	11%	72%	85%	13%
Netherlands				47%	49%	3%						
Single Largest Infrastructure Disruption (SLID)-Greece												
Greece				18%	0%	-18%	25%	0%	-25%			

ADVANCED Infrastructure Level – Distributed Energy

Sum of Value / Row Labels	2025 CBG WITHOUT	2025 CBG WITH	2025 CBG DELTA	2025 GBC WITHOUT	2025 GBC WITH	2025 GBC DELTA	2030 DE WITHOUT	2030 DE WITH	2030 DE DELTA	2040 DE WITHOUT	2040 DE WITH	2040 DE DELTA
Security of Supply												
Remaining Flexibility 2-Week Cold Spell (%)												
Greece				76%	93%	17%	39%	51%	12%			
Remaining Flexibility 2-Week Cold Spell (%) --- DF												
Greece				68%	85%	16%	26%	38%	12%	34%	48%	13%
Remaining Flexibility Peak day (%)												
Greece	82%	99%	17%	48%	62%	14%	24%	36%	11%	54%	66%	13%

EXISTING Infrastructure Level – Global Ambition

Sum of Value	Column Labels											
	2025						2030			2040		
	CBG			GBC			GA			GA		
Row Labels	WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA
Competition												
Commercial Supply Access (CSA)												
Greece	3	4	1	3	4	1	3	4	1	3	4	1
MASD-LNGall												
Greece										4%	2%	-2%
Security of Supply												
Curtailment Rate 2-Week Cold Spell (%) --- DF												
Greece							-10%	0%	10%			
Curtailment Rate Peak Day (%)												
Greece							-19%	-10%	9%			
Remaining Flexibility 2-Week Cold Spell (%)												
Greece				42%	59%	17%	2%	14%	11%	30%	43%	13%
Remaining Flexibility 2-Week Cold Spell (%) --- DF												
Greece				36%	53%	16%	0%	1%	1%	3%	14%	11%
Remaining Flexibility Peak day (%)												
Greece	47%	65%	17%	20%	34%	14%				1%	11%	10%
Single Largest Infrastructure Disruption (SLID)-Greece												
Greece	34%	0%	-34%	46%	0%	-46%	61%	10%	-51%	46%	0%	-46%

LOW Infrastructure Level – Global Ambition

Sum of Value	Column Labels											
	2025						2030			2040		
	CBG			GBC			GA			GA		
Row Labels	WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA
Competition												
MASD-RU												
Bosnia Herzegovina							27%	20%	-7%	7%	2%	-4%
Bulgaria							26%	22%	-4%	7%	4%	-4%
Greece				16%	11%	-5%						
North Noth Macedonia							27%	21%	-6%	7%	3%	-4%
Serbia							26%	21%	-5%	7%	3%	-4%
Security of Supply												
Curtailment Rate Peak Day (%)												
Greece							-1%	0%	1%			
Remaining Flexibility 2-Week Cold Spell (%)												
Greece				76%	93%	17%	25%	36%	11%	56%	69%	13%
Remaining Flexibility 2-Week Cold Spell (%) --- DF												
Greece				68%	85%	16%	11%	21%	10%	25%	36%	11%
Remaining Flexibility Peak day (%)												
Belgium							53%	60%	7%			
France				48%	51%	3%	20%	23%	3%	44%	47%	3%
Germany	36%	38%	2%	27%	29%	2%	11%	13%	1%	22%	23%	1%
Greece	82%	99%	17%	48%	62%	14%	0%	8%	8%	21%	31%	10%
Italy							15%	17%	2%	35%	37%	2%
Netherlands				47%	49%	3%	24%	27%	3%	53%	56%	3%
Single Largest Infrastructure Disruption (SLID)-Greece												
Greece				18%	0%	-18%	43%	1%	-42%	26%	0%	-26%

ADVANCED Infrastructure Level – Global Ambition

Sum of Value	Column Labels											
	2025						2030			2040		
	CBG			GBC			GA			GA		
Row Labels	WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA
Security of Supply												
Curtailment Rate Peak Day (%)												
Greece							-4%	0%	4%			
North Noth Macedonia							-4%	0%	4%			
Remaining Flexibility 2-Week Cold Spell (%)												
Greece				76%	93%	17%	23%	35%	11%	43%	56%	13%
Remaining Flexibility 2-Week Cold Spell (%) --- DF												
Greece				68%	85%	16%	8%	19%	10%	10%	22%	11%
Remaining Flexibility Peak day (%)												
Germany	48%	49%	1%	39%	40%	1%						
Greece	82%	99%	17%	48%	62%	14%	0%	5%	5%	6%	16%	10%
North Noth Macedonia							0%	70%	70%			
Single Largest Infrastructure Disruption (SLID)-Greece												
Greece							13%	0%	-13%	4%	0%	-4%
North Noth Macedonia							14%	0%	-14%	5%	0%	-5%

