

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

## Project Group EAST\_13 - Eastring

### Reasons for grouping [ENTSO G]

The project group includes the different parts of the Eastring project.

A bi-directional transmission pipeline to connect existing gas transmission infrastructure in Slovakia, Hungary, Romania and Bulgaria.

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

The objective of the project group is to secure natural gas supply for 100% of all Balkan countries' consumption and to provide western shippers with the possibility of supplying vulnerable Balkan countries incl. Turkey from European hubs. It aims at allowing additional utilization for existing transit and storage assets in Central and Eastern Europe (CZ, SK, PL, UA, RO, BG) for new alternative gas sources. The project is scalable and the final technical capacity can be adjusted to the market demand. Project can help in the transition to the carbon neutral economies, mitigation of the air pollution impacts in the region and will be ready to support transport of H2 local production.



## 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-A-0628	Eastring - Slovakia	eustream, a.s.	SK	Less-Advanced	-	2025	2030	Delayed
TRA-A-0654	Eastring - Bulgaria	Bulgartransgaz EAD	BG	Less-Advanced	-	2025	2030	Delayed
TRA-A-0655	Eastring - Romania	SNTGN Transgaz SA	RO	Less-Advanced	-	2025	2030	Delayed
TRA-A-0656	Eastring - Hungary	FGSZ	HU	Less-Advanced	-	2025	2030	Delayed

## Technical Information

TYNDP Project Code	Diameter [mm]	Length [km]	Compressor Power [MW]
TRA-A-0628	1400	17	93
TRA-A-0654	1400	262	93
TRA-A-0655	1400	646	93
TRA-A-0656	1400	28284	-

## 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
TRA-A-628	Eastring Cross-Border HU/EAR <> SK/EAR	Eastring B.V.	Transmission Eastring Slovakia	617	2025	Transmission Eastring Hungary (MGP)	617	2025
TRA-A-628	Eastring Cross-Border HU/EAR <> SK/EAR	Eastring B.V.	Transmission Eastring Slovakia	617	2030	Transmission Eastring Hungary (MGP)	617	2030
TRA-A-654	Eastring BG Domestic Point	Bulgartransgaz EAD	Transmission Bulgaria (NGTS)	200	2025	Transmission Eastring Bulgaria	200	2025
TRA-A-654	Eastring Cross-Border BG/EAR <> RO/EAR	Bulgartransgaz EAD	Transmission Eastring Bulgaria	617	2025	Transmission Eastring Romania	617	2025
TRA-A-654	Eastring Cross-Border BG/EAR>TR	Bulgartransgaz EAD	Transmission Eastring Bulgaria	617	2025	Transmission Turkey (Exports)	-	-
TRA-A-654	Eastring Cross-Border BG/EAR <> RO/EAR	Bulgartransgaz EAD	Transmission Eastring Bulgaria	617	2030	Transmission Eastring Romania	617	2030
TRA-A-654	Eastring Cross-Border BG/EAR>TR	Bulgartransgaz EAD	Transmission Eastring Bulgaria	617	2030	Transmission Turkey (Exports)	-	-

