

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

## Project Group EAST\_15 - North Bosnia-Croatia interconnection

### Reasons for grouping [ENTSO G]

The project group represents a new interconnection between Bosnia-Herzegovina and Croatia at IP Slobodnica- Bosanski Brod / Zenica and includes the two sides of the investment, as well as the enabler project from Croatian side (TRA-N-1057).

Enabler project TRA-N-1057 increases efficiency and flexibility of the Croatian transmission network, as well as enables new capacities in the interconnection Croatia- Bosnia (North).

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

Due to BiH dependence to a single route and source of gas supply, the existing gas pipeline system does not provide sufficient level of security of supply to existing consumers and does not allow future gas market development. Group implementation will provide new gas supply route for BiH, with a possibility of diversification of supply sources. Group will enhance SoS for BiH (current N-1 = 0). Group will enable natural gas supply to Oil Refinery Brod and other industrial and residential consumers along this route, as part of BiH with the highest population density.

Also, this Project Group will significantly contribute to diversification of entry/exit points of Croatian gas transmission system with neighbouring countries. Group is planned as bidirectional.



## 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-0066	Interconnection Croatia -Bosnia and Herzegovina (Slobodnica- Bosanski Brod)	Plinacro Ltd	HR	Less-Advanced	-	2025	2025	Delayed
TRA-N-0224	Gaspipeline Brod - Zenica	BH Gas d.o.o.	BA	Less-Advanced	-	2025	2025	Rescheduled
TRA-N-1057	Compressor stations 2 and 3 at the Croatian gas transmission system	Plinacro Ltd	HR	Less-Advanced	6.26.1.3	2029	2029	Rescheduled

## Technical Information

TYNDP Project Code	Diameter [mm]	Length [km]	Compressor Power [MW]
TRA-N-0066	700	6	-
TRA-N-0224	500	140	0
TRA-N-1057	-	-	20

## 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-N-224	Slobodnica-Bosanski Brod-Zenica	BH Gas d.o.o.	Transmission Bosnia Herzegovina	35	2025	Transmission Croatia	162	2025
TRA-N-66	Slobodnica-Bosanski Brod-Zenica	Plinacro Ltd	Transmission Croatia	162	2025	Transmission Bosnia Herzegovina	162	2025

## 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-N-1057	TRA-N-224	TRA-N-66	Total Cost
CAPEX [min, EUR]	-**	85	9	<b>94</b>
OPEX [min, EUR/y]	-**	1	0.01	<b>1.01</b>
Range CAPEX (%)	0	5	0	-
Range OPEX (%)	0	1	0	-

\*\* CAPEX and OPEX figures are confidential. In TYNDP 2020 project collection the project did not indicate intention to apply to PCI and it has been introduced in the project group only for capacity reason, therefore no alternative costs have been provided.

### Description of costs and range [Promoter]

**TRA-N-0066** Interconnection Croatia-Bosnia and Herzegovina (Slobodnica-Bosanski Brod)

**Description of CAPEX:** 100% of the CAPEX of the Interconnection Croatia-Bosnia and Herzegovina (Slobodnica-Bosanski Brod) refers to the costs of designing and engineering, civil works, assembly and installation works, material and equipment.

**Description of OPEX:** 100% of the cost refers to the operation and maintenance cost. There are no additional costs of own consumption (fuel gas) and labour cost.

CAPEX and OPEX represent best estimations available to project promoters at the moment of TYNDP 2018 call for projects (start of 2018).

**TRA-N-224:** Estimated CAPEX in the amount of 85 Mil EUR includes construction of the 140 km transmission pipeline (DN 500/75 bar). Data source: PFS Feb 2006. CAPEX range is estimated as 5% because of the age and maturity of available data. Once when FS and Preliminary Design will be developed, CAPEX data will be more accurate.

## 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 allows Croatia and Bosnia-Herzegovina to further cooperate, and in this way the project group **fully mitigates the risk of demand curtailment** in Bosnia- Herzegovina from 2030 under 2-weeks cold spell and 2-weeks dunkelflaute climatic stress conditions and reduces this risk for peak day. Additionally, the project group reduces the risk of demand curtailment in Serbia from 2030 for all climatic stress cases.