C.3 Monetised benefits

This section includes all benefits stemming from the realisation of a project that are quantified and monetised. Some benefits are monetised ex-post while others directly as a result of the simulations and are impacted by the modelling assumptions chosen (e.g. tariffs or supply price assumptions). Monetised benefits are showed at EU level. In order to keep the results in a manageable number, those have been aggregated per Infrastructure Level and Demand Scenarios. In line with the CBA Methodology, promoters could provide additional benefits related to Sustainability or Gasification. In the tables below these benefits are displayed separately from the ones computed directly by ENTSOG and are labelled as "(Promoter)".
More information on how to read the data in this section is provided in the Introduction Document.

		EXISTING			LOW			ADVANCED		
Benefits (Meur/year)		NATIONAL TRENDS	DISTRIBUTED ENERGY	GLOBAL AMBITION	NATIONAL TRENDS	DISTRIBUTED ENERGY	GLOBAL AMBITION	NATIONAL TRENDS	DISTRIBUTED ENERGY	GLOBAL AMBITION
EU Bill benefits With Tariffs	Reference Supply	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Supply Maximization	0.0	0.0	0.0	2.6	1.0	1.0	1.9	1.9	1.9
Security of Supply	Design Case	4.1	3.3	6.2	1.4	1.3	3.9	0.0	0.0	1.3
	2-weeks Cold Spell	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2-weeks Cold Spell DF	0.0	0.0	6.5	0.0	0.0	0.0	0.0	0.0	0.0
Sustainability	CO2 and Other externalities savings	0 / 0	0 / 0	0 / 0	0.1 / 0.3	0.6 / 0.7	0.5 / 0.5	0 / 0.1	0.1 / 0.1	0.3 / 0.3
	Additional benefit (Promoter)	0.0	0.0	0.0	68.9	94.7	75.5	0.0	0.0	0.0
Additional benefits promoter	Fuel Switch	0	0	0	124	124	124	0	0	0

Comparison between the assessed SCENARIOS

ENTSOG runs the assessment for 5-year-rounded years (2020, 2025, 2030 and 2040) and interpolates these results to compute the benefits for the 25-years economic lifetime of projects. The following tables show the benefits as computed in the specific assessment years.

Year of assessment		*2020*									*2025*								
		EXISTING			LOW			ADVANCED			EXISTING			LOW			ADVANCED		
Benefits (Meur/year)		NT	DE	GA	NT	DE	GA	NT	DE	GA	NT	DE	GA	NT	DE	GA	NT	DE	GA
EU Bill benefits With Tariffs	Reference Supply	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Supply Maximization	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3	3.3	3.3	7.7	7.7	7.7
Security of Supply	Design Case	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.3	4.3	4.3	1.7	1.7	1.7	0.0	0.0	0.0
	2-weeks Cold Spell	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2-weeks Cold Spell DF	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sustainability	CO2 and Other externalities savings	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	1 / 1	1 / 1	1 / 1	0 / 0	0 / 0	0 / 0
	Additional benefit (Promoter)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.9	57.1	37.4	0.0	0.0	0.0
Additional benefits	Fuel Switch	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	51.5	75.7	60.7	0.0	0.0	0.0