TRA-A-654	Eastring Cross-Border TR>BG/EAR	Bulgartransgaz EAD	Transmission Turkey (Imports)	-	-	Transmission Eastring Bulgaria	617	2025
TRA-A-654	Eastring Cross-Border TR>BG/EAR	Bulgartransgaz EAD	Transmission Turkey (Imports)	-	-	Transmission Eastring Bulgaria	617	2030
TRA-A-655	Eastring Cross-Border BG/EAR <> RO/EAR	SNTGN Transgaz S.A.	Transmission Eastring Romania	617	2025	Transmission Eastring Bulgaria	617	2025
TRA-A-655	Eastring Cross-Border RO/EAR <> HU/EAR	SNTGN Transgaz S.A.	Transmission Eastring Romania	617	2025	Transmission Eastring Hungary (MGP)	617	2025
TRA-A-655	Eastring RO Domestic Point	SNTGN Transgaz S.A.	Transmission Romania	150	2025	Transmission Eastring Romania	150	2025
TRA-A-655	Eastring Cross-Border BG/EAR <> RO/EAR	SNTGN Transgaz S.A.	Transmission Eastring Romania	617	2030	Transmission Eastring Bulgaria	617	2030
TRA-A-655	Eastring Cross-Border RO/EAR <> HU/EAR	SNTGN Transgaz S.A.	Transmission Eastring Romania	617	2030	Transmission Eastring Hungary (MGP)	617	2030
TRA-A-656	Eastring Cross-Border HU/EAR <> SK/EAR	FGSZ Ltd.	Transmission Eastring Hungary (MGP)	617	2025	Transmission Eastring Slovakia	617	2025
TRA-A-656	Eastring Cross-Border RO/EAR <> HU/EAR	FGSZ Ltd.	Transmission Eastring Hungary (MGP)	617	2025	Transmission Eastring Romania	617	2025
TRA-A-656	Eastring HU Domestic Point	FGSZ Ltd.	Transmission Hungary (MGP)	310	2025	Transmission Eastring Hungary (MGP)	310	2025
TRA-A-656	Eastring Cross-Border HU/EAR <> SK/EAR	FGSZ Ltd.	Transmission Eastring Hungary (MGP)	617	2030	Transmission Eastring Slovakia	617	2030
TRA-A-656	Eastring Cross-Border RO/EAR <> HU/EAR	FGSZ Ltd.	Transmission Eastring Hungary (MGP)	617	2030	Transmission Eastring Romania	617	2030

## 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 2020 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 “\*”.

	TRA-A-628	TRA-A-654	TRA-A-655	TRA-A-656	Total Cost
<b>CAPEX [min, EUR]</b>	146.1	626.4	1297	530.9	<b>2600.4</b>
<b>OPEX [min, EUR/y]</b>	7	21.8	18.1	8.3	<b>55.2</b>
<b>Range CAPEX (%)</b>	25	25	25	25	-
<b>Range OPEX (%)</b>	25	25	25	25	-

### Description of costs and range [Promoter]

The expected costs are based on the result of the feasibility study completed in 2018.

## C. Project Benefits

### C.1 Summary of project benefits

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

#### National Trends

##### Benefits explained (but Sustainability) [ENTSG]

###### > Security of Supply:

The project group significantly increases the remaining flexibility for Romania (all climatic cases) in all infrastructure levels.

In case of **Ukrainian disruption**, the project group significantly mitigates the risk of demand curtailment in Romania in Existing and LOW infrastructure.

In case of **disruption of the single largest infrastructure** in Romania, the project group fully mitigates the risk of demand curtailment in Romania, year 2040.

###### > Competition:

The project group further improves the **diversification of capacities** (LICD indicator) in entry in Bulgaria, Hungary and Romania.

Enabling a better connection between the Eastern European countries, the project group uniformizes the **dependency on the Russian supply** and reduce it especially in Hungary, Romania, Slovakia and Croatia in the EXISTING and LOW infrastructure level.

The projects group **increases the number of sources** for Bulgaria, Bosnia and Herzegovina, Croatia, Hungary and Serbia in Romanian national production and in Romania, Slovenia and North Macedonia in LNG.

###### > Market integration:

The project group brings benefits in monetised terms as a **reduction of the cost of gas supply**.

In the reference supply price configuration this can be estimated around 209.5 Mln EUR/y (on average) in the existing infrastructure level and 30 Mln EUR/y (on average) in the low infrastructure level with the reference prices. Such benefits are driven by the fact that the project allows Europe to connect to new supply sources through the Turkish region. These benefits are lower in the advanced infrastructure level.

Additional benefits compared to the reference situation can be observed in case of Southern supply Maximisation (313 Mln EUR/y in existing and 83 Mln EUR/y in LOW infrastructure level) and Russian supply Minimisation due to the new supply source diversification through Turkey. The maximum availability of gas through Turkey in ENTSG assessment is based on TYNDP supply potential and it is assumed to be 6 bcm in 2030, which can be redirected gas from the Azerbaijan, Russia or LNG.

By observing the results under the tariffs sensitivities, reduction in the cost of gas supply can be also explained by savings in transportation costs thanks to the utilisation of this new alternative route. In case of higher tariffs, the sensitivity analysis tables show in fact lower benefits (83 Mln EUR/y in existing infrastructure level). Under these circumstances, in the low and infrastructure level, the project group brings benefits only with a Russian supply minimisation and a Southern gas supply maximisation.