The situation improves in the low and advanced infrastructure levels, where the project group fully mitigates the risk of demand curtailment in Bosnia-Herzegovina under peak-day climatic stress case.

The project also provides additional **remaining flexibility** in Bosnia-Herzegovina up to the maximum level (100%) under 2-weeks and 2-weeks dunkelflaute climatic cases in the existing infrastructure level and for all climatic stress cases in the low and advanced levels.

Regarding disruptions of the largest infrastructure in the following countries:

In the case of **SLID-Bosnia-Herzegovina**, the project group reduces the risk of demand curtailment in Bosnia-Herzegovina in all infrastructure levels.

In the case of **SLID-Serbia**, the project group allows Croatia and Bosnia Herzegovina to cooperate and therefore reduces the risk of demand curtailment in Bosnia-Herzegovina in existing and low infrastructure levels. Besides, the project reduces the risk of demand curtailment in Serbia in the low infrastructure level.

###### > Competition:

The project group increases diversification of entry points (being a precondition for competition and arbitrage). The increase in the capacities in Bosnia Herzegovina and Croatia allows for a **further diversification of entry points**, leading to a lower LICD indicator in Bosnia Herzegovina and Croatia.

###### > Market integration:

The development of interconnection capacities with Croatia and consequently improvement of interconnection with the rest of Eastern countries, the project group allows Bosnia Herzegovina to benefit from a **slight decrease in its marginal prices**. This reduction is triggered by transmission tariffs savings with the use of a new and direct route between Croatia and Bosnia Herzegovina that allows these countries to reduce the use of more expensive routes. This is confirmed by the sensitivity on tariffs that shows high variation in the size of benefits depending on the level of tariffs (higher or lower compared to the reference one) considered for this new route. In case of higher tariffs, the sensitivity analysis tables show in fact no benefits while, on the contrary, in case of lower tariffs the benefits are higher. In monetary terms this can be translated in a **decrease of the overall cost of gas** by 0.5 MEUR/y (on average) in the existing infrastructure level in the reference situation. In the existing infrastructure level, benefits from supply cost savings are similar for all supply price configurations.

Additional benefits compared to the existing infrastructure can be observed in case of low and advanced infrastructure levels, not only for reference supply price configuration, but also in case of cheap Russian gas and expensive LNG (up to 3.2 MEUR/y in the advanced infrastructure level). Such benefits are mainly explained by tariffs savings by the utilisation of this new supply route that allows Bosnia for a more direct gas access through Croatia thanks to the FID and advanced-status projects commissioned in Croatia allowing Bosnia to access LNG.

Additionally, the project group establishes **bidirectionality between Croatia and Bosnia** with the creation of capacity between both countries at Slobodnica Bosanski Brod/Zenica IP.

## Distributed Energy

### Benefits explained (but Sustainability) [ENTSO G]

#### > Security of Supply:

The project group allows Croatia and Bosnia-Herzegovina to further cooperate, and in this way the project group **fully mitigates the risk of demand curtailment** in Bosnia- Herzegovina from 2030 under all climatic stress cases and **reduces the risk of demand curtailment** in Serbia from 2030 under all climatic stress cases.

The situation improves in the low and advanced infrastructure levels, where the project group fully mitigates the risk of demand curtailment in Bosnia-Herzegovina under peak-day climatic stress case.

The project also provides additional **remaining flexibility** in Bosnia-Herzegovina up to the maximum level (100%) under all climatic stress cases in all infrastructure levels.

Regarding disruptions of the largest infrastructure in the following countries:

In the case of **SLID-Bosnia-Herzegovina**, the project group reduces the risk of demand curtailment in Bosnia-Herzegovina in all infrastructure levels.

In the case of **SLID-Serbia**, the project group allows Croatia and Bosnia Herzegovina to cooperate and therefore reduces the risk of demand curtailment in Bosnia-Herzegovina in existing and low infrastructure levels. Besides, the project reduces the risk of demand curtailment in Serbia in the low infrastructure level.

#### > Competition:

Further reducing the LICD indicator value, the project group **contributes to the diversification of entry points** in Bosnia-Herzegovina and Croatia.

