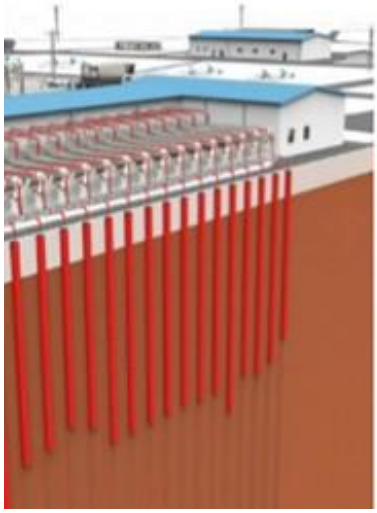
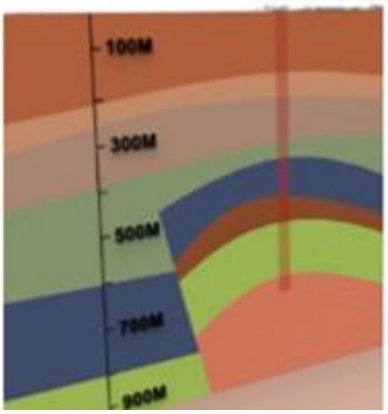
PCI PROJECT 8.2.4

INVESTMENT REQUEST

INČUKALNS UNDERGROUND GAS STORAGE ENHANCEMENT

October 2018





conexus

ABBREVIATIONS AND TERMS

Abbreviation	Explanation
ACER	Agency for the Cooperation of Energy Regulators
BEMIP	The Baltic Energy Market Interconnection Plan
CAPEX	Capital expenditure
CBA	Cost-benefit analysis
CBCA	Cross-border cost allocation
CBMZ	Common Baltic Market Zone
RER	Renewable energy resources
JSC	Joint-Stock Company
Conexus	JSC Conexus Baltic Grid
EC	European Commission
ENTSOG	European Network of Transmission System Operators for Gas
EP	European Parliament
EU	European Union
EUR	Euro
FID	Final Investment Decision
Gas Directive	Directive 2009/73/EC concerning common rules for the internal market in natural gas
GDP	Gross Domestic Product
IUGS	Inčukalns Underground Gas Storage
Klaipeda LNG terminal	Klaipeda liquefied natural gas floating storage and regasification unit terminal
LG	JSC Latvijas Gāze
MCM	Million cubic metres
M^3	Cubic metre
Mil.	Million
MWh	Megawatt-hour
OPEX	Operational expenditure
TSO	Transmission system operator
PCI	Project of Common Interest
Project	Modernization and extension of Inčukalns Underground Gas Storage Facility
PUC	Public Utilities Commission
RGMCG	Regional Gas Market Coordination Group
t	Tonne
k	Thousand
TWh	terawatt-hour, 1 terawatt-hour is equal to 1 billion kWh
WACC	Weighted average cost of capital

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INTRODUCTION

In accordance with Regulation 347/2013 (EU) JSC Conexus Baltic Grid submits the following investment request to the Public Utility Commission in Latvia and requests the cross-border cost allocation for the PCI project “Inčukalns Underground Gas Storage enhancement” (8.2.4), hereinafter – The Project.

The aim of the project is to enhance the operations of the storage to allow the Inčukalns Underground gas storage to maintain its functionality after pressure upgrade in Baltic transmission system. The key benefit from the implementation of the Project is the ability to reduce the dependence of withdrawal capacity on the volume of gas reserves in the IUGS.

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This investment request shall not be considered as a final investment decision. The final investment decision of the project depends on the adequate sources of financing for the project.

Zane Kotāne
JSC Conexus Baltic Grid
Chairman of the Board

September 25, 2018

EXECUTIVE SUMMARY

Description of the Project

With working gas capacity of 24 TWh Inčukalns Underground Gas Storage (hereinafter – IUGS) represents the largest available gas storage in the Baltic Sea region. IUGS is natural, aquifer type storage with compressor injection but natural withdrawal. Pressure difference between storage and transmission system ensures withdrawal from storage. Currently at the end of withdrawal season, pressure at entry from storage drops to 30 bar, allowing ensuring late winter supply.

Several cross boarder transmission system enhancement projects are ongoing in Baltic market, to facilitate gas market integration, end Baltic isolation and enhance gas flows. During feasibility analysis of Enhancement of the Latvian – Lithuanian Interconnection (ELLI) project as well as technical design of Baltic Connector, it has been concluded that Baltic transmission system pressure shall be increased to 50 - 55 bar to allow gas transit flows between Baltic countries to extent planned in EU financed projects. Increasing pressure in Baltic transmission system adversely impact working conditions of the storage and ability to withdraw gas from the storage at the end of winter.

The aim of the project is to enhance the operations of the storage to allow the Inčukalns Underground gas storage to maintain its functionality after pressure upgrade in Baltic transmission system. The key benefit from the implementation of the Project is the ability to reduce the dependence of withdrawal capacity on the volume of gas reserves in the IUGS.

During the project, new compressor will be installed allowing first time compression extraction from the storage. The compressor will allow increasing pressure in reservoir until the necessary 50-55 bar in outlet pipeline from IUGS. To function in such new regime, storage wells and surface facilities require certain enhancements, which are inherent part of this project. Besides, the project will improve environment measures by decreasing CO2; NOx, Sox and other emission footprint.

Significance of the Project

On 5 December 2014, the Prime Ministers of the three Baltic States – Estonia, Latvia and Lithuania agreed to work together towards creation of an effectively functioning regional gas market in their territories. Gas storage plays important role in unified Baltic has market by helping to implement EU gas market objectives - facilitate competition through additional gas source in winter, ensuring Security of Supply and promoting sustainability.

In accordance with the “Study of increased flexibility and use as strategic storage” performed by Ramboll in 2017, the role of the storage in Baltic market is changing, and include three different areas of use – short term use; seasonal usage and security of supply usage. Based on study, short-term usage refer to LNG parking, power plant usage, peak demand management and commercial optimisation. Based on assessment, storage is contributing to security of supply in all three Baltic states.

From technical perspective, unlike other regions, Baltic transmission system is functioning through active use of storage – storage is designed as integrated part of transmission system. Although transit route through Latvia is more than 300 km long, the transmission system does not have any line compressors. Due to such design, upon implementation of EU legislation on natural gas market from 2009 (the III package), politicians decided to establish unified gas transmission and storage operator, defining that both segments shall be fully regulated. The only income from storage operations is through tariffs approved by Public Utility Commission. Any additional CAPEX would have impact on storage tariffs.

Business plan

Conexus Baltic Grid is the only Project Promoter, which bear costs related to execution of the Project. Other Baltic TSOs are net beneficiaries of the Project.

The enhancement of the IUGS is expected to be partially financed by EU support in the form of CEF grants, and the remaining part of CAPEX will be covered by a 50/50 mix of debt and equity.

The major objective of Market Testing related to enhancement of IUGS was to assess general, non-binding interest of market players in using the Project in the future. Market Testing participants indicated that the Project is welcomed by the market with interest and appreciation, with its potential users looking forward to taking advantage of the IUGS's functionality. Nonetheless, despite the positive reception of the Project and the possibilities it brings, its potential users would rather not see IUGS tariffs increase.

Total Project CAPEX is estimated at 88 million EUR and Project OPEX at 0.9 million EUR p.a. No direct revenues of the Project are foreseen. The financial profitability of the Project for the Project Promoter measured in FNPV terms was assessed at -71.4 million EUR. There is no financial impact for companies in other Baltic markets.

Cost – benefit analysis

From the socio-economic externalities perspective, the Project successfully improves the security of supply. In addition, the Project brings working capital cost saving, as compressor extraction of gas avoids the need to hold high volumes of gas in the UGS. The non-quantifiable benefits of the Project as well include market Integration, overall flexibility of system and sustainability.

The IUGS enhancement project is not profitable in financial terms, however it results in significant economic benefit – total benefit/cost ratio of the Project is equal to 215%.

ENPV and national net impacts for each country are provided in the table below.

Table 1. Project's ENPV and national net impacts for Latvia, Lithuania and Estonia, MEUR

Country	Unit	ENPV	National net impacts
Latvia	MEUR	78.4	78.4
Lithuania	MEUR	9.0	9.0
Estonia	MEUR	9.7	9.7
Total	**MEUR**	**97.1**	**97.1**

Based on the CBA results and national net impact calculation, cross border cost sharing outside the project promoting state is not expected.

Cross border cost allocation

In case of modernization and extension of IUGS, the countries impacted by the Project implementation, i.e. Lithuania, Latvia and Estonia, reach a positive value of ENPV. As such, these countries have been identified as net beneficiaries of the Project. However, the analysis reveals that there are no net cost bearers of the Project – societies in all countries significantly impacted by implementation of the IUGS enhancement are expected to benefit from its realization.

Consequently, the Project Promoter proposes that a CBCA decision is issued, dictating that there should be no CBCA transfers between the significantly impacted countries (Latvia, Lithuania and Estonia) resulting from realization of the IUGS enhancement.

REGIONAL INFRASTRUCTURE DEVELOPMENT

The EU legislation on natural gas market from 2009 (the III package) is based on an objective to establish an internal market in natural gas. In its' conclusions on February 4, 2011, the European Council agreed on that the EU needs a fully functioning, interconnected and integrated internal energy market. Major efforts are needed to modernise and expand Europe's energy infrastructure and to interconnect networks across borders.

Further in regulation 347/2013 on guidelines for trans-European energy infrastructure, the BEMIP – area has been designated as one of the priority gas corridors with an objective for gas infrastructure to end the isolation of the three Baltic States and Finland and their dependency on a single supplier, to reinforce internal grid infrastructures and to increase diversification and security of supplies in the Baltic Sea region. In its conclusions on October 24, 2014, the European Council agreed on list of critical infrastructure objects (PCIs) that shall contribute positively on reaching EU gas market objectives.

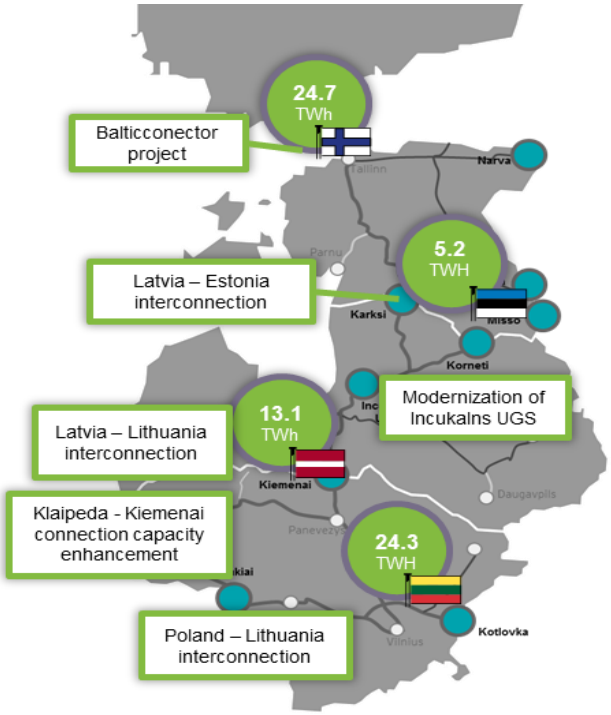


Figure 1 Planned infrastructure development projects in the region

To remedy the situation and connect the Eastern Baltic region gas supply system with the joint EU gas transmission network, there are certain European projects of common interest (hereinafter referred to as PCIs), for which facilitated procedure and, in some cases, funding from the EU infrastructure fund is available:

- **Construction of the Estonia-Finland interconnection (Baltic Connector)**. The construction of this interconnection will allow to connect Finland's natural gas transmission system directly to the Baltic natural gas transmission system. Baltic connector is a precondition for creation of single Baltic natural gas market, as the natural gas markets of Estonia and Finland that have been closed until now will be opened in 2019, along with the commissioning of the interconnector. The planned entry and exit capacity of Baltic connector will be 79 GWh/d.
- **Improvement of Latvia-Estonia interconnection (Karksi)**. The improvement of this interconnection will allow the increase of natural gas flows to the volumes required in the single Baltic natural gas market and allow Estonian and Finnish traders to store natural gas at IUGS. The planned entry capacity of the interconnection is 42 GWh/d and the exit capacity is 105 GWh/d. The improvement of the interconnection is expected to be completed in 2019.
- **Enhancement of IUGS operations**. Taking into account the fact that IUGS is the largest and most important natural gas storage facility in the Eastern Baltic region and supplies the region during the winter, with

enhanced withdrawal capacity it will be possible to withdraw of natural gas from the storage under the conditions of of 50-55 bar transmission system pressure. That will significantly improve the natural gas supply security, as well as operational efficiency of the storage facility, which will be especially important in the single Baltic natural gas market. The key benefit from the implementation of the project is the ability to reduce the dependence of withdrawal capacity on the volume of gas reserves in the IUGS.

