

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

## Project Group EAST\_10 - Sarmasel UGS

### Reasons for grouping [ENTSO G]

The project group includes the stand-alone UGS project in Romania. The submission includes also the evacuation pipeline connecting the UGS facility to the transmission grid.

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

The project group aims to:

- a) decongest existing storage capacities in South Romania which may become available for neighbouring countries
- b) increase the flexibility of the storage system
- c) contribute to the sustainability and flexibility of the transmission system especially of high pressure pipelines
- d) reduce dependency on Russian import gas in every scenario
- e) support Romania's gas export potential connecting new Black Sea resources to the EU infrastructure.



## 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
UGS-N-0371	Sarmasel underground gas storage in Romania	DEPOGAZ Ploiesti SRL	RO	Less-Advanced	6.20.6	2025	2026	Rescheduled

## Technical Information

TYNDP Project Code	Injection Capacity Increment [mcm/d]	Withdrawal Capacity Increment [mcm/d]	WGV Increment [mcm]
UGS-N-0371	42.32	42.32	650

## 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
UGS-N-371	VIP Romgaz UGS (RO)	DEPOGAZ	Storage Romania	42.32	2026	Transmission Romania	42.32	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 “\*”.

	UGS-N-371	Total Cost
<b>CAPEX [min, EUR]</b>	163,110,985	<b>163,110,985</b>
<b>OPEX [min, EUR/y]</b>	2.455	<b>2.455</b>
<b>Range CAPEX (%)</b>	20	-
<b>Range OPEX (%)</b>	20	-

### Description of costs and range [Promoter]

Description of costs [EUR]

- Acquisition procedure for EPCC contract: 699,563
- Land acquisition: 1,521,969
- Obtaining the Building Permit: 957,081
- Construction: 119,560,833
- Pre commissioning and commissioning, performance testing and training personnel: 925,761
- Gas cushion acquisition and injection to UGS: 39,445,778

**TOTAL 163,110,985 EUR**

## 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 realisation of the project **increases remaining flexibility** in Romania in all infrastructure levels.

Regarding Ukrainian supply route disruption:

In the existing infrastructure level, the project group **reduces risk of demand curtailment** in Romania from 2025 for peak-day climatic stress case and from 2030 for 2-weeks cold spell and 2-weeks dunkelflaute climatic stress cases. This situation improves in the low infrastructure level with the implementation of FID projects in Romania. In this infrastructure level, the project group further reduces the risk of demand curtailment for peak-day climatic stress case in 2030 and in 2040 for all climatic stress cases.

Regarding infrastructure disruptions:

For SLID-Romania, in the existing infrastructure level the project group **fully mitigates the risk of demand curtailment** in Romania in 2030 and in 2040 it **reduce this same risk** in case of disruption of the single largest infrastructures in Romania (VIP Mediesu Aurit - Isaccea (RO-UA)).

The project group provides more flexibility to the Romanian gas system, ensuring balance between supply and demand under Ukrainian disruption case and Single Largest Infrastructure Disruption in Romania.

#### Distributed Energy

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

###### > Security of Supply:

In the existing infrastructure level, the project group **reduces risk of demand curtailment** in Romania under Ukrainian supply route import disruption in 2025 for peak-day climatic stress case and **fully mitigates the risk of demand curtailment** in 2040 for 2-weeks dunkelflaute climatic stress conditions. Romanian gas demand is lower in Distributed Energy and higher National Production than National Trends demand scenario, leading to lower curtailment rates in case of Ukrainian disruption.

Implementation of the **project group improves remaining flexibility** in Romania in the existing and low infrastructure levels.

#### Global Ambition

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

###### > Security of Supply:

Regarding Ukrainian import route disruption:

In the existing infrastructure level, the project group **reduces risk of demand curtailment** in Romania in 2025 for peak-day climatic stress case and fully mitigates this risk in 2040. Global Ambition demand scenario has lower gas demand and higher National Production than National Trends demand scenario, this leads to lower curtailment rates in case of Ukrainian disruption.

Implementation of the **project group improves remaining flexibility** in Romania in the existing and low infrastructure levels.

**Sustainability benefits [ENTSOG]**

Project groups EAST\_10 does not show benefits from fuel switch under flow-based allocation.