Year of assessment		*2030*									*2040*								
		EXISTING			LOW			ADVANCED			EXISTING			LOW			ADVANCED		
Benefits (Meur/year)		NT	DE	GA	NT	DE	GA	NT	DE	GA	NT	DE	GA	NT	DE	GA	NT	DE	GA
EU Bill benefits With Tariffs	Reference Supply	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Supply Maximization	0.0	0.0	0.0	1.6	0.5	0.0	0.5	0.0	0.0	0.0	0.0	0.0	2.9	0.2	0.4	0.2	0.0	0.0
Security of Supply	Design Case	3.8	5.5	7.5	1.2	2.9	6.3	0.0	0.0	2.6	4.1	1.3	6.0	1.5	0.0	3.4	0.0	0.0	0.7
	2-weeks Cold Spell	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2-weeks Cold Spell DF	0.0	0.0	17.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sustainability	CO2 and Other externalities savings	0 / 0	0 / 0	0 / 0	0 / 0	1 / 2	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	1 / 1	0 / 0	0 / 0	0 / 0
	Additional benefit (Promoter)	0.0	0.0	0.0	49.1	77.6	57.0	0.0	0.0	0.0	0.0	0.0	0.0	89.6	118.7	96.3	0.0	0.0	0.0
Additional benefits	Fuel Switch	0.0	0.0	0.0	87.3	102.9	93.0	0.0	0.0	0.0	0.0	0.0	0.0	158.8	157.4	157.6	0.0	0.0	0.0

C.4 Sensitivities analysis on monetised benefits

In line with ENTSOG Adapted 2nd CBA Methodology, ENTSOG has also run sensitivities on some relevant assumptions such as tariffs, commissioning year and lower supply source price differential. The results included in the tables below have to be compared with the ones included in section C.3. Further information is available in the common introduction (Pages 1-6) to all project fiches.

EXISTING Infrastructure Level

Benefits (Meur/year)		*Commissioning Year Sensitivity*			*Lower Tariff Sensitivity*			*Higher Tariff Sensitivity*			*Cost of Disruption Sensitivity*		
		NATIONAL TRENDS	DISTRIBUTED ENERGY	GLOBAL AMBITION	NATIONAL TRENDS	DISTRIBUTED ENERGY	GLOBAL AMBITION	NATIONAL TRENDS	DISTRIBUTED ENERGY	GLOBAL AMBITION	NATIONAL TRENDS	DISTRIBUTED ENERGY	GLOBAL AMBITION
EU Bill benefits With Tariffs	Reference Supply	0.0	0.0	0.0	11.6	4.7	3.9	0.0	0.0	0.0	0.0	0.0	0.0
	Supply Maximization	0.0	0.0	0.0	16.5	8.5	8.1	0.0	0.0	0.0	0.0	0.0	0.0
Security of Supply	Design Case	4.0	3.0	5.8	4.1	3.3	6.2	4.1	3.3	6.2	0.0	0.0	1.1
	2-weeks Cold Spell	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2-weeks Cold Spell DF	0.0	0.0	6.5	0.0	0.0	6.5	0.0	0.0	6.5	0.0	0.0	14.5
Sustainability	CO2 and Other externalities savings	0 / 0	0 / 0	0 / 0	0.3 / 0.8	1.1 / 1.7	1.1 / 1.6	0.2 / 0.2	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	Additional benefit (Promoter)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Additional benefits promoter	Fuel Switch	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

LOW Infrastructure Level

Benefits (Meur/year)		*Commissioning Year Sensitivity*			*Lower Tariff Sensitivity*			*Higher Tariff Sensitivity*			*Cost of Disruption Sensitivity*		
		NATIONAL TRENDS	DISTRIBUTED ENERGY	GLOBAL AMBITION	NATIONAL TRENDS	DISTRIBUTED ENERGY	GLOBAL AMBITION	NATIONAL TRENDS	DISTRIBUTED ENERGY	GLOBAL AMBITION	NATIONAL TRENDS	DISTRIBUTED ENERGY	GLOBAL AMBITION
EU Bill benefits With Tariffs	Reference Supply	0.0	0.0	0.0	36.1	15.2	23.8	0.0	0.0	0.0	0.0	0.0	0.0
	Supply Maximization	2.6	0.8	0.8	44.0	25.2	32.7	0.0	0.0	0.0	2.6	1.0	1.0
Security of Supply	Design Case	1.4	1.1	4.0	1.4	1.3	3.9	1.4	1.3	3.9	0.0	0.0	0.1
	2-weeks Cold Spell	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2-weeks Cold Spell DF	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sustainability	CO2 and Other externalities savings	0 / 0.2	0.5 / 0.7	0.5 / 0.5	0.6 / 1.6	1.6 / 2.7	4 / 5	0 / 0	0 / 0	0 / 0	0.1 / 0.3	0.6 / 0.7	0.5 / 0.5
	Additional benefit (Promoter)	68.9	94.7	75.5	68.9	94.7	75.5	68.9	94.7	75.5	68.9	94.7	75.5
Additional benefits promoter	Fuel Switch	123.6	123.7	123.6	123.6	123.7	123.6	123.6	123.7	123.6	123.6	123.7	123.6