The project group has a positive impact (Marginal Price smaller) in Bosnia, Hungary, Serbia and Slovenia but a negative impact on the MP in Bulgaria and in some cases Greece. In Romania, depending on the scenarios, the impact can be positive or negative. In a scenario where the MP in Bulgaria, Romania & Hungary are close without the project, the project will decrease the MP of the three countries (but if Hungary is more expensive without the project, the MP of the three countries will become closer which means a higher MP for Bulgaria & Romania and a smaller one for Hungary).

The impact of the project group on the weighted convergence factor is not uniform. The value of the indicator decreases for most of the scenarios (price configurations & years) and infrastructure levels. It can also slightly increase when all the countries benefit from a lower marginal price (but keep their divergences).

## Distributed Energy

### Benefits explained (but Sustainability) [ENTSOG]

#### > Security of Supply:

The project group increases the **remaining flexibility** for Romania (peak day and 2-week cold spell DF) in Existing infrastructure level.

#### > Competition:

The project group further improves the **diversification of capacities** (LICD indicator) in entry in Bulgaria, Hungary and Romania. Enabling a better connection between the Eastern European countries, the project group uniformizes the **dependency on the Russian supply** and reduces it especially in Bosnia and Herzegovina, Croatia, Hungary, Romania and Slovenia in Existing and Low infrastructure level.

The projects group **increases the number of sources** for Bulgaria, Bosnia and Herzegovina, Croatia, Hungary and Serbia in Romanian national production and in Bosnia and Herzegovina, Croatia, Hungary, Romania and Serbia in LNG.

#### > Market integration:

The project group brings benefits in monetised terms as a **reduction of the cost of gas supply**.

In the reference supply price configuration this can be estimated around 165 Mln EUR/y (on average) in the existing infrastructure level and 2 Mln EUR/y (on average) in the low infrastructure level with the reference prices. Such benefits are driven by the fact that the project allows Europe to connect to new supply sources through the Turkish region. These benefits are lower in the advanced infrastructure.

Additional benefits compared to the reference situation can be observed in the case of Southern supply Maximisation (268 Mln EUR/y in existing and 41 Mln EUR/y in low infrastructure level) and Russian supply Minimisation due to the new supply source diversification through Turkey. The maximum availability of gas through Turkey in ENTSOG assessment is based on TYNDP supply potential and it is assumed to be 6 bcm in 2030, which can be redirected gas from the Azerbaijan, Russia or LNG.

By observing the results under the tariffs sensitivities, reduction in the cost of gas supply can also be explained by savings in transportation costs thanks to the utilisation of this new alternative route. In case of higher tariffs, the sensitivity analysis tables show in fact lower benefits (25 Mln EUR/y in existing infrastructure level). Under these circumstances, in the low and advanced infrastructure levels, the project group brings benefits mainly with a Southern gas supply maximisation.

The project group has a positive impact (Marginal Price smaller) in Bosnia, Hungary, Serbia and Slovenia but a negative impact on the MP in Bulgaria and in some cases Greece. In Romania, depending on the scenarios, the impact can be positive or negative. In a scenario where the MP in Bulgaria, Romania & Hungary are close without the project, the project will decrease the MP of the three countries (but if Hungary is more expensive without the project, the MP of the three countries will become closer which means a higher MP for Bulgaria & Romania and a smaller one for Hungary).

The impact of the project group on the weighted convergence factor is not uniform. The value of the indicator decreases for most of the scenarios (price configurations & years) and infrastructure levels. It can also slightly increase when all the countries benefit from a lower marginal price (but keep their divergences).

## Global Ambition

### Benefits explained (but Sustainability) [ENTSOG]

#### > Security of Supply:

The project group increases the **remaining flexibility** in Romania (all climatic cases) in Existing and LOW infrastructure levels. The project group completely mitigates risk of demand curtailment in case of **Ukrainian disruption** in Romania (only in Peak Day, 2040, existing infrastructure level).