#### > Market integration:

The development of interconnection capacities with Croatia and consequently improvement of interconnection with the rest of Eastern countries, the project group allows Bosnia Herzegovina to benefit from a **slight decrease in its marginal prices**. This reduction is triggered by transmission tariffs savings by creating a new and direct route between Croatia and Bosnia Herzegovina that allows the countries to reduce the use of more expensive routes. This is confirmed by the sensitivity on tariffs that shows high variation in the size of benefits depending on the level of tariffs (higher or lower compared to the reference one) considered for this new route. In case of higher tariffs, the sensitivity analysis tables show in fact no benefits while, on the contrary, in case of lower tariffs the benefits are higher. In monetary terms this can be translated in a decrease of the overall cost of gas by 1.4 MEUR/y (on average) in the existing infrastructure level in the reference situation. In this infrastructure level, benefits from supply cost savings are similar for all supply price configurations.

Additional benefits compared to the existing infrastructure can be observed in case of low and advanced infrastructure levels, not only for reference supply price configuration, but also in case of cheap Russian gas and expensive LNG (up to 5.2 MEUR/y in the low infrastructure level). Such benefits are mainly explained by tariffs savings by the utilisation of this new supply route that allows Bosnia for a more direct gas access through Croatia thanks to the FID and advanced-status projects commissioned in Croatia allowing Bosnia and Serbia to access LNG. These benefits for both low and advanced infrastructure levels are higher in the Distributed Energy demand scenario when compared with National Trends as with lower gas demand and higher indigenous production from renewables gases more cheap supply is available.

The project group establishes **bidirectionality between Croatia and Bosnia** with the creation of capacity between both countries at SlobodnicaBosanski Brod/Zenica IP.

## Global Ambition

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

#### > Security of Supply:

The project group allows Croatia and Bosnia-Herzegovina to further cooperate, and in this way the project group **fully mitigates the risk of demand curtailment** in Bosnia- Herzegovina from 2030 under all climatic stress cases and **reduces the risk of demand curtailment** in Serbia from 2030 under all climatic stress cases.

The situation improves in the low and advanced infrastructure levels, where the project group fully mitigates the risk of demand curtailment in Bosnia-Herzegovina from 2030 only under peak-day climatic stress case.

The project also provides additional **remaining flexibility** in Bosnia-Herzegovina up to the maximum level (100%) under all climatic stress cases in all infrastructure levels.

Regarding disruptions of the largest infrastructure in the following countries:

In the case of **SLID-Bosnia-Herzegovina**, the project group reduces the risk of demand curtailment in Bosnia-Herzegovina in all infrastructure levels.

In the case of **SLID-Serbia**, the project group allows Croatia and Bosnia Herzegovina to cooperate and therefore reduces the risk of demand curtailment in Bosnia-Herzegovina in existing and low infrastructure levels. Besides, the project reduces the risk of demand curtailment in Serbia in the low infrastructure level.

#### > Competition:

The project group **reduces the dependence from Russian gas** for Croatia and Slovenia from 2030 in Low infrastructure level thanks to the increased cooperation in the area provided by the project group and by the project increasing capacity between Hungary and Croatia.

Further reducing the LICD indicator value, the project group **contributes to the diversification of entry points** in Bosnia Herzegovina and Croatia.

#### > Market integration:

The development of further interconnection with the rest of Eastern countries allows Bosnia Herzegovina to **benefit from a slightly decrease in its marginal prices**. This reduction is triggered by transmission tariffs savings by creating a new and direct route between Croatia and Bosnia Herzegovina that allows the countries to reduce the use of more expensive routes (based on the reference tariffs used). This is confirmed by the sensitivity on tariffs that shows high variation in the size of benefits depending on the level of tariffs (higher or lower compared to the reference one) considered for this new route. In case of higher tariffs, the sensitivity analysis tables show in fact no benefits while, on the contrary, in case of lower tariffs the benefits are higher. In monetary terms this can be translated in a decrease of the overall cost of gas by 0.5 MEUR/y (on average) in the existing infrastructure level under reference supply configuration. Benefits from supply cost savings are similar for all supply price configurations in the existing infrastructure level.