- **Improvement of the Latvia-Lithuania interconnection**. Increase of the interconnection capacity will enable the exchange of greater volumes of natural gas between Latvia and Lithuania, which will be especially important after establishment of the single Baltic natural gas market. It is expected to increase the interconnection capacity to 125 GWh/d when the project is completed. The project is scheduled to be completed in 2023.
- **Construction of the Poland-Lithuania interconnection (GIPL**). This project aims to connect the Polish and Lithuanian natural gas transmission systems, thus connecting the Eastern Baltic gas transmission systems to the single EU natural gas transmission network. GIPL will function as an alternative gas supply source for the Eastern Baltic region, improving the natural gas supply security in the region and allowing to integrate the region in the EU natural gas transmission network. The project is scheduled to be completed in 2023. The planned capacity will be 73.9 GWh/d towards Lithuania and 51.1 GWh/d towards Poland.

In 2017, as part of the Baltic Energy Market Interconnection Plan (BEMIP), the regional transmission system operators jointly completed the development of the third Gas Regional Investment Plan (GRIP), providing collected information on the planned projects in the BEMIP region. According to this plan, the following GRIP projects are going to be implemented in the Eastern Baltic region in addition to the aforementioned PCI projects[1]:

- Construction of the Paldiski LNG terminal in Estonia;
- Construction of the Tallinn LNG terminal in Estonia;
- Construction of the Syderiai UGS in Lithuania;
- Acquisition of the Klaipeda LNG terminal.

[1] GRIP Annex A: Infrastructure projects. Available at: https://entsog.eu/public/uploads/files/publications/GRIPs/2017/entsog_BEMIP_GRIP_2017_Annex_A_web.pdf

PROJECT DESCRIPTION

Following provides the required information for submitting the CBCA request according to ACER recommendation 5/2015.

Reference to ACER Recommendation 5/2015 1.5 (1.):
A detailed description of the project, including a description of the rationale behind the choice of the technology.

Technical Solution

With working gas capacity of 24 TWh Inčukalns Underground Gas Storage (hereinafter – IUGS) represents the largest available gas storage in the Baltic Sea region. IUGS is natural, aquifer type storage with compressor injection but natural withdrawal. Pressure difference between storage and transmission system ensures withdrawal from storage.

In 2016 European Commission (Joint Research Center) provided risk assessment of the gas system of Estonia, Finland, Latvia and Lithuania and concluded the following: "The flexibility of the IUGS as an active pressure control facility depends on its inventory level, which turns out to be a key component of the regional security of gas supply". Similar conclusion about UGS role in region market zone was also made in Europe Commission co-financed assessment provided by company Ramboll in 2017 "Inčukalns gas storage study of increased flexibility and use as strategic gas storage".

Currently, at the end of extraction season from IUGS, the pressure in reservoir drops until the 33 bar, which means that pressure in outlet pipeline from IUGS could drop until 28 bar when the level of commodities is close to zero. The extent to which the pressure and daily productivity during the extraction season of IUGS serves the transmission system depends on many different factors but the most important one is the level of commodities in the storage. The following figure shows estimated curve for 2018/2019:

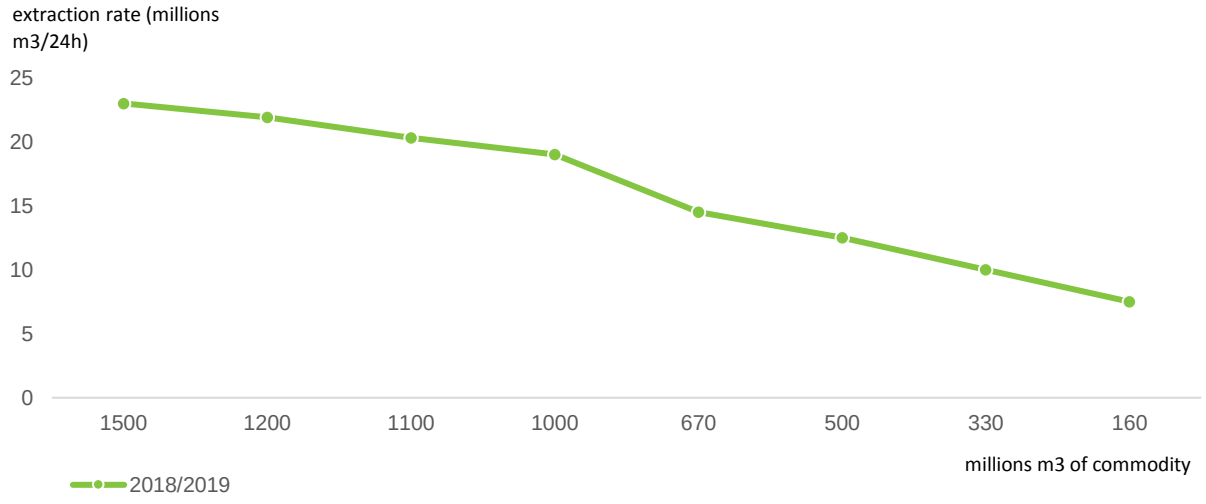


Figure 2 IUGS productivity against level of commodities 2018/19 (based on geological and gas dynamic models).

The graph above presents productivity in the case when TSO decreases pressure in transmission network until 28 bar to accommodate to the dropping level of commodities in the IUGS.

Several cross boarder transmission system enhancement projects are ongoing in Baltic market, to facilitate gas market integration, end Baltic isolation and enhance gas flows. During feasibility analysis of Enhancement of the Latvian – Lithuanian Interconnection (ELLI) project as well as technical design of Baltic Connector, it has been concluded that Baltic transmission system pressure shall be increased to 50 - 55 bar to allow gas transit flows between Baltic countries to extent planned in EU financed projects. Increasing pressure in Baltic transmission system adversely impact working conditions of the storage and

ability to withdraw gas from the storage at the end of winter. Implementation on EU financed transmission system enhancement projects has following impact on technical operations of storage:

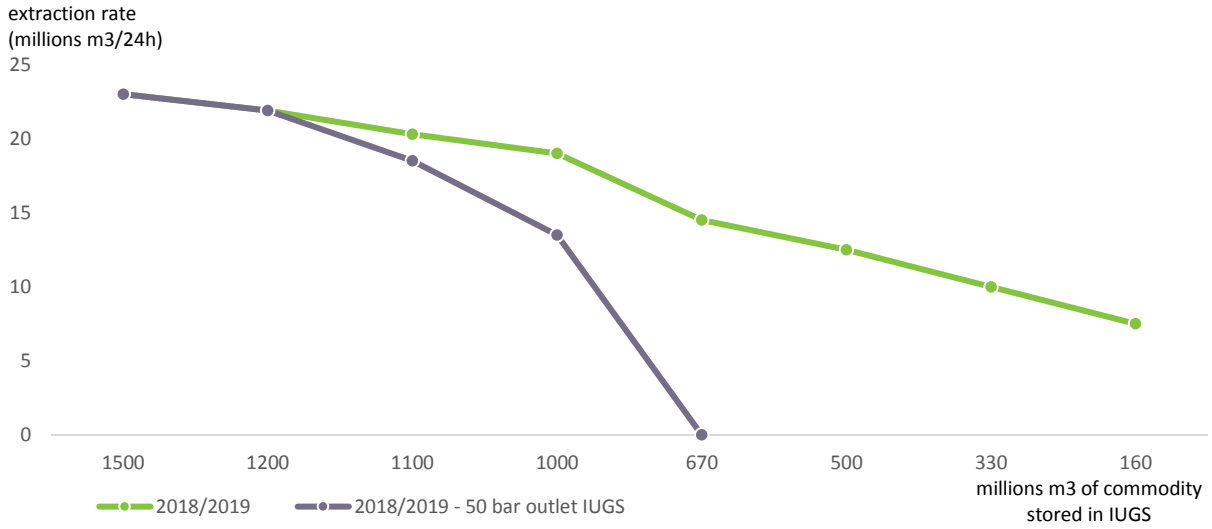


Figure 3 IUGS productivity against level of commodities estimation of two scenarios.

To maintain providing the region with stable and secure gas supply after increasing pressure in region transmission network storage operations require certain adjustments. There are two scenarios how to maintain storage extraction at current level:

- Increase the volume of active gas in by approximately 8 TWh
- Enhance the assets of IUGS

Although the first option in faster to realise it will have many technical disadvantages. IUGS is an aquifer reservoir. According to current technology, it is necessary to drop pressure in the reservoir below hydrostatic level (70 bar for IUGS) every year to prevent the increase of gas field area. By increasing the volume of gas in the storage, pressure dynamics in the reservoir change, and after short time additional gas again might be required, thus even more adversely impacting costs of the storage. Storage operator considers first option with high uncertainty and thus not sustainable.

Second scenario reaches the goal of maintaining withdrawal volume by enhancing storage assets and changing technical operations. During the project, new compressor will be installed allowing first time compression extraction from the storage. The compressor will allow increasing pressure in reservoir until the necessary 50-55 bar in outlet pipeline from IUGS. To function in such new regime, storage wells and surface facilities require certain enhancements, which are inherent part of this project.

The following table summarises technology selected for implementation of the Project:

Table 2 Technology for Project implementation

Asset Group	Technological scope	Explanation of choice
Surface infrastructure (increasing capacity)	• Increasing number of technological lines. • MOP 105 bar • Pipeline sizes from 150 mm to 700 mm • Productivity at least 20 million m3/24 hours. • Number of cleaning stages – 2 • Ultrasonic measure on each line • Separate regulation of gas flow for each line • Reservoir water gathering system • Remote control system establishment	Enhancement of surface facilities is designed to use technology that has proven experience in IUGS. Other surface facilities are equipped with similar technology, allowing access to better knowledge base and easier maintenance. Based on supplier questioning, suggested technical decision is cheaper when compared with two-stage pressure reduction technology. All decisions and equipment installed will correspond with EU legislation and standards. Core standards for designing are EN1918:5; EN1594; EN ISO3183; EN12186; EN12327; EN13509
Wells (increasing productivity)	• Productivity increased at least 5% for each well • 36 wells included in the Project • Subsurface safety valves – 36 pcs • Packers, circulating valves – 36 pcs • Tubing installation – 25 200 m • Valves (wellheads and tubing heads include) – 36 pcs • Washing of perforation zones or creation of additional perforation intervals – 36 technological operations • MOP 105 bar • Size from 74 mm to 114 mm • Geophysical investigations – 58 operations • Connection to cathodic protection system 36 pcs	Storage in constantly assessing performance of wells. In 2017 – benchmark study with Storengy has been undertaken to assess architecture of IUGS wells and practice on managing wells. Current approach has been evaluated as safe and compliant with EU regulations. From prior experience, CAPEX would lead to well productivity increase in range from 5% to 15%. 5% productivity increase has been taken into account for technical design of the Project. Core standards used for preparation of technical design: EN1918:1; EN1918:5; NORSOK Standard D-010; EN ISO 10423.
Gas compression units (increasing power): 1. Installation of additional gas compression unit	• productivity increasing for 6 million m3/24 hours • Compression extraction organization 14 – 15 million m3/24 hours • MOP 105 bar • Pipeline size from 50 mm till 1020 mm • Gas compression unit – gas turbine engine and centrifugal gas compressor with possibility to change pressure stages from rope to parallel type • Scope of gas - air cooling units • one gas separator • 500 m pipeline Dn300 mm Pn 105 bar • Technological Air preparation unit	Installation of additional gas compression unit (GCU) takes place in territory of gas compression workshop No.1. Compression extraction is performed in many storages across EU and the technology selected by IUGS is according to EU practise and standards. Core standards to used for designing: EN1918:5; EN1594; EN ISO 3183; EN12327; EN12583; EN12732; EN12954.