#### > Competition:

The project group further improves the **diversification of capacities** (LICD indicator) in entry in Bulgaria, Hungary and Romania. Enabling a better connection between the Eastern European countries, the project group uniformizes the **dependency on the Russian supply** and reduces it especially in Bosnia and Herzegovina, Croatia, Hungary, Romania and Slovenia in Existing and Low infrastructure level.

The projects group **increases the number of sources** for Bulgaria, Bosnia and Herzegovina, Croatia, Hungary and Serbia in Romanian national production and in Bosnia and Herzegovina, Croatia, Hungary, Romania and Serbia in LNG.

#### > Market integration:

The project group brings benefits in monetised terms as a **reduction of the cost of gas supply**.

In the reference supply price configuration this can be estimated around 209.5 Mln EUR/y (on average) in the existing infrastructure level and 21 Mln EUR/y (on average) in the low infrastructure level with the reference prices. Such benefits are driven by the fact that the project allows Europe to connect to new supply sources through the Turkish region. These benefits are lower in the advanced infrastructure.

Additional benefits compared to the reference situation can be observed in the case of Southern supply Maximisation (313 Mln EUR/y in existing and 71 Mln EUR/y in low infrastructure level) and Russian supply Minimisation due to the new supply source diversification through Turkey. The maximum availability of gas through Turkey in ENTSG assessment is based on TYNDP supply potential and it is assumed to be 6 bcm in 2030, which can be redirected gas from Azerbaijan, Russia or LNG.

By observing the results under the tariffs sensitivities, reduction in the cost of gas supply can also be explained by savings in transportation costs thanks to the utilisation of this new alternative route. In case of higher tariffs, the sensitivity analysis tables show in fact lower benefits (68 Mln EUR/y in existing infrastructure level). Under these circumstances, in the low infrastructure and advanced infrastructure levels, the project group brings benefits only with a Russian supply minimisation and a Southern gas supply maximisation.

The project group has a positive impact (Marginal Price smaller) in Bosnia, Hungary, Serbia and Slovenia but a negative impact on the MP in Bulgaria and in some cases Greece. In Romania, depending on the scenarios, the impact can be positive or negative. In a scenario where the MP in Bulgaria, Romania & Hungary are close without the project, the project will decrease the MP of the three countries (but if Hungary is more expensive without the project, the MP of the three countries will become closer which means a higher MP for Bulgaria & Romania and a smaller one for Hungary).

The impact of the project group on the weighted convergence factor is not uniform. The value of the indicator decreases for most of the scenarios (price configurations & years) and infrastructure levels. It can also slightly increase when all the countries benefit from a lower marginal price (but keep their divergences).

## Sustainability benefits explained [ENTSOG]

In the yearly assessment, the projects group realisation enhances the replacement of more polluting fuels with natural gas, which enables fuel switch savings in Romania, Hungary and Bulgaria between 1.2-13.4 MEUR/y under existing infrastructure level and between 0.4-7.5 MEUR/y under low infrastructure level. The table below shows the related reduction in terms of CO<sub>2</sub>eq/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 CO<sub>2</sub>eq/y emissions (positive number indicate reduction in CO<sub>2</sub>eq/y emissions) is also displayed for the three simulation configurations that consider different level of tariffs for the project group.

Sustainability		EXISTING			LOW			ADVANCED		
CO <sub>2</sub> and Other externalities (KtCO <sub>2</sub> eq/y)	Reference	19 / 33	75 / 176	213 / 239	16 / 27	7 / 23	105 / 127	12 / 19	4 / 14	77 / 114
	Lower Tariff Sensitivity	19 / 33	150 / 176	213 / 239	19 / 30	42 / 47	160 / 162	16 / 22	56 / 75	145 / 148
	Higher Tariff Sensitivity	17 / 26	0 / 50	0 / 150	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0

The minimum and the maximum values displayed in the table above refer respectively to the CO<sub>2</sub>eq/y savings in case emissions from the additional gas demand increase not replacing other more polluting fuels are counted in the overall CO<sub>2</sub>eq 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.

The realisation of the project group will enhance gas diversification and reduction of gas prices in South-Eastern Europe which will enable new development of gas consumption in sectors like power or transport and have an impact on the reduction of CO<sub>2</sub> emissions.