Additional benefits compared to the existing infrastructure can be observed in case of low and advanced infrastructure levels, not only for reference supply price configuration, but also in case of cheap Russian gas and expensive LNG (up to 4.1 MEUR/y in the low infrastructure level). Such benefits are mainly explained by tariffs savings by the utilisation of this new supply route that allows Bosnia for a more direct gas access through Croatia thanks to the FID and advanced-status projects commissioned in Croatia allowing Bosnia to access LNG. These benefits for both low and advanced infrastructure levels are slightly higher in Global Ambition demand scenario when compared with National Trends as with lower gas demand and higher indigenous production from renewables gases more cheap supply is available.

The project group establishes **bidirectionality between Croatia and Bosnia** with the creation of capacity between both countries at Slobodnica - Bosanski Brod/Zenica IP.

### Sustainability benefits explained [ENTSOG]

Project groups EAST\_15 does not show significant benefits from fuel switch under flow-based allocation.

### 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		
Row Labels		NT			NT		
		WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA
<b>Competition</b>							
<b>LNG and Interconnection Capacity Diversification (LICD)</b>							
	Bosnia Herzegovina	10,000	5,000	-5,000	10,000	5,000	-5,000
	Croatia	5,137	3,632	-1,505	5,110	3,603	-1,507
<b>Security of Supply</b>							
<b>Curtailment Rate 2-Week Cold Spell (%)</b>							
	Bosnia Herzegovina	-18%	0%	18%	-14%	0%	14%
	Serbia	-18%	-14%	4%	-13%	-8%	5%
<b>Curtailment Rate 2-Week Cold Spell (%) --- DF</b>							
	Bosnia Herzegovina	-18%	0%	18%	-14%	0%	14%
	Serbia	-18%	-14%	4%	-13%	-8%	6%
<b>Curtailment Rate Peak Day (%)</b>							
	Bosnia Herzegovina	-36%	-4%	32%	-41%	-4%	37%
	Serbia	-34%	-27%	7%	-36%	-28%	8%
<b>Remaining Flexibility 2-Week Cold Spell (%)</b>							
	Bosnia Herzegovina	0%	100%	100%	0%	100%	100%
<b>Remaining Flexibility 2-Week Cold Spell (%) --- DF</b>							
	Bosnia Herzegovina	0%	100%	100%	0%	100%	100%
<b>Single Largest Infrastructure Disruption (SLID)-Bosnia Herzegovina</b>							
	Bosnia Herzegovina	100%	36%	-64%	100%	41%	-59%
<b>Single Largest Infrastructure Disruption (SLID)-Serbia</b>							
	Bosnia Herzegovina	90%	4%	-86%	90%	4%	-86%
<b>Market Integration</b>							
<b>Bi-directionality - Country</b>							
	BA <=> HR	0%	22%	22%	0%	22%	22%

LOW Infrastructure Level – National Trends

Sum of Value		Column Labels					
		2030			2040		
Row Labels		NT			NT		
		WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA
<b>Competition</b>							
<b>LNG and Interconnection Capacity Diversification (LICD)</b>							
	Bosnia Herzegovina	10,000	5,000	-5,000	10,000	5,000	-5,000
	Croatia	3,406	2,696	-711	3,393	2,676	-716
<b>Security of Supply</b>							
<b>Curtailment Rate Peak Day (%)</b>							
	Bosnia Herzegovina	-27%	0%	27%	-41%	0%	41%
<b>Remaining Flexibility 2-Week Cold Spell (%)</b>							
	Bosnia Herzegovina				54%	100%	46%
	Croatia	73%	80%	6%	72%	76%	4%
<b>Remaining Flexibility 2-Week Cold Spell (%) --- DF</b>							
	Bosnia Herzegovina				47%	100%	53%
	Croatia	63%	69%	6%	68%	71%	4%
<b>Remaining Flexibility Peak day (%)</b>							
	Bosnia Herzegovina	0%	100%	100%	0%	100%	100%
<b>Single Largest Infrastructure Disruption (SLID)-Bosnia Herzegovina</b>							
	Bosnia Herzegovina	100%	27%	-73%	100%	41%	-59%
<b>Single Largest Infrastructure Disruption (SLID)-Serbia</b>							
	Bosnia Herzegovina	28%	0%	-28%	41%	0%	-41%
	Serbia	27%	19%	-7%	28%	20%	-8%
<b>Market Integration</b>							
<b>Bi-directionality - Country</b>							
	BA <=> HR	0%	22%	22%	0%	22%	22%