Asset Group	Technological scope	Explanation of choice
2. Strengthening of existing gas compression units	• 5 gas reciprocating units • MOP 105 bar • Productivity 12 million m3/24 hours • 5 hyper fuel units • 5 hyper balance units • 60 ePPC electronic non-returned valves of combustor • 60 combustors of high pressure • gas preparation plant • fuel gas consumption metering • 5 new generation control panels • installation works installation works	In compression station No.2 (CS2) of IUGS 5 reciprocating GCU Cooper Bessemer Z330 are used. Cooper Bessemer company belongs to GE Oil & Gas which produces the new generation of Z330 named W330. The ignition system for W330 is produced by Hoerbirger and its purpose is to mount the new generation ignition system to Z330. Technology is approved on many GCU in EU and USA. The estimated decrease of emissions is: • NOx from 35 -90% depends from regime; • CO2 approximately 7 000 tons per year; • Fuel gas consumption shell decrease until 5% full load and for loads 70-80% approximately 15%; • Increasing of productivity and flexibility for approximately 10%. Conexus has received letter from GE Oil & Gas explaining their product usage for GCU. Design of the product has been developed to comply with Directive for Medium combustion plant 2015/2193.

The project promoter Conexus conducted gas flow studies for transmission system using OPTIPLAN for modeling gas streams in all exit points from Latvia. Storage modeling has been done using ECLIPSE 100 for IUGS productivity at different outlet pipeline pressures. OPTIPLAN has more than 15 years experience for analyzing Latvian transmission system flows and ECLIPSE 100 is used for IUGS from 2004. Both models are endorsed in practice before applying for this project. All conducted gas flow studies demonstrate necessity of enhancement of IUGS to set stable gas deliveries to Latvia and the region under the new technical parameters of Baltic transmission system.

The Project significantly contributes towards achieving the EU-wide target of building a well-functioning common energy market. This involves facilitating the provision of affordable, secure and sustainable energy, promoting competition on energy markets and increasing EU energy security by diversifying gas supply routes and sources. As such, the Project has been included on the PCI ("Project of Common Interest) list assembled by the European Commission.

Completion of the Project facilitates achievement of the following goals:

Table 3 Project's contribution toward market development goals

Goal	How the project will achieve the goal
Improving the regional security of supply by ensuring flexibility in supply and availability of gas	• To ensure the needs of the common gas supply system of the region and to avoid such security problems as peak loads, emergency situations and supply disruption IUGS shall ensure stable and firm supply
Supporting diversification of gas supply sources in the Baltic States through facilitating efficient use of the storage	• Storage effectively functions as additional gas source in region. Seasonal use of storage allows to optimise gas deliveries from LNG markets
Promoting wholesale market development, facilitating price improvements	• Increasing liquidity though immediately available gas in storage increases competition between suppliers and results in stabilization of gas price
Facilitating the development of a regional energy market in the East Baltic region	• Stabile and firm extraction capacity of IUGS will enable further integration of Baltic energy market to continental Europe and the Nordic zone and assure the increased demand in the region.

Detailed implementation plan

Reference to ACER Recommendation 5/2015 1.5 (2.):
A detailed implementation plan of the project, which should provide substantial information about the progress achieved in the development of the project and its status, as well as a (probability) assessment of the critical and risk factors for the project and the risk mitigation measures adopted in the relation to those factors, which could have the most negative impact.

Feasibility study was carried out in several steps from 2011 until 2018. Project received PCI status in 2014. During the preparation for the Project, Project promoter carried out detailed implementation schedules for each activity, examined potential producers of equipment and calculated possible project costs. Project promoter acknowledge that project is mature and sufficiently certain to provide time plan and financial estimates.

Table 4 Project implementation plan

Project stage	Start date (expected)	Finish date (expected)
Consideration and preparatory works. Feasibility studies, hydraulic simulations, creation of technical decision, pricing of activities	06/2011	11/2017 **Completed**
Public consultation. Public consultation have been held during the feasibility studies twice by JSC "Conexus" (former JSC "Latvijas Gāze") and by Ramboll	06/2011	15/10/2014 **Completed**
Preliminary design studies. All necessary studies are carry out by Ramboll during the feasibility studies	09/2016	11/2017 **Completed**
Market test. Market test was provided twice by Ramboll and EY participation with and without taking in account possible changes after creation of unified marketing zone of region	05/2017	09/2019 **Completed**
Agreements with landowners for construction.	01/2018	Surface facilities Compression units 11 wells **Completed** 12/2019 (Expected) 25 wells
Definition of financing scheme and CBCA	07/2018	03/2019 (Expected)
Final investment decision. The project promotorer will make FID when financing for the project has been awarded	04/2019	06/2019 (Expected)

Implementation schedules for each activity

Table 5 Surface infrastructure - commissioning 2025

Action		Year	2019		2020		2021		2022		2023		2024		2025	
		half-year	I	II	I	II	I	II	I	II	I	II	I	II	I	II
Designing	Creation of technical task															
	Procurement procedure															
	Conclusion of contract															
	Designing															
	Expertise of design															
Equipment deliveries	Creation of technical specifications															
	Procurement procedure															
	Conclusion of contract															
	Deliveries															
Construction	Creation of technical task															
	Procurement procedure															
	Conclusion of contract															
	Construction:															
	- East part															
	- West part															
Super-vision	Creation of technical task															
	Conclusion of contract															
	Supervising															

Table 6 Wells commissioning - 2024

Action		Year	2019		2020		2021		2022		2023		2024	
		half-year	I	II	I	II	I	II	I	II	I	II	I	II
Equipment deliveries	Creation of technical specifications													
	Procurement procedure													
	Conclusion of contract													
	Deliveries													
Construction	Creation of technical task													
	Procurement procedure													
	Conclusion of contract													
	Construction:													
	-Subcontractors:													
	-IUGS staff:													

Table 7 Gas compression units - commissioning 2024

Installation of additional gas compression unit.

Action	Year half-year	2019		2020		2021		2022		2023		2024	
		I	II	I	II	I	II	I	II	I	II	I	II
Designing	Creation of technical task												
	Procurement procedure												
	Conclusion of contract												
	Designing												
	Expertise of design												
Equipment deliveries	Creation of technical specifications												
	Procurement procedure												
	Conclusion of contract												
	Deliveries												
Construction	Creation of technical task												
	Procurement procedure												
	Conclusion of contract												
	Construction:												

Strengthening of existing gas compression units

Action	Year half-year	2018		2019		2020		2021		2022		2023		2024	
		I	II	I	II	I	II	I	II	I	II	I	II	I	II
Designing \ Equipment deliveries	Creation of technical task														
	Procurement procedure														
	Conclusion of contract														
	Performance of contract														
	Designing														
	Deliveries (GPU3;GPU2,4;GPU5,6)														
Installation															
	Installation:														
	-GPU 2														
	-GPU 3														
	-GPU 4														
	-GPU 5														
	-GPU 6														

Project Management Office (PMO) has been established for implementation of the Project. The PMO team consists of specialists with deep experience in gas industry and owners of certificates of project management.

Project risks and their mitigation measures are identified in the table below.

Table 8 Risk assessment.

Risk type	Description	Internal/ External	Likelihood	Impact	Risk mitigation
Technical risks	Failures of equipment deliveries	Internal	High	Medium	Splitting equipment deliveries by packages. Creation of List of potential producers before start of the Project. Development of supervision programme.
	Failures of construction/designing	Internal	Medium	Medium	Select construction/designing company with appropriate experience (Price cannot be the only criteria). Development of special criteria for qualification.
	Low commodities level	External	Low	Low	All commissioning is scheduled to September – February.
Financial risks	Missing EU co-financing	External	Medium	High	Reassessment of FID, project scope and timing
	Changing equipment price	Internal	Medium	Medium	Timely procurement and pre-ordering.
Legal risks	Changes in EU legislation	External	Low	High	Monitoring of EU activities.
	Landowner permits	Internal	Low	Medium	The risk is relevant only for 15 wells. Enough time planned to allow proper procedure.
	Construction permits	Internal	Low	High	One permit is already received. Regular meetings with local municipalities.
Political risks	Relationship with Russia impacting gas flows and storage filling	External	Medium	High	Monitoring and readiness to accept more flows from LNG terminal
Environmental risks	Changes in emission levels	External	Low	Medium	Monitor changes in EU and national level.
	Ground pollution	Internal	Low	Medium	Review all decisions during the designing process. Regular meetings with designers/constructors.

Preliminary investment decision

Reference to ACER Recommendation 5/2015 1.5 (3.):
A preliminary investment decision on the investment(s) (e.g. a – possibly conditional - board decision on intended investment), if applicable.

Preliminary investment decisions taken by the board related to the Project are noted below.

- 18.01.2018. JSC "Conexus Baltic Grid" supervision board decision. Results of preliminary and feasibility studies for Inčukalns UGS enhancement provided by JSC "Ramboll Denmark" and Ernst&Young Global limited and scope of activities of project Inčukalns UGS enhancement.
- 01.02. 2017 Decision of the Board of JSC „Conexus Baltic Grid". Development of Incukalns underground gas storage sustainable operation model.
- 01.03.2017 Decision of the Board of JSC „Conexus Baltic Grid". Organization of negotiated procedure to start the feasibility study of „Incukalns Underground Gas Storage Enhancement".
- 16.03.2017 Decision of the Board of JSC „Conexus Baltic Grid". Acceptance of procurement documentation for the feasibility study „Incukalns Underground Gas Storage Enhancement".
- 12.04.2017 Decision of the Board of JSC „Conexus Baltic Grid". Acceptance of the contract on funding allocation from European Infrastructure fund for the feasibility study „Incukalns Underground Gas Storage enhancement".

- 21.04.2017. JSC “Conexus Baltic Grid” board decision. Winner of procurement for feasibility study of Inčukalns UGS enhancement JSC “Ramboll Denmark” is selected.
- 19.07.2017. JSC “Conexus Baltic Grid” board decision. Regarding interim report of feasibility studies results of Inčukalns UGS enhancement made by JSC “Ramboll Denmark”.
- 28.11.2017. JSC “Conexus Baltic Grid” board decision. Final report and results of feasibility study of Inčukalns UGS enhancement made by JSC “Ramboll Denmark”.
- 15.01.2018. JSC “Conexus Baltic Grid” board decision. Beginning of preparation of investment request for Inčukalns UGS enhancement. Activities included in the request in total investment scope of 88 000 k EUR.

Permitting process

Reference to ACER Recommendation 5/2015 1.5 (4.):
A short description of the status of the project permitting process in all hosting countries, including a detailed schedule (in line with Annex VI (2) of Regulation (EU) No 347/201 3) and corresponding evidence.

Local municipalities issue Construction permits in accordance with the Construction law based on draft Project design. Draft design prior to permitting process shall be agreed with landowners owning the land in the construction area. Surface infrastructure, gas compression units and 11 wells from 36 are located on lands belonging to project promoter - JSC “Conexus Baltic Grid” therefore no difficulties are expected during the permitting process. For another 25 wells it is estimated to collect all the agreements with landowners until the end of 2019. Project promoter has prior experience in cooperation with landowners. Storage wells are operational for long time, and land owners are regularly approached for maintenance and inspection works.

Construction permit is basis for detail engineering and further construction.