ADVANCED Infrastructure Level

Benefits (Meur/year)		*Commissioning Year Sensitivity*			*Lower Tariff Sensitivity*			*Higher Tariff Sensitivity*			*Cost of Disruption Sensitivity*		
		NATIONAL TRENDS	DISTRIBUTED ENERGY	GLOBAL AMBITION	NATIONAL TRENDS	DISTRIBUTED ENERGY	GLOBAL AMBITION	NATIONAL TRENDS	DISTRIBUTED ENERGY	GLOBAL AMBITION	NATIONAL TRENDS	DISTRIBUTED ENERGY	GLOBAL AMBITION
EU Bill benefits With Tariffs	Reference Supply	0.0	0.0	0.0	28.3	13.9	24.0	0.0	0.0	0.0	0.0	0.0	0.0
	Supply Maximization	1.9	1.9	1.9	46.1	27.5	37.8	2.9	2.9	2.9	1.9	1.9	1.9
Security of Supply	Design Case	0.0	0.0	1.3	0.0	0.0	1.3	0.0	0.0	1.3	0.0	0.0	0.5
	2-weeks Cold Spell	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2-weeks Cold Spell DF	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sustainability	CO2 and Other externalities savings	0.1 / 0	0.1 / 0.1	0.3 / 0.3	0.1 / 0.1	0 / 0.1	0.3 / 0.3	0 / 0	0 / 0	0 / 0	0 / 0.1	0.1 / 0.1	0.3 / 0.3
	Additional benefit (Promoter)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Additional benefits promoter	Fuel Switch	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

D. Environmental Impact

Any gas infrastructure has an impact on its surroundings. This impact is of particular relevance when crossing some environmentally sensitive areas. Mitigation measures are taken by the promoters to reduce this impact and comply with the EU and National regulations. The Tables have been filled in by the promoter.

TYNDP Code	Type of infrastructure	Surface of impact	Environmentally sensitive area
LNG-N-062	LNG Terminal (FSRU)	15,000 m^2	The project is not expected to have significant impacts on a Natura 2000 site as documented in the Environmental Impact Assessment of the project. The EIA is environmentally approved by the competent Authorities through the environmental consent for the project (Environmental Terms).
TRA-N-063	Pipeline	224,000 m^2	
TRA-N-0128	Compressor station	Approximately 20,000 m2	Protected areas are not affected
TRA-N-1090	M/R Station	Approximately 5,000 m2	Protected areas are not affected

Potential impact	Mitigation measures	Related costs included in project CAPEX and OPEX	Additional expected costs
Impact on air and sea water	The FSRU will be equipped with a hybrid regasification system (50% sea water and 50% gas fired) in order to balance emissions to the atmosphere and water discharges in the sea	CAPEX = approx. 50 mil. Euro OPEX = approx. 4 mil. Euro / year (related to energy costs)	CO2 emission costs = approx. 2.5 mil. Euro / year
The compressor station operation will generate exhaust gas emissions and noise. The M/R station will not have any impact on air and sea water.	Noise will be mitigated by housing the station in a building and by using enclosures for the turbo-compressors. Moreover, the station will be located at 3 km distance from the closer village. Chimney height and selection of low NOx emitting units will mitigate the exhaust gas issues.	Not yet available	Not yet available

Environmental Impact explained [Promoter]

In the Environmental Impact Assessment (EIAS) of the project, alternative solutions were examined with regards to the environmental impacts of the project and the solution with the smaller environmental impacts was selected. As demonstrated by the EIA, the project is not expected to have significant negative environmental impacts. The area in which it is located does not belong to any part of the environmentally protected areas and priority habitats such as Posidonia oceanica meadows. Bio-communities and habitats of high ecological sensitivity are not affected. In the land part forest areas are avoided and no significant riparian vegetation is affected. The operation of the project will not have a significant impact on the quality of the atmosphere, seawater or terrestrial aquifers and water resources. Also, the route of the pipeline does not meet known archaeological sites or other findings, while negative effects on local tourism, recreation or aesthetics are not expected. As regards impacts on human activities, fishing is not materially affected, and any potential damage to crops from the installation of the pipeline will be extremely small, temporary and reversible. In any case, however, with the measures envisaged in this EIA, any, even minor, effects will either be eliminated or minimized. Preventive measures are foreseen in the EIAS for the prevention of environmental impacts. During the construction of the project, the Contractor will assume all additional costs related to the environmental rehabilitation and maintenance of the landscape and the monitoring of important environmental parameters. Also, under the terms of the EPC Contract, it is responsible for damages and / or compensation for damage in the event of an environmental accident. The Contractor will use an Environmental Management System based on ISO 14001: 2004 and will comply with the HSE Performance System.