ADVANCED Infrastructure Level – National Trends

Sum of Value	Row Labels	Column Labels					
		2030			2040		
		NT	WITH	DELTA	NT	WITH	DELTA
		WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA
<b>Competition</b>							
	<b>LNG and Interconnection Capacity Diversification (LICD)</b>						
	Bosnia Herzegovina	10,000	5,000	-5,000	10,000	5,000	-5,000
	Croatia	2,566	2,132	-434	2,553	2,118	-435
<b>Security of Supply</b>							
	<b>Curtailment Rate Peak Day (%)</b>						
	Bosnia Herzegovina	-27%	0%	27%	-41%	0%	41%
	<b>Remaining Flexibility 2-Week Cold Spell (%)</b>						
	Bosnia Herzegovina				54%	100%	46%
	<b>Remaining Flexibility 2-Week Cold Spell (%) --- DF</b>						
	Bosnia Herzegovina				47%	100%	53%
	Croatia	96%	100%	4%			
	<b>Remaining Flexibility Peak day (%)</b>						
	Bosnia Herzegovina	0%	100%	100%	0%	100%	100%
	<b>Single Largest Infrastructure Disruption (SLID)-Bosnia Herzegovina</b>						
	Bosnia Herzegovina	100%	27%	-73%	100%	41%	-59%
<b>Market Integration</b>							
	<b>Bi-directionality - Country</b>						
	BA <=> HR	0%	22%	22%	0%	22%	22%

EXISTING Infrastructure Level – Distributed Energy

Sum of Value		Column Labels					
		2030			2040		
Row Labels		DE			DE		
		WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA
<b>Competition</b>							
LNG and Interconnection Capacity Diversification (LICD)							
	Bosnia Herzegovina	10,000	5,000	-5,000	10,000	5,000	-5,000
	Croatia	5,002	3,458	-1,543	5,000	3,406	-1,594
<b>Security of Supply</b>							
Curtailment Rate 2-Week Cold Spell (%)							
	Bosnia Herzegovina	-18%	0%	18%	-20%	0%	20%
	Serbia	-17%	-13%	4%	-19%	-15%	5%
Curtailment Rate 2-Week Cold Spell (%) --- DF							
	Bosnia Herzegovina	-18%	0%	18%	-20%	0%	20%
	Serbia	-17%	-13%	4%	-19%	-15%	5%
Curtailment Rate Peak Day (%)							
	Bosnia Herzegovina	-36%	0%	36%	-41%	0%	41%
	Serbia	-34%	-27%	7%	-36%	-28%	8%
Remaining Flexibility 2-Week Cold Spell (%)							
	Bosnia Herzegovina	0%	100%	100%	0%	100%	100%
Remaining Flexibility 2-Week Cold Spell (%) --- DF							
	Bosnia Herzegovina	0%	100%	100%	0%	100%	100%
Remaining Flexibility Peak day (%)							
	Bosnia Herzegovina	0%	100%	100%	0%	100%	100%
Single Largest Infrastructure Disruption (SLID)-Bosnia Herzegovina							
	Bosnia Herzegovina	100%	36%	-64%	100%	41%	-59%
Single Largest Infrastructure Disruption (SLID)-Serbia							
	Bosnia Herzegovina	90%	0%	-90%	90%	0%	-90%
<b>Market Integration</b>							
Bi-directionality - Country							
	BA <=> HR	0%	22%	22%	0%	22%	22%