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. Benefits are significantly reduced in case of high tariffs sensitivity due to the lower utilisation of the assessed project group under both existing and low infrastructure levels.

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\_08, such benefits represent more than 80% 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]

No additional benefits were provided by promoters.



## 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					
		2030			2040		
		NT	NT	NT	NT	NT	NT
Row Labels		WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA
<b>Competition</b>							
Commercial Supply Access (CSA)							
	Bosnia Herzegovina	2	4	2	2	3	1
	Bulgaria	2	4	2			
	Croatia	2	4	2	2	3	1
	Hungary	3	4	1			
	North Noth Macedonia	2	4	2			
	Romania	2	4	2	2	3	1
	Serbia	2	4	2	2	3	1
	Slovakia	2	3	1	2	3	1
	Slovenia				2	3	1
LNG and Interconnection Capacity Diversification (LICD)							
	Bulgaria	10,000	7,002	-2,998	10,000	6,956	-3,044
	Hungary	4,532	3,441	-1,091	4,532	3,193	-1,339
	Romania	5,536	4,963	-573	5,536	4,963	-573
MASD-RU							
	Austria	43%	38%	-5%	45%	41%	-4%
	Bosnia Herzegovina	43%	39%	-4%	45%	41%	-4%
	Croatia	43%	39%	-4%	45%	41%	-4%
	Hungary	43%	39%	-4%	45%	41%	-4%
	Romania	43%	38%	-5%	55%	41%	-14%
	Serbia	43%	39%	-4%	45%	41%	-4%
	Slovakia	43%	39%	-4%	45%	41%	-4%
	Slovenia	43%	39%	-4%	45%	41%	-4%
<b>Security of Supply</b>							
Remaining Flexibility 2-Week Cold Spell (%)							
	Romania	62%	89%	27%	34%	58%	25%
Remaining Flexibility 2-Week Cold Spell (%) --- DF							
	Romania	54%	80%	26%	32%	56%	24%
Remaining Flexibility Peak day (%)							
	Romania	32%	54%	22%	14%	35%	21%
Single Largest Infrastructure Disruption (SLID)-Romania							
	Romania	5%	0%	-5%	21%	0%	-21%
Ukraine Disruption Curtailment Rate 2-Week Cold Spell (%)							
	Romania	-6%	0%	6%	-28%	-3%	25%
Ukraine Disruption Curtailment Rate 2-Week Cold Spell (%) --- DF							
	Romania	-10%	0%	10%	-29%	-4%	24%
Ukraine Disruption Curtailment Rate Peak Day (%)							
	Romania	-22%	0%	22%	-38%	-17%	21%



# LOW Infrastructure Level – National Trends

Sum of Value		Column Labels					
		2030			2040		
		NT			NT		
Row Labels		WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA
Competition							
Commercial Supply Access (CSA)							
	Bosnia Herzegovina	3	4	1			
	Bulgaria	2	4	2	2	3	1
	Croatia	3	4	1			
	Greece	2	4	2	2	3	1
	Hungary	3	4	1			
	North Noth Macedonia	2	3	1			
	Romania	3	4	1	2	3	1
	Serbia	3	4	1			
LNG and Interconnection Capacity Diversification (LICD)							
	Bulgaria	5,724	4,626	-1,098	5,724	4,581	-1,143
	Hungary	3,044	2,682	-362	3,044	2,440	-604
	Romania	5,536	4,963	-573	5,536	4,963	-573
MASD-RU							
	Croatia	29%	16%	-13%	29%	26%	-3%
	Hungary	30%	17%	-13%	30%	26%	-4%
	Romania	30%	17%	-13%	49%	26%	-23%
	Slovakia				30%	27%	-3%
	Slovenia	29%	22%	-7%			
Security of Supply							
Remaining Flexibility 2-Week Cold Spell (%)							
	Romania	80%	100%	20%	44%	69%	25%
Remaining Flexibility 2-Week Cold Spell (%) --- DF							
	Romania	71%	97%	26%	42%	67%	24%
Remaining Flexibility Peak day (%)							
	Romania	47%	69%	22%	24%	44%	21%
Single Largest Infrastructure Disruption (SLID)-Romania							
	Romania				12%	0%	-12%
Ukraine Disruption Curtailment Rate 2-Week Cold Spell (%)							
	Romania				-17%	0%	17%
Ukraine Disruption Curtailment Rate 2-Week Cold Spell (%) --- DF							
	Romania				-18%	0%	18%
Ukraine Disruption Curtailment Rate Peak Day (%)							
	Romania	-7%	0%	7%	-28%	-7%	21%