Table 9 Permits for implementation of project

Activity	Permits scheduled
Surface infrastructure	10.2020
Wells:	
6 pcs	Obtained on 07.09.2018
30 pcs	09.2019.
Gas compression units:	
Installation of additional gas compression unit	01.2021
Strengthening of existing compression units	Not applicable

Project Maturity

Reference to ACER Recommendation 5/2015 1.5 (5.):

Information about the sufficient maturity of the project

- *Sufficient certainty about the costs assessed by the project-specific CBA;*
- *Good knowledge of the factors affecting expected costs and their ranges;*
- *As regards investment costs, a cost uncertainty range should be identified. The maximum investment cost should not exceed the minimum investment cost by more than 20%;*
- *Reasonable foresight of the benefits assessed by the project-specific CBA;*
- *Reasonable foresight of factors affecting benefits and their ranges, also with regard to different scenarios and sensitivity analyses;*
- *Permitting procedures have started in all hosting countries;*
- *Commissioning to be achieved indicatively within 60 months from the date of submission of the investment request.*

The Project promoter has taken various factors that might influence total costs of the project into account during the assessment for each activity of the Project. The Project promoter is confident about the expected costs, considering the existing experience of similar projects and corporation with other storage operators in Europe.

The Project promoter assess the risk related to uncertainty of investment pricing in range of 5%. The uncertainty is due to market situation related to steel prices.

The cost and timing estimates take into account potential environmental risks that might arise in permitting process or during project execution. Although environmental factors do not have significant financial effect on costs of the project, it might cause Project delays.

Table 10 Expected costs (thousands EUR) by activities and by years.

Activities Years	Surface	Wells	Gas compression	Total
2019	-	4 900	1 740	6 640
2020	950	5 800	1 270	8 020
2021	4 170	4 060	2 775	11 005
2022	7 900	4 070	11 610	23 580
2023	8 280	4 070	7 600	19 950
2024	4 710	4 100	3 705	12 515
2025	6 290	-	-	6 290
TOTAL (k EUR)	**32 300**	**27 000**	**28 700**	**88 000**

Project is managed by Project Management office. The project promoter has assigned qualified Project manager with more than 15 year experience in gas industry (14 years as Head of Inčukalns UGS). The Project promoter ascertain the project team is sufficiently and professionally staffed to complete project according to enclosed project plan.

As mentioned before, Conexus conducted gas flow studies for transmission system using OPTIPLAN for modeling gas streams in all exit points from Latvia. Storage modeling has been done using ECLIPSE 100 for IUGS productivity at different outlet pipeline pressures.

Many preliminary activities as feasibility studies, preliminary designing, public consultations, market tests, partially agreements with landowners are already completed, including:

- The construction permission for 6 wells renovation with increasing productivity is received on 07.09.2018.
- The detailed technical design of renovation of 36 wells with increasing productivity is finished in 2015.
- Accurate and detailed implementation schedules are developed.

Maturity comparison to other projects in the region

The table below illustrates the maturity of gas projects in the region. IUGS enhancement is necessary for unified market zone development in order to ensure a stable gas delivery in the region, particularly with low storage filling that is usually evidenced in February and March, when cold spells are still likely to occur.

Table 11 Maturity comparison of gas projects in the region

	IUGS enhancement	Enhancement Latvia-Lithuania interconnection	GIPL	Baltic Connector
Commissioning	2025	2023	2021	2020

Description of Project promoter

Based on the requirements of the EU III Energy package, the Latvian government took the decision in February 2016 to liberalize the Latvian natural gas market. The decision included the requirement for a stepwise unbundling of the formerly integrated business activities of Latvijas Gāze as well as opening of the Latvian gas market to competition. In early January 2017, Latvijas Gāze spun off its transmission and storage business into the newly founded company JSC Conexus Baltic Grid. On April 3, 2017 – the non-household segment of the Latvian natural gas market was open to competition.

From technical perspective, unlike other regions, Baltic transmission system is functioning through active use of storage – storage is designed as integrated part of transmission system. Although transit route through Latvia is more than 300 km long, the transmission system does not have any line compressors. Due to such design, politicians decided to establish unified gas transmission and storage operator, defining that both segments shall be fully regulated. The only income from storage operations is through tariffs approved by Public Utility Commission. Conexus is unified gas storage and transmission operator.

Figure 3 Vission. Mission. Values

Conexus is an independent and competitive company with a high quality of service that enables development opportunities for customers as well as employees.

According to the 5 December and 19 December 2017 decision of the Cabinet of Ministers, shares of CBG were purchased by the Latvian power transmission system operator JSC Augstsprieguma Tīkls (hereinafter referred to as AST). Shares in equity of AST are held by the Ministry of Finance, therefore the Conexus equity shares are owned by the Latvian state.

Vision

To become the most reliable energy source in the region by facilitating the development of the transmission system and using the potential of the underground gas storage.

Mission

To promote sustainable energy market in the region, offering reliable operation of natural gas transmission and storage system.

Values

- **Secure operation of the system** – we ensure secure operation of the infrastructure through regular infrastructure monitoring.
- **Flexibility and openness through competent solutions** – we are in favour of market development and open to new solutions that support market development.
- **Sustainable development** – to protect people and the environment from potential safety risks, we regularly invest in modernisation and security of the gas system and technological development..
- **Professional and united team** – we appreciate professionalism in everything we do and our colleagues, customers and partners can rely on us.

Sustainability

We are a socially responsible company that enables the growth of employees and contributes to the overall development of the industry by creating sustainable employment and added economical value, while taking care of the impact of technological processes on the environment.

The company cooperates with legal entities — registered natural gas traders in the region, providing services in accordance with the natural gas transmission system and IUGS service tariffs approved by the Public Utilities Commission (hereinafter referred to as PUC).

Conexus manages the only functioning underground gas storage facility in the Baltic States, which provide regional gas supply stability and is an important strategic object in the entire region. It ensures the energy security and independence of the entire region. The active natural gas reserves of IUGS may reach up to 24.2 TWh (2.3 billion cubic metres), which is enough to fully provide for the natural gas needs of Latvia and the region during the heating season. For traders, it provides the possibility to store natural gas in a strategic location.

The advanced mainline natural gas transmission system, which is part of the company's structure, is 1,191 km long and connects the Latvian natural gas market with Lithuania, Estonia and Russia. The transmission system allows traders to provide flexible and reliable supply of natural gas to customers, as well as international transit, which is the cornerstone of the region's natural gas supply.

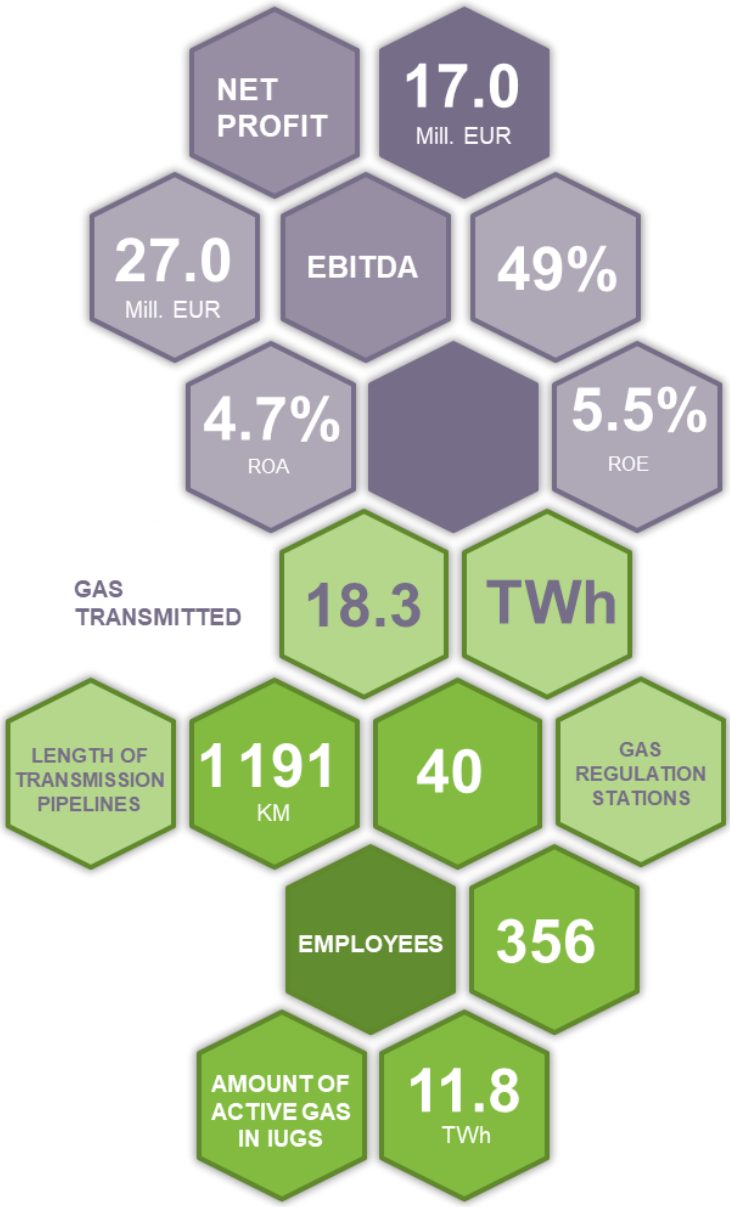
In order to provide effective natural gas supply and delivery options for traders, Conexus maintains and improves the mainline transmission system and storage infrastructure, makes the required investments in infrastructure development, monitors and controls the stability of the transmission network and storage facility eliminates any damage that has occurred.

After market opening in Latvia, Conexus took active role in promoting storage products to traders registered in Latvia and neighbouring countries. One year after market liberalization Conexus has 23 transmission agreements and 15 storage agreements. Taking into account changes in market, storage is mostly used for supply to Baltic counties.

Transmission system offers standard capacity products - yearly, quarterly, monthly, day-ahead, and within-day capacities. From mid 2018, entry and exit from storage as 100% discount. Currently storage has three main products – Standard Bundles Unit, Market price based product and reverse flow product. Due to short market experience, IUGS products are under contract review and improvement.

Facts and Figures

Figure 5. Conexus Facts and Figures (2017 data)



IUGS description

IUGS currently is the only underground gas storage facility in the eastern part of the EU Baltic Sea region. During the summer season, natural gas is injected into IUGS and extracted in the winter to ensure the supply of natural gas to customers in Latvia and, where required, to other Baltic countries. IUGS currently offers a very flexible storage product capable of ensuring the available gas volume without contractual restrictions in respect of injection and extraction capacity. It is only limited by the available transmission capacity and the geophysical parameters of IUGS.

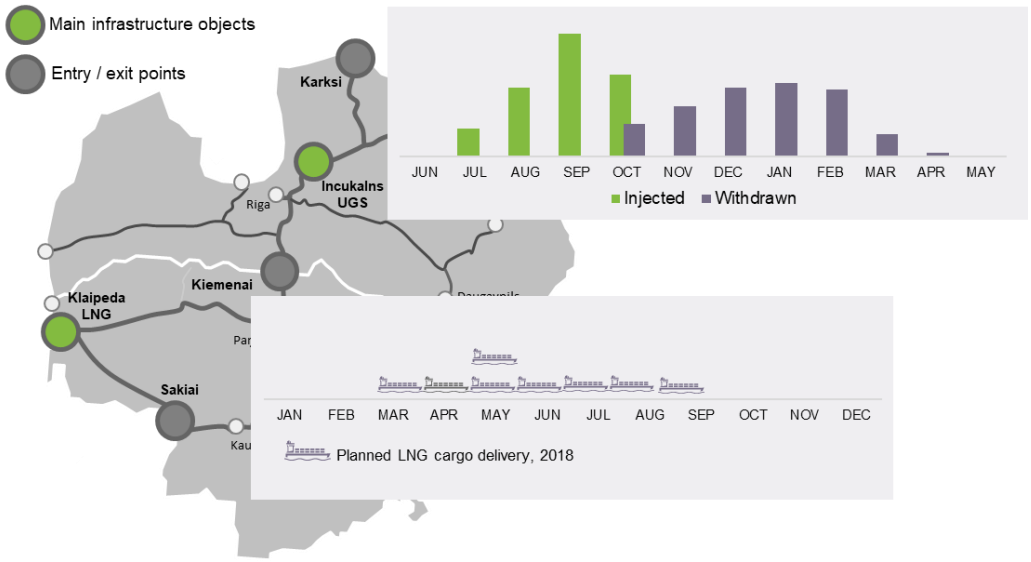


Figure 6 Key infrastructure objects.[2]

Table 12 Parameters of gas storage system in Latvia

Parameters of gas storage system in Latvia	
Natural gas consumption	13,1 TWh
Total gas storage capacity	24,2 TWh
Number of gas storage facilities in the country	1
Gas storage price	regulated
Number of storage system operators	1

The key natural gas infrastructure objects in the Baltic states are the IUGS and the Klaipeda LNG terminal.