Based on the "Thrace Water Department River Basin Management Plan (EL12)" the project is located in the Water System of Evros (EL1210), in the Underground Water System of Alexandroupolis (EL200130) and in the Coastal water system of Alexandroupolis Coast (EL1210C0008N). The project is compatible with the measures described in the approved Management Plan. The project is not expected to degrade the status of the water systems nor prevent the achievement of the objectives set for the water systems.

E. Other Benefits [Promoter]

Missing benefits are all benefits of a project which may be not captured by the current application in TYNDP 2020 of the 2nd CBA Methodology.
As a necessary condition a missing benefit cannot have discrepancies with the benefits already covered by the assessment run by ENTSOG and this condition needs to be proved and justified.

Other benefits explained

Apart from the benefits described above, the group is also anticipated to have a positive impact in Greece and Bulgaria, in a potential Russian gas 'supply source' disruption and in a Turkish Transit 'supply route' disruption. The promoter considers that these disruption scenaria are more relevant than the Ukraine 'supply route' disruption, as Russian gas supplies in the project's primary target markets (Greece and Bulgaria) are currently sourced via Turk Stream pipeline. Specifically:

- **Russian gas disruption:**

Greece

During the potential disruption, no natural gas supply will be available via the Sidirokastro entry point, which is the entry point for direct Russian gas supplies to Greece. In addition, in the case of such disruption, natural gas from other sources will also not be available via the Sidirokastro entry point as gas supply in Europe will be in shortage and neighbouring countries will not have any surplus gas to export to Greece.
It is further assumed that during the disruption of Russian gas, all remaining gas supply infrastructure in the country will supply gas at full capacity i.e. 28.25 mcm/day:

- Kipi at 4.3 mcm/d;
- TAP at 4.8 mcm/d;
- Revithoussa at 19.2 mcm/d.

The disruption analysis is carried out on the basis of peak demand projections for Greece as it is possible that the disruption could occur during a period of high gas demand. Using 2023 as the reference year for the analysis we examine the following scenarios regarding peak demand for 2023:

1. Peak Demand 2023 = Peak Demand 2019 = 26.6 mcm/day
   Existing infrastructure covers peak demand by a small margin of 1.7 mcm/day.
2. As per DESFA's 10-year development study (2020-2029) yearly demand growth rate between 2019 and 2023 is estimated at 15%. Peak Demand 2023 (in high scenario) is estimated at 27,34 mcm/day.
   Existing infrastructure marginally covers peak demand 2023 at 0.96 mcm/day.

Thus, the Project supports the security of supply in Greece and helps maintaining a positive remaining flexibility at peak day under such disruption in these scenarios.

Bulgaria

During such disruption, it is assumed that no natural gas supply will be available via the Negru Voda 1,2,3 entry points, via IBS interconnector (from 2022 onwards) and Strandzha 2/Malkoclar at the connection between Bulgartransgaz GTNTT and the gas transmission system operated by TAGAS in Turkey, which are the routes for the transmission/transit of Russian gas supplies to/via the country.
In addition, in this scenario no other natural gas supplies will be available via these entry points as gas supply in Europe will be in shortage and neighbouring countries, including Turkey, will not have any natural gas surpluses to export to Bulgaria. Shah Deniz supplies via TAP and IGB will be capped at the currently contracted supply to Bulgaria of 1.0 bcm/year or 2.7 mcm/d, since all other contracted volumes via TAP will be fully absorbed due to gas shortage in the wider region.
Imports from Greece via Sidirokastro will not be available as Greece will not have any natural gas surpluses to export to Bulgaria (see above re. Greece disruption analysis).
Thus, during the Russian gas disruption, the remaining gas supply infrastructure in the country will be able to provide, at full capacity, 11.5 mcm/day of gas, as follows:

- IBR: 2.5 mcm/d;
- UGS Chiren: 3.8 mcm/d;
- Local production: 2.5 mcm/d;
- IGB: (only via TAP): 2.7 mcm/day

Using 2023 as the reference year for the analysis, according to Bulgartransgaz NDP, peak demand for 2023 is estimated at 18.2 mcm/day while average demand from 2030 onwards is estimated in excess of 11.9 mcm/day. Hence, existing infrastructure will not be able to cover the peak demand and an estimated supply gap of 6.7 mcm/day will arise. The supply gap with respect average demand is estimated at 0.4 mcm/day in 2030 and growing thereafter. Considering that the combined capacity of Sidirokastro and IGB towards Bulgaria (excluding IGB capacity reserved for contracted volumes via TAP) is 12.4 mcm/day, the project will be able to fully cover the supply gap in both cases. Thus, in the case of Russian disruption at peak day as well as average daily demand, the project can offer the additional required capacity to safeguard security of supply in Bulgaria.

- **Turkish Transit disruption:**

Turkish Transit disruption is examined following the Russian discontinuation of the routing of current volumes of gas to South-East Europe via Ukraine and its substitution with the construction of Turk Stream. Although Russia currently channels gas to Europe via Ukraine, the construction of new pipelines between Russia and Europe (e.g. Nord Stream 2, Turk Stream) aims at the minimization of Russian dependence on Ukraine. To that end, the examination of Turk Stream is relevant hypothesizing that Russia has minimized (or completely cancelled) the routing of gas to South-East Europe via Ukraine by following the alternative routing of Turk Stream. In addition, it is considered that under Turkish Transit disruption, the immediate action of replacing Turkish routing by returning back to Ukrainian routing could not be an immediate action resolving short term negative effects (let alone a feasible action under circumstances of heavy conflict between Russian and Ukraine).
Whilst that scenario is not currently assessed by ENTSOG as a potential route disruption, the impact of a disruption of all routes transiting through Turkey i.e. both the Turk Stream, carrying Russian gas and TANAP carrying Azeri gas (and possibly, in the future, gas from other central Asia origins like Turkmeni gas) is however presented here for the sake of completeness of the potential project benefits specifically:

Greece
The promoter's analysis assumes that all Sidirokastro's throughput volumes would be served exclusively via Turkish routes. In addition, it is assumed that there are no other gas sources that could send significant volumes to Greece via Sidirokastro. Along with Sidirokastro, the entry points in Greece related to Turkish routing (TAP and Kipi) will stay inactive too. The promoter's analysis indicates that the discontinuation of supply from the above entry points will lead the Greek energy system to face a supply gap in addressing peak day demand situations, as well as average demand from 2029 onwards (estimated at approx. 17.5 mcm/d) as the only remaining gas supply infrastructure in the country that will be able to supply gas will be Revithoussa at 19.2 mcm/d.

Bulgaria
During such disruption, it is assumed that no natural gas supply will be available via the Negru Voda 1,2,3 entry points and via Strandzha 2/Malkocla at the connection between Bulgartransgaz GTNTT and the gas transmission system operated by TAGAS in Turkey. Imports from Greece via Sidirokastro via TAP and IGB will not be available as Greece will not have any natural gas surpluses to export to Bulgaria (see above re. Greece disruption analysis), while no imports related to Turkish routing (TAP and IGB) will be available either. Thus, during the Turkish Transit disruption, the remaining gas supply infrastructure in the country will be able to provide, at full capacity, 14.3 mcm/day of gas, as follows:
- IBR: 2.5 mcm/d;
- UGS Chiren: 3.8 mcm/d;
- Local production: 2.5 mcm/d;
- IBS: 5.5 mcm/day

Thus, the promoter's analysis indicates that Turkish Transit disruption will also lead the Bulgarian energy system to face a supply gap in addressing peak day demand situations.

- **Other benefits:**

In addition, the Project is anticipated to support the viability and/or commercial attractiveness of regional or inter-regional transmission and/or interconnection projects and provide an outlet for the transmission and marketing of new gas findings in East Mediterranean basin.

F. Useful Links

The project website: www.gastrade.gr
Network Development Plan: http://www.desfa.gr/en/national-natural-gas-system/development-of-the-nngs/development-plan
PCI Fiche: http://ec.europa.eu/energy/maps/pci_fiches/pci_6_9_1_en_2017.pdf