ADVANCED Infrastructure Level – National Trends

Sum of Value		Column Labels					
		2030			2040		
		NT			NT		
Row Labels		WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA
Competition							
LNG and Interconnection Capacity Diversification (LICD)							
	Bulgaria	5,724	4,626	-1,098	5,724	4,581	-1,143
	Hungary	2,754	2,405	-350	2,754	2,221	-533
	Romania	4,783	3,394	-1,389	4,783	3,394	-1,389
Security of Supply							
Remaining Flexibility 2-Week Cold Spell (%)							
	Romania				71%	97%	25%
Remaining Flexibility 2-Week Cold Spell (%) --- DF							
	Romania				69%	94%	25%
Remaining Flexibility Peak day (%)							
	Romania	83%	100%	17%	47%	68%	21%
Ukraine Disruption Curtailment Rate Peak Day (%)							
	Romania				-5%	0%	5%

EXISTING Infrastructure Level – **Distributed Energy**

Sum of Value		Column Labels					
		2030			2040		
		DE			DE		
Row Labels		WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA
<b>Competition</b>							
Commercial Supply Access (CSA)							
	Bosnia Herzegovina	2	4	2			
	Bulgaria	3	4	1	3	4	1
	Croatia	2	4	2			
	Hungary	2	4	2			
	Romania	2	4	2	2	4	2
	Serbia	2	4	2			
LNG and Interconnection Capacity Diversification (LICD)							
	Bulgaria	10,000	6,718	-3,282	10,000	6,850	-3,150
	Hungary	4,532	3,256	-1,276	4,532	3,181	-1,351
	Romania	5,536	4,963	-573	5,536	4,963	-573
MASD-RU							
	Bosnia Herzegovina	42%	23%	-19%	23%	5%	-18%
	Croatia	42%	23%	-19%	23%	5%	-18%
	Hungary	42%	23%	-19%	23%	5%	-19%
	Serbia	42%	23%	-19%	23%	5%	-18%
	Slovakia	42%	39%	-3%	23%	18%	-5%
	Slovenia	42%	24%	-18%	23%	5%	-18%
<b>Security of Supply</b>							
Remaining Flexibility 2-Week Cold Spell (%) --- DF							
	Romania				72%	100%	28%
Remaining Flexibility Peak day (%)							
	Romania	85%	100%	15%	68%	95%	27%
Ukraine Disruption Curtailment Rate 2-Week Cold Spell (%) --- DF							
	Romania				-2%	0%	2%

LOW Infrastructure Level – Distributed Energy

Sum of Value		Column Labels					
		2030			2040		
		DE			DE		
Row Labels		WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA
Competition							
LNG and Interconnection Capacity Diversification (LICD)							
	Bulgaria	5,724	4,365	-1,359	5,724	4,482	-1,242
	Hungary	3,044	2,504	-540	3,044	2,428	-616
	Romania	5,536	4,963	-573	5,536	4,963	-573
MASD-RU							
	Bosnia Herzegovina	16%	12%	-4%			
	Bulgaria	15%	12%	-3%			
	Croatia	17%	12%	-5%			
	Hungary	28%	12%	-16%	7%	0%	-7%
	North Noth Macedonia	16%	13%	-3%			
	Romania	16%	12%	-4%	6%	0%	-6%
	Serbia	15%	12%	-4%			
	Slovenia	17%	13%	-4%			
Security of Supply							
Remaining Flexibility 2-Week Cold Spell (%) --- DF							
	Romania				85%	100%	15%
Remaining Flexibility Peak day (%)							
	Romania				80%	100%	20%