- **IUGS** is an integral part of the Baltic natural gas supply system and is the only functionary storage facility in the Baltic states and ensures the stability of the regional gas supply. During the summer season, when consumption of natural gas is several times lower than in the winter season, natural gas is injected into the storage to be delivered to customers in Latvia, Estonia, the north-western region of Russia and (in smaller amounts) in Lithuania during the heating (winter) season. The total capacity of IUGS has been 4.47 billion m^3, of which 2.32 billion m^3 has been active gas or gas that has been regularly extracted.
- Historically, the region has been dependent solely on natural gas supplies from Russia, but since the opening of the Klaipeda LNG terminal in 2014, an alternative natural gas supply route is available in the region. Since the terminal was opened, more than 50 shipments of natural gas from suppliers in Norway, USA and other countries have been received. In 2017, natural gas received from the Klaipeda LNG was injected into the IUGS.

To ensure the sustainability of the storage and the organization, and the environmentally friendly development, JSC “Conexus Baltic Grid” has implemented IUGS management system and the storage has received ISO: 14001:2004 certificate. With the help of environmental management system, a closer link is maintained between the organization professionals, local government, public authorities and the public on the topic of environmental issues. In addition, IUGS implements a protection systems management standard LVS OHSAS 18001:2007, which proves that in this area the processes going on in the storage are going in tradition of the best of European standards.

[2]Klaipėdos Nafta, 15 June 2018; "Joint annual schedule of the terminal of gas year 2018"; accessed: https://www.kn.lt/uploads/files/dir54/dir2/16_0.php

In accordance with the "Study of increased flexibility and use as strategic storage" performed by Ramboll in 2017, the role of the storage in Baltic market is changing, and include three different areas of use – short term use; seasonal usage and security of supply usage. Based on study, short-term usage refer to LNG parking, power plant usage, peak demand management and commercial optimisation. Based on assessment, storage is contributing to security of supply in all three Baltic states.

The study also indicated increasing role of the storage in providing back up for renewable electricity generation, including needs for Nordic countries. Storage is located close to Latvian electricity generation plans, providing immediate access to gas, if required. Storage could benefit for closer collaboration between electricity and gas industries.

TSO consultations and regional cooperation

ACER Recommendation 5/2015 1.5 (6.):
Information on TSO consultations and the results of the consultations;

Project promoter organized meetings with Estonian and Lithuanian TSOs about the project scope and benefits. Both TSO are introduced with Project's CBA and CBCA. Estonian and Lithuanian TSOs have positively responded to the project scope and benefits and commented support for IUGS enhancement project. Additionally, Conexus sent official letter No.01-11/774 to Estonian TSO Elering and Lithuanian TSO Amber Grid on 21.09.2018 with the request to provide Project promoter with written support letter.

BUSINESS PLAN

Reference to ACER Recommendation 5/2015 1.5 (8.):
A business plan including a description of the chosen financing solution (including tariffs), and information on awarded, applied for and expected grants and loans, also differentiating on national, European and other sources, as well as on the estimated financing costs (indicating an estimation of the part of financing costs to be incurred until commissioning of the project). In Member States where the tariff calculation is carried out by TSOs, a description of the respective applicable national methodologies for tariff calculation and of the project's impact on network tariffs should be provided in sufficient detail.

Business plan evaluates the financial viability of the Project, including chosen financing solution, and the results of the Market Testing procedure.

The aim of this section is to:

- Identify the crucial outlays and costs related to the Project.
- Present the pursued financing structure of the Project-related outlays and costs.
- Present the results of market demand assessments (Market Testing procedure).
- Evaluate the Project's financial viability

This section has been prepared in line with ENTSOG and EC Guide to CBA. The key items of the Business plan section are discussed in the subchapters below.

CAPEX, OPEX and financing structure

The aim of this subchapter is to provide an overview of outlays and costs related to the construction and operation of the IUGS enhancement under the base case assumptions and present the selected solution for it's financing.

The scope of the IUGS enhancement includes:

- Enhancing gas compressors
- Increasing productivity of 36 wells.
- Increasing capacity of UGS surface facilities.

Technical parameters of the Project are described in a greater detail in (Project technical solution).

Project-related outlays consist of capital (CAPEX) and operational (OPEX) expenditures. CAPEX is expected to amount to 88.0 EURm, out of which

- 28.7 EURm is attributable to increasing power of gas compression units
- 27.0 EURm is attributable to increasing productivity of wells.
- 32.3 EURm is attributable to increasing capacity of surface infrastructure.

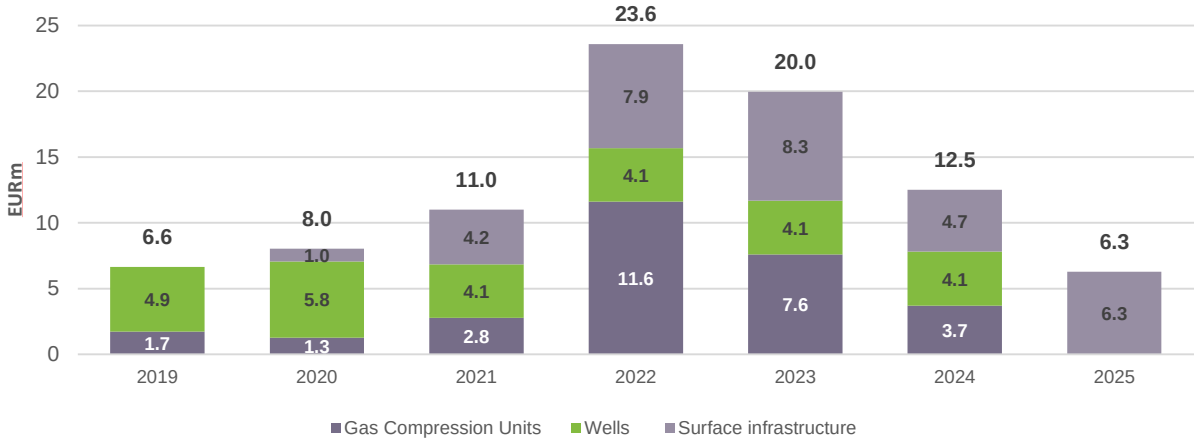


Figure 7 Project-related capital expenditures

OPEX will be incurred by Conexus on a yearly basis and is expected to amount to 0.85 EURm, out of which 0.10 EURm is attributable to fixed OPEX and 0.75 EURm to variable OPEX.

Figure 8 Project-related operational expenditures

The incremental OPEX have been estimated with the following considerations:

- Variable OPEX
  - Gas for driving of gas compression unit – 4 TWh m3 of gas is expected to be extracted with compression annually. Estimated consumption of fuel gas is 0,75% (30 000 MWh) and gas price 20 EUR/MWh, thus the cost of compression extraction is estimated at 600 000 EUR/year.
  - Electricity cost for compression extraction is estimated at approximately 100 000 EUR/year (during 2018 the injection of 10 TWh caused electricity costs of approx. 500 000 EUR, however, the cost of 50 000 EUR/TWh will be lower for the Project due to 1 pressure increasing step vs. 2 steps during injection, therefore 25 000 EUR/TWh is assumed. As previously, the estimated 4 TWh of extraction with compression annually translates to 100 000 EUR/year)
  - Incremental increase in the OPEX of IUGS because of extended infrastructure – 50 000 EUR/year.
- Fixed OPEX
  - Spare parts for equipment – 50 000 EUR/year
  - Service costs of equipment – 50 000 EUR/year.
- No expected incremental OPEX for wells.
- Part of assets (wells, surface infrastructure) are expected to start depreciating during the project (with a depreciation period of 40 years)

The enhancement of the IUGS is expected to be partially financed by EU support in the form of CEF grants. The value of the funds received from CEF will be dependent on the eligibility of project-related capital expenditures. The remaining part of CAPEX will be covered by a 50/50 mix of debt and equity.

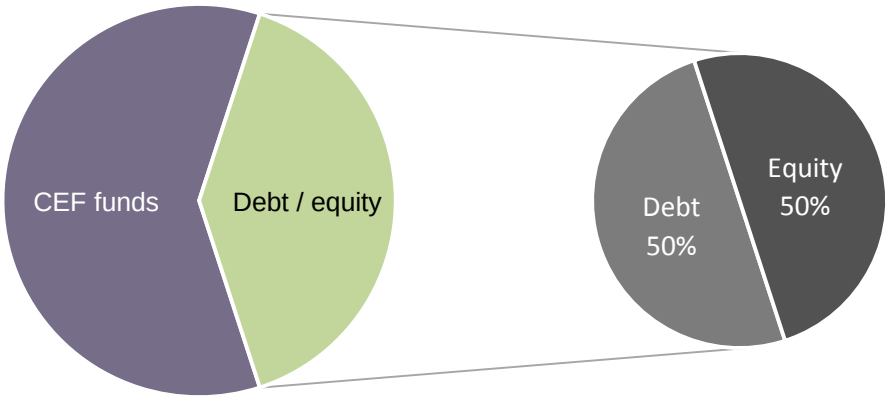


Figure 9 Illustrative funding structure of the Project's CAPEX

Results of Market Testing

The major objective of Market Testing related to enhancement of IUGS was to assess general, non-binding interest of market players in using the Project in the future. It was conducted in the August 2018. Key market players in the region were sent a Market Testing questionnaire and asked to make an unbinding indication of:

- their potential level of interest in making capacity booking at IUGS in years 2026-2046
- optimal withdrawal schedule
- target destination markets of stored gas
- acceptability of tariff increases

Market Testing questionnaires were received from all major market participants. As such, Market Testing procedure was evaluated as successful.

For the purpose of further financial and economic analyses, it was crucial to identify additional capacity bookings that would appear in IUGS solely due to the enhancement. Consequently, the obtained capacity bookings were divided into substitutional (substituting existing bookings) and incremental (new bookings).

Market Testing participants indicated that the Project is welcomed by the market with interest and appreciation, with its potential users looking forward to taking advantage of the IUGS's increased flexibility. Interest of market players was further confirmed during telephone contacts and informal discussions, in which specific companies stated that:

- „We (…) strongly support projects like this which increase true diversification of sources and routes of supply"
- „The IUGS expansion will allow us to tap into short-term trading opportunities which we did not have before. Increased flexibility of the IUGS is something that we have been looking for."
- „The idea behind the Project is most justified: (…) it should allow to increase the liquidity of the wholesale market (…) we fully suport it"
- „With higher withdrawal capacity, IUGS will be able to play a larger role in peak shaving during winter months."

Market Testing results received from major market participants indicate continued interest in the usage of IUGS after the enhancement. Nonetheless, none of the capacity bookings declared in the received Market Testing questionnaires was identified as incremental.

Not all of the current users of IUGS submitted their replies to the Market Testing procedure, however, on the basis of key market players interest, it was assumed that they will continue to utilize the IUGS at the same level as they do currently. Moreover, no estimates of short-term storage volumes (for trading purposes) was provided despite the expressed interest. Consequently, the expected demand for IUGS seasonal balancing and month-per-month withdrawal remains at the current level.