LOW Infrastructure Level – Distributed Energy

Sum of Value		Column Labels					
		2030			2040		
Row Labels		DE			DE		
		WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA
<b>Competition</b>							
LNG and Interconnection Capacity Diversification (LICD)							
	Bosnia Herzegovina	10,000	5,000	-5,000	10,000	5,000	-5,000
	Croatia	3,334	2,576	-759	3,333	2,544	-789
<b>Security of Supply</b>							
Curtailment Rate Peak Day (%)							
	Bosnia Herzegovina	-27%	0%	27%	-41%	0%	41%
Remaining Flexibility 2-Week Cold Spell (%)							
	Bosnia Herzegovina				54%	100%	46%
Remaining Flexibility 2-Week Cold Spell (%) --- DF							
	Bosnia Herzegovina				47%	100%	53%
Remaining Flexibility Peak day (%)							
	Bosnia Herzegovina	0%	100%	100%	0%	100%	100%
Single Largest Infrastructure Disruption (SLID)-Bosnia Herzegovina							
	Bosnia Herzegovina	100%	27%	-73%	100%	41%	-59%
Single Largest Infrastructure Disruption (SLID)-Serbia							
	Bosnia Herzegovina	28%	0%	-28%	41%	0%	-41%
	Serbia	27%	19%	-7%	28%	20%	-8%
<b>Market Integration</b>							
Bi-directionality - Country							
	BA <=> HR	0%	22%	22%	0%	22%	22%

ADVANCED Infrastructure Level – Distributed Energy

Sum of Value	Column Labels	2030						2040		
		DE			DE			DE		
		WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA
Row Labels										
<b>Competition</b>										
LNG and Interconnection Capacity Diversification (LICD)										
	Bosnia Herzegovina	10,000	5,000	-5,000	10,000	5,000	-5,000			
	Croatia	2,501	2,049	-451	2,500	2,029	-471			
<b>Security of Supply</b>										
Curtailment Rate Peak Day (%)										
	Bosnia Herzegovina	-27%	0%	27%	-41%	0%	41%			
Remaining Flexibility 2-Week Cold Spell (%)										
	Bosnia Herzegovina				54%	100%	46%			
Remaining Flexibility 2-Week Cold Spell (%) --- DF										
	Bosnia Herzegovina				47%	100%	53%			
Remaining Flexibility Peak day (%)										
	Bosnia Herzegovina	0%	100%	100%	0%	100%	100%			
Single Largest Infrastructure Disruption (SLID)-Bosnia Herzegovina										
	Bosnia Herzegovina	100%	27%	-73%	100%	41%	-59%			
<b>Market Integration</b>										
Bi-directionality - Country										
	BA <=> HR	0%	22%	22%	0%	22%	22%			

EXISTING Infrastructure Level – Global Ambition

Sum of Value		Column Labels					
		2030			2040		
Row Labels		GA			GA		
		WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA
<b>Competition</b>							
Commercial Supply Access (CSA)							
	Slovenia				2	3	1
LNG and Interconnection Capacity Diversification (LICD)							
	Bosnia Herzegovina	10,000	5,000	-5,000	10,000	5,000	-5,000
	Croatia	5,005	3,468	-1,537	5,000	3,453	-1,547
<b>Security of Supply</b>							
Curtailment Rate 2-Week Cold Spell (%)							
	Bosnia Herzegovina	-24%	0%	24%	-26%	0%	26%
	Serbia	-23%	-19%	3%	-25%	-21%	4%
Curtailment Rate 2-Week Cold Spell (%) --- DF							
	Bosnia Herzegovina	-24%	0%	24%	-26%	0%	26%
	Serbia	-23%	-19%	3%	-25%	-21%	4%
Curtailment Rate Peak Day (%)							
	Bosnia Herzegovina	-36%	0%	36%	-41%	0%	41%
	Serbia	-34%	-27%	7%	-36%	-28%	8%
Remaining Flexibility 2-Week Cold Spell (%)							
	Bosnia Herzegovina	0%	100%	100%	0%	100%	100%
Remaining Flexibility 2-Week Cold Spell (%) --- DF							
	Bosnia Herzegovina	0%	100%	100%	0%	100%	100%
Remaining Flexibility Peak day (%)							
	Bosnia Herzegovina	0%	100%	100%	0%	100%	100%
Single Largest Infrastructure Disruption (SLID)-Bosnia Herzegovina							
	Bosnia Herzegovina	100%	36%	-64%	100%	41%	-59%
Single Largest Infrastructure Disruption (SLID)-Serbia							
	Bosnia Herzegovina	90%	0%	-90%	90%	0%	-90%
<b>Market Integration</b>							
Bi-directionality - Country							
	BA <=> HR	0%	22%	22%	0%	22%	22%