ADVANCED Infrastructure Level – Distributed Energy

Sum of Value		Column Labels					
		2030			2040		
		DE			DE		
Row Labels		WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA
Competition							
Commercial Supply Access (CSA)							
	Bosnia Herzegovina				4	5	1
	Croatia				4	5	1
	Hungary				4	5	1
	Romania				4	5	1
	Serbia				4	5	1
LNG and Interconnection Capacity Diversification (LICD)							
	Bulgaria	5,724	4,365	-1,359	5,724	4,482	-1,242
	Hungary	2,754	2,268	-487	2,754	2,213	-542
	Romania	4,783	3,394	-1,389	4,783	3,394	-1,389

EXISTING Infrastructure Level – Global Ambition

Sum of Value		Column Labels					
		2030			2040		
		GA			GA		
Row Labels		WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA
Competition							
Commercial Supply Access (CSA)							
	Bosnia Herzegovina	2	4	2	2	4	2
	Bulgaria	3	4	1			
	Croatia	2	4	2	2	4	2
	Hungary	2	4	2	2	4	2
	North Noth Macedonia	2	3	1	2	3	1
	Romania	2	4	2	2	4	2
	Serbia	2	4	2	2	4	2
	Slovakia	2	3	1			
LNG and Interconnection Capacity Diversification (LICD)							
	Bulgaria	10,000	6,751	-3,249	10,000	6,834	-3,166
	Hungary	4,532	3,258	-1,274	4,532	3,200	-1,332
	Romania	5,536	4,963	-573	5,536	4,963	-573
MASD-RU							
	Bosnia Herzegovina	48%	28%	-20%	42%	25%	-17%
	Croatia	47%	28%	-19%	42%	24%	-18%
	Hungary	47%	28%	-20%	42%	24%	-18%
	Romania				31%	24%	-7%
	Serbia	48%	28%	-20%	42%	25%	-17%
	Slovenia	47%	28%	-19%	42%	25%	-17%
Security of Supply							
Remaining Flexibility 2-Week Cold Spell (%)							
	Romania	90%	100%	10%	90%	100%	10%
Remaining Flexibility 2-Week Cold Spell (%) --- DF							
	Romania	88%	100%	12%	76%	100%	24%
Remaining Flexibility Peak day (%)							
	Romania	72%	99%	27%	65%	95%	30%
Ukraine Disruption Curtailment Rate Peak Day (%)							
	Romania				-4%	0%	4%

LOW Infrastructure Level – Global Ambition

Sum of Value		Column Labels					
		2030			2040		
		GA			GA		
Row Labels		WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA
Competition							
Commercial Supply Access (CSA)							
	Bulgaria	3	4	1			
	Greece	3	4	1	3	4	1
	North Noth Macedonia	3	4	1			
	Romania	3	4	1			
LNG and Interconnection Capacity Diversification (LICD)							
	Bulgaria	5,724	4,394	-1,331	5,724	4,467	-1,257
	Hungary	3,044	2,506	-538	3,044	2,447	-596
	Romania	5,536	4,963	-573	5,536	4,963	-573
MASD-RU							
	Bosnia Herzegovina	27%	23%	-4%			
	Bulgaria	26%	23%	-3%			
	Croatia	30%	23%	-7%	23%	6%	-17%
	Hungary	32%	23%	-9%	26%	6%	-20%
	North Noth Macedonia	27%	23%	-4%			
	Romania	27%	23%	-4%	26%	6%	-20%
	Serbia	26%	23%	-3%			
	Slovenia	29%	23%	-6%	23%	15%	-9%
Security of Supply							
Remaining Flexibility 2-Week Cold Spell (%) --- DF							
	Romania				90%	100%	10%
Remaining Flexibility Peak day (%)							
	Romania	91%	100%	9%	79%	100%	21%



ADVANCED Infrastructure Level – Global Ambition

Sum of Value		Column Labels						
		2030			2040			
		GA			GA			
Row Labels		WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA	
Competition								
LNG and Interconnection Capacity Diversification (LICD)								
	Bulgaria	5,724	4,394	-1,331	5,724	4,467	-1,257	
	Hungary	2,754	2,269	-485	2,754	2,227	-528	
	Romania	4,783	3,394	-1,389	4,783	3,394	-1,389	