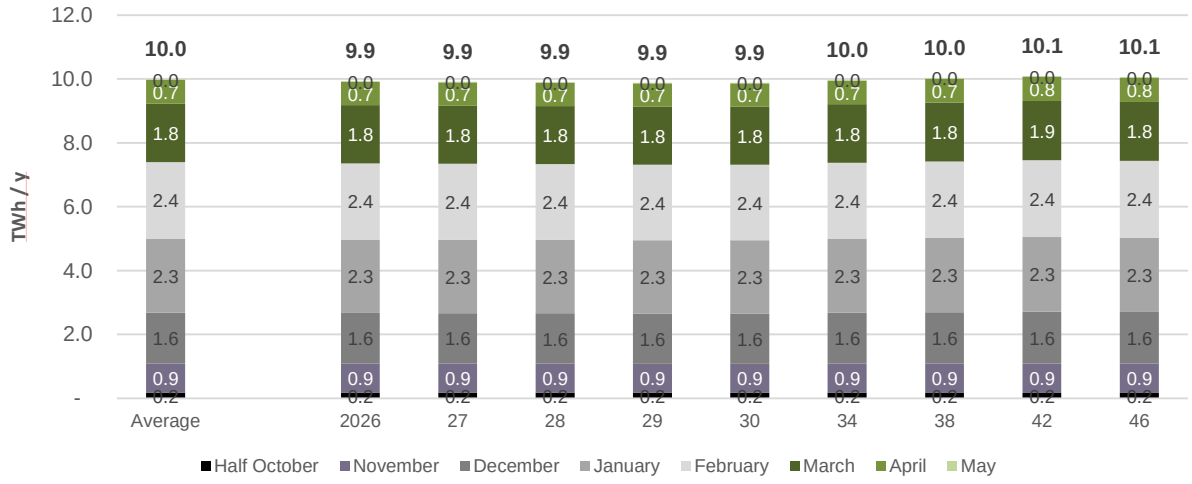


Figure 10 Volumes of gas to be injected in the enhanced IUGS and month-per-month withdrawal schedule according to declarations of Market Testing participants [TWh, 2026-46]

Nonetheless, despite the positive reception of the Project and the possibilities it brings, its potential users would rather not see IUGS tariffs increase. Majority of companies, which submitted Market Testing questionnaires, stated that they would not be willing to pay an increased IUGS tariff if the withdrawal capacity is increased. Furthermore, these companies constitute key users of the IUGS as they declared 94% of the overall expected volumes of gas injected into the IUGS.

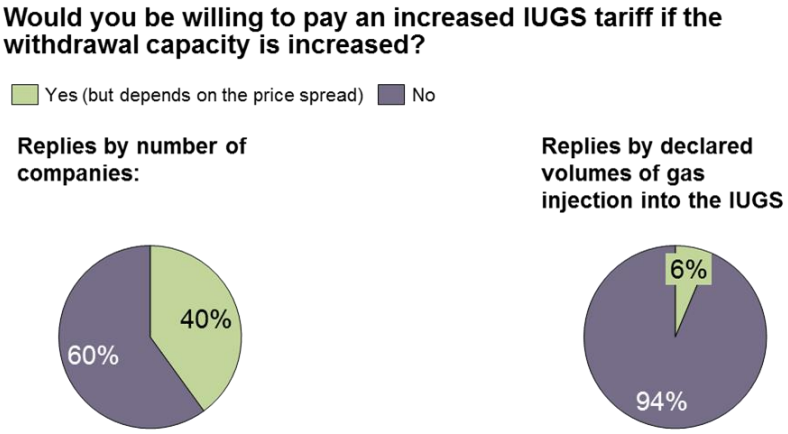


Figure 11 Survey results

Profitability analysis

The main goal of the financial analysis is to capture the general financial performance of the Project, without accounting for its financing structure. The approach to performing the financial profitability analysis is based on the 2nd ENTSOG CBA Methodology draft from July 2017 and the EC Guide to CBA of Investment Projects 2014-2020.

The final output of the financial profitability analysis is a set of three financial performance indicators, which were computed at both the total Project-, as well as the Project Promoters level:

- Financial Net Present Value (FNPV) - this indicator represents the absolute, discounted value added produced by the Project measured in Euro (a value of above zero will suggest positive Project profitability)
- Financial Internal Rate of Return (FIRR) - this indicator represents the Project profitability measured in as a percentage rate of return (a value above the financial discount rate will suggest positive Project profitability)
- Financial Benefit-Cost Ratio (FBCR) – this indicator represents a ratio of discounted benefits to discounted costs (a value of above one will suggest positive Project profitability).

The above set of three common indicators based on ENTSOG and EC guidelines ensures the comparability between projects both at Project Promoter's and European Commission level.

Figure 12 Simplified approach to calculation of financial profitability indicators

According to ENSTOG and EC methodologies, only selected groups of cash flows should be selected for financial analyses. These cash flows include:

- Investment outlays (CAPEX).
- Operating outlays (OPEX).
- Financial / economic inflows (revenues and residual value).

Table 13 Overview of cash flows taken into account for financial profitability estimation based on 2nd ENTSOG CBA methodology from July 2017 and EC Guide to CBA of Investment Projects 2014-2020

Cash flow	Description
CAPEX	Project total expenditures (TOTEX) including CAPEX and OPEX have been describe in a greater detail in subchapter Technical Solution (CAPEX, OPEX and financing structure)
OPEX	Project total expenditures (TOTEX) including CAPEX and OPEX have been describe in a greater detail in subchapter Technical Solution (CAPEX, OPEX and financing structure)
Revenues	The Project is not expected to invoke incremental long-term storage volumes (and no incremental short-term volumes were provided in Market Testing). Assuming no tariff increase, incremental revenues from the Project are zero. Assumption of no tariff increase in the initial FNPV calculation is adopted based on: • market players' expectations expressed in Market Testing • methodologies adopted in Investment Requests of other gas infrastructure projects in the Baltic region which were already approved by respective NRAs and the EC (e.g. the GIPL Project). The revenues of the Project are considered 0 (no revenues are foreseen) since the Project results are not going to be provided/sold as a separate service, but included in the scope of separate different already existing services provided by the Project promoter: transmission services and storage booking services. IUGS storage booking services offers new basic products for the users purposefully designed to convenient and economically viable in the new natural gas market conditions offers: Bundled capacity product and Market product. Each product includes injection, storage and withdrawal services, where bundled product also includes virtual reverse flow. The products include various fixed and interruptible capacity services. Taking into account that the IUGS services are sold as packages and not separately, the unbundling is not possible.
Residual value	Residual value was computed as net value of IUGS enhancement assets at the end of year 2046 (end of the 20 year forecast period).

In line with the abovementioned assumptions, the IUGS enhancement project is not profitable in financial terms and as such does not offer the Promoter sufficient incentives for pursuing its implementation. It is further confirmed by a negative FNPV of 71.4 EURm and low value of FRR and FBCR indicators equal to -5.1% and 0.1 respectively.

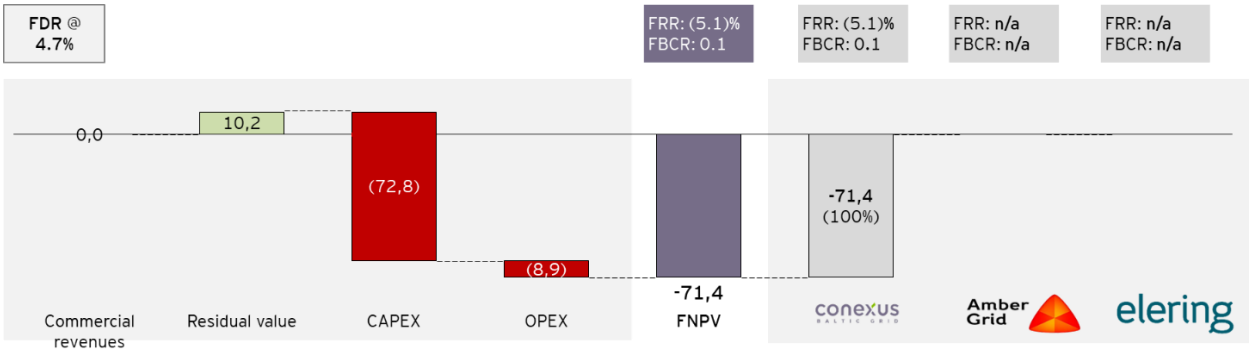


Figure 13 Project FNPV per financial cash flow component at the total Project and per TSO level [2026-2046 discounted; EURm]

Detailed financial profitability calculations are presented in Annex 1.

Sensitivity analysis (FNPV)

The main objective of the sensitivity analysis done with regard to the financial profitability results is to determine how the Project's financial profitability changes depending on the CAPEX and OPEX fluctuations.

This was achieved by simulating impacts, that a change in a single variable would have on the end result (FNPV). In order to limit the complexity of this analysis both in terms of number of assessments and interpretability of results, key input data was tested one-by-one, leaving everything else unchanged (a 'ceteris paribus' analysis). Changes in the input variables were tested at 10% intervals in the range from 80% to 120% of base value.

Table 14 Sensitivity analysis for the Project's FNPV for % of input base value [EURm]

Value of FNPV for % of base CAPEX and OPEX [EURm]

	% of base value				
	80%	**90%**	**100%**	**110%**	**120%**
CAPEX	-61.7	-66.6	-71.4	-76.3	-81.1
OPEX	-69.7	-70.7	-71.4	-72.3	-73.2

Table 15 Sensitivity analysis for the Project's FNPV for different first year of Project operations [EURm]

Value of FNPV for different first year of Project operations [EURm]

% of base value			
2026	**2027**	**2028**	**2029**
-71.4	-70.8	-70.2	-69.7

PROJECT-SPECIFIC COST-BENEFIT ANALYSIS

PS-CBA evaluates the socio-economic viability of the Project, including Project's financial and socio-economic cash flows, and the results of the sensitivity analysis.

The aim of this section is to:

- Incorporate the results of the Business plan.
- Supplement Project's financial cash flows with socio-economic cash flows.
- Perform sensitivity analysis on socio-economic benefits.
- Evaluate the Project's socio-economic viability.

This section has been prepared in line with ENTSOG and EC Guide to CBA. The key items of the PS-CBA section are discussed in the subchapters below.

PS-CBA methodology

The CBA is based on ENTSOG methodology of Energy System Wide Cost Benefits Analysis. The purpose of the cost benefit analysis methodology is to provide a tool to reflect the contribution of the candidate PCI projects to meet the criteria requested by the Regulation.

The CBA methodology is composed of two steps:

- the TYNDP-Step, providing an overall assessment of European gas system under different level of development of infrastructure;
- the Project-Specific Step (PS-Step), providing an individual assessment of project impact on the European gas system based on common dataset defined through the Ten-Year Network Development Plan step (TYNDP-Step) and project specific data.

PS-Step is following the same stages as the TYNDP-Step with the following additions:

- the calculation of the n-1 indicator;
- the calculation of Economic and Financial Performance Indicators;
- a sensitivity-analysis on project-specific data;
- a qualitative analysis commenting on the previous results and justifying potential additional benefits of the project (especially for project connecting new areas to the European gas market).

The assessment of the project is carried out on the years 2016-2046 and presented in the Investment request on the years n, n+5, n+10, n+15 and n+20 (n being the year of analysis), therefore, the presented period is covering years 2026, 2031, 2036, 2041 and 2046. In calculations of the Economic and Financial Performance Indicators, the extended time horizon is used. This covers the period from the year of the analysis until the 20th full year of operations. In the CBA three gas demand scenarios are modelled: Green Revolution, Green Evolution and Blue Transition. The green scenarios covers the significant impact of decarbonisation targets. Green Evolution, takes a national perspective and Green Revolution takes accelerated European or even global perspective on the energy transition, in light of recent developments such as the Paris Agreement and the latest EU Climate Package. The Blue Transition scenario shows efficient achievement in terms of green ambitions under a context of moderate economic growth, but does not reach the level of the Green scenarios.

The implementation of the PS-Step is composed of three major components – Financial analysis, Economic Analysis and Qualitative Analysis. Corresponding output of these components are as follows: Financial Performance Indicators, Economic Performance Indicators and Reflection on other benefits of the project.

A number of the benefits from the Project are identified in the CBA. However, many of the benefits are inherently challenging to quantify and further monetize. Many of the benefits are connected to the wider

European Union level vision of Energy Union and connecting the Baltic States to the European internal gas markets. As a result from the EU Energy security stress tests, from ENTSOG TYNDP and other analyses, the European Commission concluded that Finnish-Baltic region is most vulnerable region in EU in terms of gas supply. The Project ensures gas movement via the unified market zone and sufficient pressure levels in the national transmission system.