LOW Infrastructure Level – Global Ambition

Sum of Value		Column Labels					
		2030			2040		
Row Labels		GA			GA		
		WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA
<b>Competition</b>							
LNG and Interconnection Capacity Diversification (LICD)							
	Bosnia Herzegovina	10,000	5,000	-5,000	10,000	5,000	-5,000
	Croatia	3,336	2,583	-753	3,334	2,572	-762
MASD-RU							
	Croatia	30%	27%	-3%	23%	13%	-10%
	Slovenia				23%	17%	-6%
<b>Security of Supply</b>							
Curtailment Rate Peak Day (%)							
	Bosnia Herzegovina	-27%	0%	27%	-41%	0%	41%
Remaining Flexibility 2-Week Cold Spell (%)							
	Bosnia Herzegovina				54%	100%	46%
Remaining Flexibility 2-Week Cold Spell (%) --- DF							
	Bosnia Herzegovina				47%	100%	53%
Remaining Flexibility Peak day (%)							
	Belgium	53%	55%	1%			
	Bosnia Herzegovina	0%	100%	100%	0%	100%	100%
Single Largest Infrastructure Disruption (SLID)-Bosnia Herzegovina							
	Bosnia Herzegovina	100%	27%	-73%	100%	41%	-59%
Single Largest Infrastructure Disruption (SLID)-Serbia							
	Bosnia Herzegovina	28%	0%	-28%	41%	0%	-41%
	Serbia	27%	19%	-7%	28%	20%	-8%
<b>Market Integration</b>							
Bi-directionality - Country							
	BA <=> HR	0%	22%	22%	0%	22%	22%

ADVANCED Infrastructure Level – Global Ambition

Sum of Value		Column Labels					
		2030			2040		
Row Labels		GA			GA		
		WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA
<b>Competition</b>							
LNG and Interconnection Capacity Diversification (LICD)							
	Bosnia Herzegovina	10,000	5,000	-5,000	10,000	5,000	-5,000
	Croatia	2,502	2,053	-449	2,500	2,047	-453
<b>Security of Supply</b>							
Curtailment Rate Peak Day (%)							
	Bosnia Herzegovina	-27%	0%	27%	-41%	0%	41%
Remaining Flexibility 2-Week Cold Spell (%)							
	Bosnia Herzegovina				54%	100%	46%
Remaining Flexibility 2-Week Cold Spell (%) --- DF							
	Bosnia Herzegovina				47%	100%	53%
Remaining Flexibility Peak day (%)							
	Bosnia Herzegovina	0%	100%	100%	0%	100%	100%
Single Largest Infrastructure Disruption (SLID)-Bosnia Herzegovina							
	Bosnia Herzegovina	100%	27%	-73%	100%	41%	-59%
<b>Market Integration</b>							
Bi-directionality - Country							
	BA <=> HR	0%	22%	22%	0%	22%	22%

### 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 ENTSOG and are labelled as “(Promoter)”. More information on how to read the data in this section is provided in the Introduction Document.

Benefits (Meur/year)		EXISTING			LOW			ADVANCED		
		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	0.5	1.4	0.5	1.6	4.1	4.0	2.8	4.4	4.0
	Supply Maximization	0.5	1.5	0.7	2.1	5.2	4.1	3.2	4.7	4.3
Security of Supply	Design Case	1.2	1.6	1.6	1.1	1.1	1.1	0.8	0.8	0.8
	2-weeks Cold Spell	4.2	4.2	4.2	0.0	0.0	0.0	0.0	0.0	0.0
	2-weeks Cold Spell DF	4.4	4.4	4.4	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
	Additional benefit (Promoter)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Gasification Benefits	Fuel Switch	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7

## 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	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	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0
Gasification 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	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	0.4	0.4	0.4	2.8	3.5	3.4	3.6	3.7	3.7	0.5	2.1	0.6	1.3	5.4	5.1	2.9	5.6	5.0
	Supply Maximization	0.4	0.4	0.4	3.2	4.7	4.0	3.6	3.7	3.7	0.6	2.3	0.9	2.0	6.6	5.1	3.1	5.8	5.0
Security of Supply	Design Case	1.0	1.5	1.5	1.1	0.9	0.9	0.7	0.7	0.7	1.4	10.0	1.8	1.3	1.7	1.3	0.9	8.0	8.0
	2-weeks Cold Spell	3.7	3.7	3.7	0.0	0.0	0.0	0.0	0.0	0.0	4.9	4.9	4.9	0.0	0.0	0.0	0.0	0.0	0.0
	2-weeks Cold Spell DF	3.8	3.8	3.8	0.0	0.0	0.0	0.0	0.0	0.0	5.1	5.1	5.1	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)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	4.50	4.50	4.50	4.5	4.5	4.5	4.5	4.5	4.5
Gasification Benefits	Fuel Switch	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5