**Sustainability benefits [Project 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	2025											
		2025			2030			2040					
		CBG	GBC	NT	CBG	GBC	NT	CBG	GBC	NT			
Row Labels	WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA	
<b>Security of Supply</b>													
Remaining Flexibility 2-Week Cold Spell (%)													
Romania	65%	72%	6%	65%	71%	6%	62%	67%	6%	34%	38%	5%	
Remaining Flexibility 2-Week Cold Spell (%) --- DF													
Romania	65%	71%	6%	65%	71%	6%	54%	60%	5%	32%	37%	5%	
Remaining Flexibility Peak day (%)													
Romania	43%	48%	6%	42%	48%	6%	32%	37%	4%	14%	18%	4%	
Single Largest Infrastructure Disruption (SLID)-Romania													
Romania							5%	0%	-4%	21%	17%	-4%	
Ukraine Disruption Curtailment Rate 2-Week Cold Spell (%)													
Romania							-6%	-1%	5%	-28%	-23%	5%	
Ukraine Disruption Curtailment Rate 2-Week Cold Spell (%) --- DF													
Romania							-10%	-5%	5%	-29%	-24%	5%	
Ukraine Disruption Curtailment Rate Peak Day (%)													
Romania	-11%	-5%	6%	-11%	-6%	6%	-22%	-18%	4%	-38%	-34%	4%	

### LOW Infrastructure Level – National Trends

Sum of Value	Column Labels	2025											
		2025			2030			2040					
		CBG	GBC	NT	CBG	GBC	NT	CBG	GBC	NT			
Row Labels	WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA	
<b>Security of Supply</b>													
Remaining Flexibility 2-Week Cold Spell (%)													
Romania	79%	86%	7%	79%	86%	7%	80%	85%	6%	44%	50%	6%	
Remaining Flexibility 2-Week Cold Spell (%) --- DF													
Romania	79%	86%	7%	79%	86%	7%	71%	77%	5%	42%	48%	5%	
Remaining Flexibility Peak day (%)													
Romania	54%	61%	6%	54%	60%	6%	47%	52%	5%	24%	28%	5%	
Single Largest Infrastructure Disruption (SLID)-Romania													
Romania										12%	7%	-5%	
Ukraine Disruption Curtailment Rate 2-Week Cold Spell (%)													
Romania										-17%	-12%	6%	
Ukraine Disruption Curtailment Rate 2-Week Cold Spell (%) --- DF													
Romania										-18%	-13%	5%	
Ukraine Disruption Curtailment Rate Peak Day (%)													
Romania							-7%	-2%	5%	-28%	-24%	5%	

### ADVANCED Infrastructure Level – National Trends

Sum of Value	Row Labels	Column Labels						
		2025			2040			
		CBG	NT		NT			
	WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA		
<b>Security of Supply</b>								
Remaining Flexibility 2-Week Cold Spell (%)	Romania				97%	100%	3%	
Remaining Flexibility 2-Week Cold Spell (%) --- DF	Romania				94%	99%	5%	
Remaining Flexibility Peak day (%)	Romania				68%	72%	5%	

### EXISTING Infrastructure Level – Distributed Energy

Sum of Value	Row Labels	Column Labels												
		2025						2030			2040			
		CBG	GBC		DE			DE						
	WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA		
<b>Security of Supply</b>														
Remaining Flexibility 2-Week Cold Spell (%)	Romania	65%	72%	6%	65%	71%	6%							
Remaining Flexibility 2-Week Cold Spell (%) --- DF	Romania	65%	71%	6%	65%	71%	6%				72%	79%	7%	
Remaining Flexibility Peak day (%)	Romania	43%	48%	6%	42%	48%	6%	85%	92%	7%	68%	75%	7%	
Ukraine Disruption Curtailment Rate 2-Week Cold Spell (%) --- DF	Romania										-2%	0%	2%	
Ukraine Disruption Curtailment Rate Peak Day (%)	Romania	-11%	-5%	6%	-11%	-6%	6%							

### LOW Infrastructure Level – Distributed Energy

Sum of Value	Row Labels	Column Labels									
		2025						2040			
		CBG	GBC		DE			DE			
	WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA	WITHOUT	WITH	DELTA		
<b>Security of Supply</b>											
Remaining Flexibility 2-Week Cold Spell (%)	Romania		79%	86%	7%	79%	86%	7%			
Remaining Flexibility 2-Week Cold Spell (%) --- DF	Romania		79%	86%	7%	79%	86%	7%	85%	93%	8%
Remaining Flexibility Peak day (%)	Romania		54%	61%	6%	54%	60%	6%	80%	87%	7%