The CBA looks at the regional benefits from the Project, however due to GIPL connection to Central Europe, different benefits can arise which have wider geographical consequences. In the CBA, efforts are made to monetize as many benefits as possible, for which robust methodologies exist.

Due to the historical progress of the Project (as described in Project description), certain positive socio-economic externalities have appeared due to CBMZ developments that have taken place after PS CBA completed by ENTSOG in 2017. Therefore the PS-CBA of the Project combines ENTSOG PS_CBA results with additional economic benefits assessed for the project.

Detailed CBA calculations are given in Annex 2 and their summary is presented in the following chapters.

Financial analysis

This section provides a short summary of the financial profitability analysis, as required by the relevant regulations. The key financial performance indicators of the Project are presented below.

Table 16 Financial performance indicators for Latvia

	Unit	Value
FNPV	MEUR	(71,4)
FIRR	%	(5,1)%
FBCR	%	(0,1)%

In conclusion, the IUGS enhancement project is not profitable in financial terms and as such does not offer the Promoter sufficient incentives for pursuing its implementation.

- The Project is not expected to invoke incremental long-term storage volumes (and no incremental short-term volumes were provided in Market Testing). Assuming no direct service revenue, incremental revenues from the Project are zero.
- Residual value computed as net value of IUGS enhancement assets at the end of year 2046 (end of the 20 year forecast period).
- Project TOTEX including 88.0 million EUR CAPEX and 0.85 EURm / y OPEX (undiscounted).
- The whole project profitability is attributed to Conexus, which is the sole Project Promoter.

Consequently, EU support is required in order to close the funding gap of the Project.

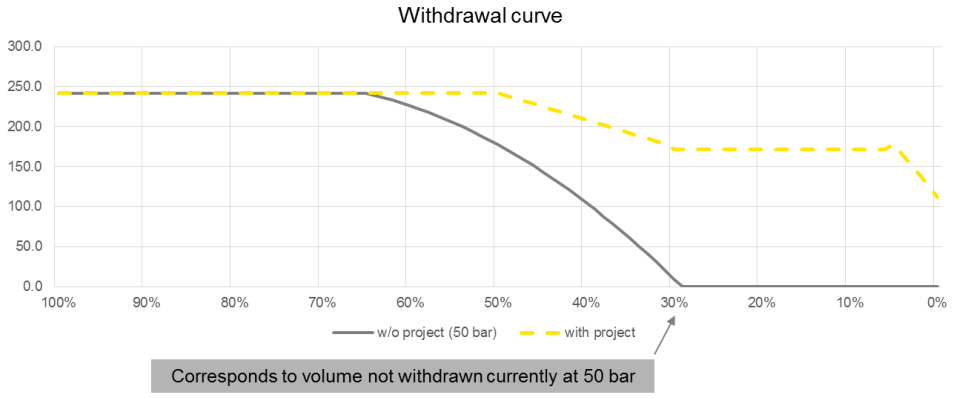
Economic analysis

Reference to ACER Recommendation 5/2015 1.5 (7.e):
A detailed assessment of the efficiency of the expected costs of the project;

In order to calculate the economic performance indicators, benefits and costs are identified and monetized. For discounting the social discount rate of 4% has been applied in accordance with the

ENTSOG methodology[3]. Specific assumptions for the economic cash flows categories utilized in the course of the Cost Benefit Analysis are presented in the table below.

Table 17 Assumptions for economic performance indicators

<table>
<tr><th colspan="2">Costs and benefits</th><th>Assumptions</th></tr>
<tr><td rowspan="3">Costs</td><td>CAPEX</td><td>Same assumptions as for Financial Performance Indicators. Please see the respective section for information about the assumptions.</td></tr>
<tr><td>OPEX</td><td>Same assumptions as for Financial Performance Indicators. Please see the respective section for information about the assumptions.</td></tr>
<tr><td>Interest expenses</td><td>Same assumptions as for Financial Performance Indicators. Please see the respective section for information about the assumptions.</td></tr>
<tr><td>Benefits</td><td>Competition (Saved Costs of Working Capital („SCoWC”))</td><td>Saved working capital costs calculation quantifies the degree to which the IUGS has to be filled, in order to cover the minimum demand for the storage in the Baltics without the occurrence of disruptions.
Minimum demand (daily need) for the storage in the Baltics is calculated based on the daily gas consumption in the Baltics, which was historically not covered by annual base load imports of gas to the Baltics. Thus, this is a conservative assumption calculating with the theoretical minimum volume at which the IUGS would have to be used in order to cover daily gas consumption in the Baltics without any disruptions.
Gas consumption of the Baltics is based on daily historical data about consumption in 2015, 2016 a 2017 (after 1 May 2017 in case of Latvia). The dataset is built on daily data on gas flow (Lithuania, Estonia) or allocation (Latvia) on cross-border interconnection points of the given countries, netted to derive a daily consumption in each country and finally adjusted by Eurostat data on annual natural gas consumption. Daily data on gas flow and allocation were gathered from corresponding TSOs' websites.
The calculation reveals that before the IUGS enhancement, with planned transmission system pressure of 50 bar, the storage would need to be filled to 60% (8.958 TWh) in order to provide sufficient withdrawal capacity; however, after the enhancement, only 27% (0.966 TWh) of the storage would be needed to provide sufficient withdrawal capacity.
The following table presents an overview of assumptions to the calculation of saved working capital costs:
<table>
<tr><td>Price of natural gas*</td><td>20</td><td>EUR/MWh as of 2018</td></tr>
<tr><td>WACC</td><td>4,7</td><td>% p.a.</td></tr>
<tr><td>Number of days[4]</td><td>450</td><td>days</td></tr>
</table>
The situation is illustrated in the following chart:


</td></tr>
</table>

[3] 2nd ENTSOG methodology for cost-benefit analysis of gas infrastructure projects

[4] average time of gas remaining in the storage (for the gas, which is not withdrawn at the end of the current storage period)

<table>
<tr><th>Costs and benefits</th><th>Assumptions</th></tr>
<tr><td></td><td>*Assumptions have been applied that the natural gas price shall develop according to the World Bank Commodity Markets Outlook. The table below provides the assumptions used in the CBA model per years:
<table>
<tr><th></th><th>2026</th><th>2031</th><th>2036</th><th>2041</th><th>2046</th></tr>
<tr><td>Price of gas

(post-2018 source: World Bank Commodity Markets Outlook)</td><td>21,2</td><td>23,0</td><td>24,3</td><td>25,5</td><td>26,7</td></tr>
</table></td></tr>
<tr><td>Security of supply (Saved Costs of Gas Disruptions („SCoGD”))</td><td>When quantifying the impact of the IUGS enhancement on disrupted demand of gas, we calculated cost of short-term gas disruption to the economy as
• GDP * Share of natural gas on GDP * Resilience of the economy to short-term gas disruption / Natural gas demand where GDP
o Latvia in 2016 = EUR 25,925.2 million
o Lithuania in 2016 = EUR 40,222.6 million
o Estonia in 2016 = EUR 21,949.0 million
o GDP growth since 2024 is fixed at 3% p.a. for each of the countries
• Share of natural gas on GDP = natural gas consumption as per ENTSOG 2017 scenarios Green Evolution, EU Green Revolution, Blue Transition (equal weight assigned to each of the three scenarios) divided by total consumption of energy (2016 levels, fixed)
• Resilience of the economy (possibility of short-term gas substitution in case of disruption) = 25%
• Probability that disruption occurs in a given year is 5%, i.e. a disruption occurs once in 20 years.

For disruption volumes with and without the IUGS enhancement, we use ENTSOG 2017 PS-CBA estimates for 1 Design Case day and 2 Weeks disruption scenario. The estimates are still applicable, because when comparing the storage volume saved following the IUGS enhancement between the previous (submitted in 2014) and current investment request, the conclusion is that the current project scope contributes to 670 mcm of storage volume savings (which is the volume at which withdrawal would have to stop at required 50 bar pressure in the base case), while the previous investment request project scope saves 535 mcm (which equals increase in working gas volume of the storage). In other words, the historical scope of the Project was causing positive externality to society by an extra 535 mcm of gas to cover the disruptions, while the current scope of the Project contributes by an extra 670 mcm of working gas volume. Using ENTSOG PS-CBA data of 2017 on disruptions thus can be considered a sufficiently conservative assumption.</td></tr>
<tr><td>Discount rate</td><td>The social discount rate (4%) suggested by ENTSOG has been used to estimate the discounted value of costs and benefits.</td></tr>
</table>

This chapter is constituted by identification of impacted countries (i.e. identification of societies which will be subject to the CBA analysis), monetization of socioeconomic externalities, calculation of economic profitability indicators and sensitivity analysis for ENPV.

Identification of impacted countries

In addition to Latvia, the foreign countries most impacted by the Project are Lithuania and Estonia (as users of IUGS services currently which is planned to continue in the future). The IUGS usage per country is foreseen around 10% for both Lithuania and Estonia, and roughly 80% for Latvia. Neighbouring countries have the direct interconnections with Latvia as well as the Klaipeda LNG terminal is a user of IUGS. After the improvement of the Latvia-Lithuania interconnection in 2023, the increase of the interconnection capacity will enable the exchange of greater volumes of natural gas between Latvia and Lithuania, which will be especially important after establishment of the single Baltic natural gas market. As well, the improvement of Latvia-Estonia interconnection (Karksi) will allow the increase of natural gas flows and allow Estonian and Finnish traders to store natural gas at IUGS. However, for the purposes of CBA, the current user portfolio is considered, therefore, impacted countries for economic analysis are Latvia, Lithuania and Estonia.

Monetization of socioeconomic externalities

The Project has significant potential to contribute to the realization of EU Objectives for energy market development (i.e. Competition, Market Integration, Security of Supply and Sustainability). The contribution can materialize by i.a:

- positively impacting the bargaining power of local players vs the currently dominant supplier of gas to the region (and as a result lowering the cost of gas supply for the region),
- improving assets' efficiency by eliminating the upkeep costs of the currently used cushion gas,
- lowering the costs of energy interruptions after desynchronization from Russia, enabled by providing a gas supply backup in an power & gas energy coupling scheme,
- reducing emission volumes of CO2, NOx, Sox and other emissions as a result of increased adoption of natural gas by the market

Out of the several likely Project impacts, two externalities related to Saved Costs of Working Capital and Saved Costs of Gas Disruptions were monetized. The detailed monetization results are presented below.

Saved Costs of Working Capital

Taking into account the increased volume of gas supply after the Project implementation, the discounted value of saved capital per year amounts to 89,8 million Eur.

Table 18 Saved capital per annum in selected years of the life cycle

	2026	2031	2036	2041	2046
Saved capital, undiscounted, MEUR	6,4	6,9	7,3	7,7	8,0

Total saved capital, MEUR	Discounted
Estonia	9,0
Latvia	71,9
Lithuania	9,0
Total	89,8

Saved Costs of Gas Disruptions

In the table below the impact of the Project on Latvian, Lithuanian and Estonian disrupted demand is presented. From the table below it can be seen that IUGS enhancement would decrease the cost of disruption mainly in Latvia and in a small amount in Estonia.