## 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
TRA-N-66	Transmission gas pipeline	DN 700, length 6 km	No.
TRA-N-224	Transmission gas pipeline	Length of the Zenica–Brod pipeline with branches to Maglaj, Zepce, Zavidovici, Dobož and Modrica is 140 km.	Potential sensitive area will be identified during EIA procedure and development of Preliminary Design.

Potential impact	Mitigation measures	Related costs included in project CAPEX and OPEX	Additional expected costs
Potential environmental impact will be identified during EIA procedure and development of Preliminary Design.	Mitigation measures will be proposed through the EIA procedure, all in line with national legislation and EU requirements.	The environmental protection and mitigation measures costs will be assessed and prescribed in EIA procedure.	

### Environmental Impact explained [Promoter]

At this development stage of TRA-N-224 project potential environmental impact has not been identified, it will be developed during EIA procedure and Preliminary Design phase. In a normal operation gas pipeline is a closed technological system that has no impact on the environment. In case of controlled discharge of certain section by application of legal and technical regulations the impact of natural gas on the environment is minimal.

For project TRA-N-66, Major influences of the project on the environmental dimensions is to be felt during the construction period (disturbance, traffic disturbance where secondary roads are cut, and impacts due to the dust, noise, transport machinery, and other machineries). The impacts on the environment are likely to appear in the following areas: air quality, noise, geomorphology, habitats, flora and fauna, cultural heritage, occupational health, waste and accidents. The proposed environmental protection measures include measures prescribed by national law and other regulations, protection measures in accidental situations, plans and technical solutions for environmental protection as well as other protective measures. Protection measures for reducing the possible impacts to the lowest possible level are proposed in the EIA procedures.

## 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

The implementation of the projects within this Group will have significant positive impact on integration of the Croatian and BiH gas markets.

The construction of the Group pipelines will enhance security of supply (BiH current N-1 = 0) and makes additional volumes of gas available to the market. Group will create potential for using gas for power generation in BiH. Natural gas consumption means using clean, environmentally friendly source of energy, because of its low-carbon intensity in comparison to other fossil fuels. Therefore, use of gas for heating and power generation lead to reduction of CO<sub>2</sub>, SO<sub>2</sub>, NO<sub>x</sub> and PM emissions.

Having in mind that Oil Refinery Brod is currently one of the largest air polluter in BiH and cross-border in Croatia, Group will significantly improve the situation with air pollution in both countries. Lack of consensus between the two BiH entities regarding this project exists. Harmonization on the priority of this project within BiH should be carried out.

Other benefits include market enhancement, increased economic activity and employment growth, savings related to lower costs of gas purchase (when potential less expensive supply sources become available) and increased bargaining power in negotiation with the current gas supplier, increased market sustainability and integration in regional energy market.

Also, this Project Group will provide diversification of cross-border entry/exit points between Croatia and neighbouring countries which will enable gas transit and better utilisation of the Croatian gas transmission system.

## F. Useful Links

### The project website:

[www.plinacro.hr](http://www.plinacro.hr)

### Network Development Plan:

PLINACRO:

<http://www.plinacro.hr/UserDocsImages/dokumenti/Desetogodi%C5%A1nji%20plan%20razvoja%20PTS%202018-2027.pdf> , (NDP 2018-2027, page 64)

BH-Gas: Framework Energy Strategy of Bosnia and Herzegovina until 2035

[http://www.mvteo.gov.ba/data/Home/Dokumenti/Energetika/Framework\\_Energy\\_Strategy\\_of\\_Bosnia\\_and\\_Herzegovina\\_until\\_2035\\_ENG\\_FINAL....pdf](http://www.mvteo.gov.ba/data/Home/Dokumenti/Energetika/Framework_Energy_Strategy_of_Bosnia_and_Herzegovina_until_2035_ENG_FINAL....pdf)