**ADVANCED Infrastructure Level – Distributed Energy**

No Benefits

**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
<b>Security of Supply</b>												
Remaining Flexibility 2-Week Cold Spell (%)												
Romania	65%	72%	6%	65%	71%	6%	90%	98%	8%	90%	97%	7%
Remaining Flexibility 2-Week Cold Spell (%) --- DF												
Romania	65%	71%	6%	65%	71%	6%	88%	96%	8%	76%	83%	7%
Remaining Flexibility Peak day (%)												
Romania	43%	48%	6%	42%	48%	6%	72%	79%	7%	65%	72%	6%
Ukraine Disruption Curtailment Rate Peak Day (%)												
Romania	-11%	-5%	6%	-11%	-6%	6%				-4%	0%	4%

**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
<b>Security of Supply</b>												
Remaining Flexibility 2-Week Cold Spell (%)												
Romania	79%	86%	7%	79%	86%	7%						
Remaining Flexibility 2-Week Cold Spell (%) --- DF												
Romania	79%	86%	7%	79%	86%	7%				90%	97%	7%
Remaining Flexibility Peak day (%)												
Romania	54%	61%	6%	54%	60%	6%	91%	98%	8%	79%	85%	7%

**ADVANCED Infrastructure Level – Global Ambition**

No Benefits

## 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	Reference Supply	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
With Tariffs	Supply Maximization	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Security of Supply	Design Case	1.8	0.2	0.6	1.6	0.0	0.0	0.0	0.0	0.0
	2-weeks Cold Spell	10.9	0.0	0.0	10.1	0.0	0.0	0.0	0.0	0.0
	2-weeks Cold Spell DF	11.6	2.9	0.6	10.1	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)	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	1.2	11.7	1.2	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	0.0	0.0	0.0	0.0	0.0	0.0	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	1.8	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	1.8	0.0	0.6	1.9	0.0	0.0	0.0	0.0	0.0
	2-weeks Cold Spell	11.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.3	0.0	0.0	14.0	0.0	0.0	0.0	0.0	0.0
	2-weeks Cold Spell DF	13.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.3	4.1	0.8	14.0	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



## 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.

The project is designed in order to raise and assure the independence of gas resources allowing the operators to have a sustainable exploitation of the gas resources all year long no matter of the fact that the consumption is different in the winter and in the summer.

The implementation of the Action will result in gaining benefits in terms of efficiency and GHG emissions reductions.

- (i) The implementation of the project will contribute to sustainability as the UGS will be upgraded with state of the art energy-efficient equipment (moto-gas-compressors), which will reduce emissions.
- (ii) The use of modern technology and last generation equipment ensures the energy efficiency increase in order to mitigate climate changes

Overall implementation of the project will sustain the raise of the gas consumption at country level, achieved through a more developed gas infrastructure, which combined with diversified gas supply sources, will contribute to the reduction of fossil fuel use, by reducing air pollution from coal burning processes in order to produce electrical energy.

The project has a huge impact on the development of national gas infrastructure in order to assure the access of population to a highly efficient source of energy, this way stepping forward to diminishing the energy poverty at country level.

## 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 PCI will bring benefits, such as optimizing the costs of gas supply, supporting and ensuring the stability and safety of the regional gas transmission systems, increasing flexibility of the national and regional supply. Through an increase in storage deliverability and by expanding the geographical area of impact for the gas storage facilities, the threat of congestions will be eliminated and the transmission routes will be shortened while supplying the final consumer, thus creating the premises for potential exports to neighbouring countries.

Reducing the cost of electricity production by partially replacing conventional energy sources with natural gas, given that conventional energy sources, through the production cycle, are not competitive in terms of operational costs, reduction of greenhouse gas emissions and pollutant emissions.

- The implementation of the project will have a significant impact on the role of natural gas in the energy mix;
- Additionally, the price evolution of ETS emission certificates in the context of European decarbonisation policies indicates a continuous increase in emission costs of up to EUR 40/tCO<sub>2</sub> in 2030, in order to facilitate the achievement of targets.

#### Other unquantified benefits

- The implementation of the project leads to a 32% increase in the maximum daily extraction capacity, to 128 GWh/day, of the Sărmășel underground natural gas storage facility, which contributes to reducing congestion of the southern storage facilities and enables a better management of natural gas resources in case of interruption of natural gas supply through Ukraine affecting all countries in the region: Bulgaria, Hungary and Serbia.

## F. Useful Links

The project website : <https://www.depogazploiesti.ro/ro/activitate/proiecte-tyndp>

Network Development Plan: <https://www.transgaz.ro/sites/default/files/PDSNT%20%202018%20-%202027%20FINAL%2014.03.2018.pdf>

PCI Fiche: <https://www.depogazploiesti.ro/en/activity/projects-of-common-interest>