### C.3 Monetised benefits [ENTSOG]

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 ENTSG 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 AMBIITION	NATIONAL TRENDS	DISTRIBUTED ENERGY	GLOBAL AMBIITION	NATIONAL TRENDS	DISTRIBUTED ENERGY	GLOBAL AMBIITION
EU Bill benefits	Reference Supply	209.5	165.1	209.6	30.1	2.0	20.9	14.8	0.0	9.2
With Tariffs	Supply Maximization	313.0	268.4	313.0	83.2	40.5	71.4	50.0	23.1	39.5
Security of Supply	Design Case	7.3	0.0	0.4	5.1	0.0	2.0	0.8	0.0	0.0
	2-weeks Cold Spell	41.4	0.0	0.0	33.0	0.0	0.0	0.0	0.0	0.0
	2-weeks Cold Spell DF	45.7	3.1	0.6	35.4	0.0	0.0	0.0	0.0	0.0
Sustainability	CO2 and Other externalities savings	1.2 / 1.9	4.7 / 13.4	12.8 / 14.1	1 / 1.6	0.4 / 1.4	6 / 7.5	0.8 / 1.1	0.3 / 1.2	4.9 / 6.9
	Additional benefit (Promoter)	0	0	0	0	0	0	0	0	0

## Comparison between the assessed SCENARIOS

ENTSOE 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	0.0	0.0	0.0	0.0	0.0	0.0
Security of Supply	Design Case	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	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	0/0	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	0.0	0.0	0.0	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	215.9	209.9	227.6	29.2	6.7	29.7	5.4	0.0	5.1	219.8	147.2	212.2	36.7	0.0	20.7	22.0	0.1	12.5
	Supply Maximization	323.7	317.6	335.4	88.5	60.5	87.2	30.2	18.7	27.3	327.6	254.7	319.9	97.6	38.6	78.0	66.5	27.5	50.2
Security of Supply	Design Case	5.5	0.0	0.0	1.4	0.0	5.2	0.0	0.0	0.0	9.0	0.0	0.6	7.0	0.0	0.0	1.1	0.0	0.0
	2-weeks Cold Spell	12.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	63.0	0.0	0.0	43.4	0.0	0.0	0.0	0.0	0.0
	2-weeks Cold Spell DF	24.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	63.0	4.1	0.8	46.6	0.0	0.0	0.0	0.0	0.0
Sustainability	CO2 and Other externalities savings	0/1	11/15	12/15	0/1	1/4	7/8	0/1	0/0	3/6	2/2	1/13	14/14	2/2	0/0	6/8	1/2	0/2	6/8
	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	0.0	0.0	0.0	0.0	0.0	0.0

## C.4 Sensitivities analysis on monetised benefits [ENTSOG]

In line with ENTSG Adapted 2nd CBA Methodology, ENTSG 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. Independently from the source of the input as described in C3 (ENTSG or Promoter), the sensitivity analysis has been carried out by ENTSG and according to the criteria in the approved CBA Methodology.

[illegible]

## D. Environmental Impact [Promoter]

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

Potential impact	Mitigation measures	Related costs included in project CAPEX and OPEX	Additional expected costs

### Environmental Impact explained [Promoter]

Environmental impact assessments for the projects have not indicated any substantial and irreversible impacts on the environment. In order to ensure that environmental assessments are correct, environmental monitoring is carried out before, during and after the construction of the infrastructure.

## 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 ENTSG and this condition needs to be proved and justified.

### Other benefits explained

The project is scalable and the final technical capacity can be adjusted to the market demand. Project can help in the transition to the carbon neutral economies, mitigation of the air pollution impacts in the region and will be ready to support transport of H2 local production.

## F. Useful Links

The project website: <https://www.eastring.eu/>

Network Development Plan:

[https://www.bulgartransgaz.bg/files/useruploads/files/amd/TYNDP\\_2020\\_ENG.pdf](https://www.bulgartransgaz.bg/files/useruploads/files/amd/TYNDP_2020_ENG.pdf)

[https://fgsz.hu/file/documents/1/1743/2020\\_07\\_09\\_ten\\_year\\_network\\_development\\_plan.pdf](https://fgsz.hu/file/documents/1/1743/2020_07_09_ten_year_network_development_plan.pdf)

<https://www.transgaz.ro/sites/default/files/uploads/users/admin/Plan%20dezvoltare%202019%20-%202028.pdf>