Table 193 Security of supply (Disrupted demand)

Duration	Country	2026	2031	2036	2041	2046
Cost of disruption without IUGS enhancement (scenarios weighted), MEUR						
DC (1 day)	Estonia	0,0	0,1	0,1	0,1	0,1
	Latvia	0,2	0,4	0,4	0,4	0,4
	Lithuania	2,1	2,4	2,6	2,6	2,6
2W (14 days)	Estonia	-	-	-	-	-
	Latvia	3,8	5,4	6,0	6,0	6,0
	Lithuania	21,1	24,4	25,9	25,9	25,9
Cost of disruption with IUGS enhancement (scenarios weighted), MEUR						
DC (1 day)	Estonia	-	-	-	-	-
	Latvia	-	-	-	-	-
	Lithuania	2,1	2,4	2,6	2,6	2,6

Duration	Country	2026	2031	2036	2041	2046
2W (14 days)	Estonia	-	-	-	-	-
	Latvia	-	-	-	0,1	0,2
	Lithuania	21,1	24,4	25,9	25,9	25,9
Disruption cost avoided (scenarios weighted), MEUR						
DC (1 day)	Estonia	0,0	0,1	0,1	0,1	0,1
	Latvia	0,2	0,4	0,4	0,4	0,4
	Lithuania	-	-	-	-	-
2W (14 days)	Estonia	-	-	-	-	-
	Latvia	3,8	5,4	6,0	5,9	5,8
	Lithuania	-	-	-	-	-

Total based on scenarios weights, MEUR	Discounted
Estonia	0,7
Latvia	78,9
Lithuania	-
Total	79,6

Economic profitability

Based on the CBA results and national net impact calculation, cross border cost sharing outside the project promoting states is not expected.

On a total Project level, the IUGS enhancement is highly profitable in socioeconomic terms and offers positive value added to societies in all impacted countries.

- 89.8 million EUR benefits (53%) expected from SCoWC, 79.6 million EUR benefits (47%) expected from SCoGD.
- Residual value, CAPEX and OPEX values as in financial analysis, just discounted at the 4% social discount rate.
- Latvia is the clear leader in terms of socioeconomic profitability due to highest expected usage of the IUGS.
- Lithuanian and Estonian societies are expected to benefit from the investment as well, proportionally to the degree of their IUGS usage.

Table 20. Economic performance indicators

Country	Unit	ENPV	EIRR	EB/C
Latvia	MEUR	78,40	4,7%	192,6%
Lithuania	MEUR	8,98	NA	N/A
Estonia	MEUR	9,69	NA	N/A
Total	**MEUR**	**97,1**	**5,6%**	**214,7%**

Based on the ACER Recommendations, calculating national net impacts, expected revenues related to capacity bookings are added to the ENPV of the particular country.

Table 21. Summary table with costs and benefits for each country

Costs and benefits		Unit	Discounted amount
Latvia			
Costs	CAPEX	MEUR	74,8
	OPEX	MEUR	9,8
	Interest expenses	MEUR	-
	Total costs	**MEUR**	**84,7**
Benefits	Competition (Saved working capital costs)	MEUR	71,9
	Security of supply (disrupted demand)	MEUR	78,9
	Competition (Price swing)	MEUR	-
	Residual value	MEUR	12,3
	Total benefits	MEUR	**163,1**
	Benefit/cost ratio		**192,6%**
Lithuania			
Costs	CAPEX	MEUR	-
	OPEX	MEUR	-
	Interest expenses	MEUR	

	Total costs	**MEUR**	
Benefits	Competition (Saved working capital costs)	MEUR	9,0
	Security of supply (disrupted demand)	MEUR	-
	Competition (Price swing)	MEUR	-
	Total benefits	**MEUR**	**9,0**
	Benefit/cost ratio		**N/A**
Estonia			
Costs	CAPEX	MEUR	-
	OPEX	MEUR	-
	Interest expenses	MEUR	
	Total costs	**MEUR**	
Benefits	Competition (Saved working capital costs)	MEUR	9,0
	Security of supply (disrupted demand)	MEUR	0,7
	Competition (Price swing)	MEUR	-
	Total benefits	**MEUR**	**9,7**
	Benefit/cost ratio		**N/A**
Total project			
Costs	CAPEX	MEUR	74,8
	OPEX	MEUR	9,8
	Interest expenses	MEUR	-
	Total costs	**MEUR**	**84,7**
Benefits	Competition (Saved working capital costs)	MEUR	89,8
	Security of supply (disrupted demand)	MEUR	79,6
	Competition (Price swing)	MEUR	-
	Residual value	MEUR	12,3
	Total benefits	**MEUR**	**181,7**
	Benefit/cost ratio		**214,7%**

Sensitivity analysis (ENPV)

Reference to ACER Recommendation 5/2015 1.5 (7.a):
A sensitivity analysis and accompanying studies;

The following tables gives the project EPIs in case of CAPEX and OPEX amount changes as well as in case if first full year of operations delayed by less than 1 to 3 year(s).

Table 22 EPIs if total CAPEX amount changes

ENPV						
Latvia	**Change**	**(20%)**	**(10%)**	**-**	**10%**	**20%**
	ENPV	87,5	82,9	78,4	73,9	69,3
Lithuania	**Change**	**(20%)**	**(10%)**	**-**	**10%**	**20%**
	ENPV	9,0	9,0	9,0	9,0	9,0
Estonia	**Change**	**(20%)**	**(10%)**	**-**	**10%**	**20%**
	ENPV	9,7	9,7	9,7	9,7	9,7
EIRR						
Latvia	**Change**	**(20%)**	**(10%)**	**-**	**10%**	**20%**
	EIRR	6,0%	5,3%	4,7%	4,2%	3,8%
Lithuania	**Change**	**(20%)**	**(10%)**	**-**	**10%**	**20%**
	EIRR	NA	NA	NA	NA	NA
Estonia	**Change**	**(20%)**	**(10%)**	**-**	**10%**	**20%**
	EIRR	NA	NA	NA	NA	NA
EB/C						
Latvia	**Change**	**(20%)**	**(10%)**	**-**	**10%**	**20%**
	EB/C	225,5%	207,5%	192,6%	180,2%	169,6%
Lithuania	**Change**	**(20%)**	**(10%)**	**-**	**10%**	**20%**
	EB/C	NA	NA	NA	NA	NA
Estonia	**Change**	**(20%)**	**(10%)**	**-**	**10%**	**20%**
	EB/C	NA	NA	NA	NA	NA

Table 23 EPIs if total OPEX amount changes

ENPV						
Latvia	**Change**	**(20%)**	**(10%)**	**-**	**10%**	**20%**
	ENPV	80,4	79,4	78,4	77,4	76,4
Lithuania	**Change**	**(20%)**	**(10%)**	**-**	**10%**	**20%**
	ENPV	9,0	9,0	9,0	9,0	9,0
Estonia	**Change**	**(20%)**	**(10%)**	**-**	**10%**	**20%**
	ENPV	9,7	9,7	9,7	9,7	9,7
EIRR						
Latvia	**Change**	**(20%)**	**(10%)**	**-**	**10%**	**20%**
	EIRR	4,9%	4,8%	4,7%	4,6%	4,5%
Lithuania	**Change**	**(20%)**	**(10%)**	**-**	**10%**	**20%**
	EIRR	NA	NA	NA	NA	NA
Estonia	**Change**	**(20%)**	**(10%)**	**-**	**10%**	**20%**
	EIRR	NA	NA	NA	NA	NA
EB/C						
Latvia	**Change**	**(20%)**	**(10%)**	**-**	**10%**	**20%**
	EB/C	197,2%	194,9%	192,6%	190,4%	188,2%
Lithuania	**Change**	**(20%)**	**(10%)**	**-**	**10%**	**20%**
	EB/C	NA	NA	NA	NA	NA
Estonia	**Change**	**(20%)**	**(10%)**	**-**	**10%**	**20%**
	EB/C	NA	NA	NA	NA	NA

Table 24 EPIs if first full year of operations is delayed by x year(s)

ENPV					
Latvia	**Change**	**0**	**1**	**2**	**3**
	ENPV	78,4	75,2	72,0	68,8
Lithuania	**Change**	**0**	**1**	**2**	**3**
	ENPV	9,0	8,5	8,0	7,6
Estonia	**Change**	**0**	**1**	**2**	**3**
	ENPV	9,7	9,2	8,7	8,3
EIRR					
Latvia	**Change**	**0**	**1**	**2**	**3**
	EIRR	4,7%	4,4%	4,2%	4,0%
Lithuania	**Change**	**0**	**1**	**2**	**3**
	EIRR	NA	NA	NA	NA
Estonia	**Change**	**0**	**1**	**2**	**3**
	EIRR	NA	NA	NA	NA
EB/C					
Latvia	**Change**	**0**	**1**	**2**	**3**
	EB/C	192,6%	189,5%	186,4%	183,1%
Lithuania	**Change**	**0**	**1**	**2**	**3**
	EB/C	NA	NA	NA	NA
Estonia	**Change**	**0**	**1**	**2**	**3**
	EB/C	N/A	N/A	N/A	N/A

Qualitative analysis

In this chapter other benefits, which could not be monetized with sufficient certainty are described.

Market Integration

Connecting Europe Facility aims to interconnect the separate energy markets of Europe into one single integrated European energy market. The Project supports this goal as it ensures the gas supply safety and pressure in the transition system after the numerous interconnection projects are implemented in the region, as improvement of Latvia-Estonia interconnection (Karksi), improvement of the Latvia-Lithuania interconnection, Baltic Connector and other.

Overall flexibility of system

IUGS is an integral part of the Baltic natural gas supply system and is the only functionary storage facility in the Baltic states and ensures the stability of the regional gas supply. After commissioning of Baltic Connector at the end of 2019 Elering is going to increase the pressure in transmission pipeline Vireši – Tallin (connect IUGS with Estonia) up to 54 bar on border Estonia and Latvia. As provided previously, currently, at the end of extraction season from IUGS, pressure in reservoir drops until the 33 bar level, which means that without the Project it becomes impossible for IUGS to secure the regional gas supplies due to too low pressure in reservoir. Additionally, it is technically almost impossible to move gas streams on short notice in the common gas market area. The Project will increase availability of storage services and trans-regional gas transfers for the region. This will increase confidence in the gas markets among market participants, which would also contribute to the harmonization of the prices. Flexible

interconnected system will enable efficient transfer of residual gas flows to other regional EU member states in need, therefore enabling greater security of supply.

Desynchronization from BRELL

The desynchronization of the Baltic electricity grid from the Russian (BRELL) zone and synchronization with the continental Europe or the Nordic zone will have a significant impact on the natural gas market. It will directly increase demand for natural gas across the region. Upon accession to the new synchronization zone, the Latvian producers of electricity will have to provide ensure their own generating capacities and natural gas to a large extent will have the role of guaranteeing the stability of power supply. The Baltic electric grid interconnections NordBalt (Sweden-Lithuania), Estlink I and II (Estonia-Finland) and LitPol (Lithuania-Poland), which have had a PCI status, have fundamentally changed the electricity generation market in the Baltic states, leading to increased demand for natural gas and its storage capacities. Interconnections with the Nordic region have increased competition in the electricity generation market, requiring greater flexibility from the electricity producers, and this can be provided by thermal power plants running on natural gas. In the next 10 years, IUGS will have a major role in Latvian energy supply, because after the desynchronization of the Baltic electricity grid IUGS will act as the electricity supply and power security warrantor in the region.

Sustainability

The Project supports biogas transportation and biogas market development. In transport sector, biogas could have a key role in meeting the EU 2020, 2030 and further goals for transport and other sectors renewable fuel share. EU goal is to have 10% of the transport fuel coming from renewable energy, as well as target of EU 2030 is at least a 27% share of renewable energy consumption. Biofuels, including biogas, are important elements in meeting this goal. Therefore, biogas market development has significant positive synergies with other sectors and EU sustainability goals.

Exploitation of natural gas produces substantially less emissions compared to other fossil fuels. Satisfying the increased demand and technical conditions after implementation of interconnection projects enhances the opportunity to minimize CO2-emissions by continuing the lifetime of power plants in the region utilizing gas as a fuel. At the same time this would improve security of supply and increasing the amount of balancing power capacity needed in efficient energy markets.

In terms of renewable energy development, gas power plants have vital role in balancing of the intermittent renewable power sources. The role of balancing capacity is increasing in the European power system, because of increased utilization of renewables in the energy sector on the continent. As gas power plants are easy, quick and less expensive to build and their electricity generation volume is high, they are well suited for balancing purposes. Gas power plants are also suitable for emergency use, as they are easily started and stopped.

CROSS-BORDER COST ALLOCATION

Key objective of the Cross-Border Cost Allocation proposal (hereinafter - CBCA) is to establish the fair division of investment outlays (CAPEX) between the Project net cost bearers and net beneficiaries as well as to define the Project-optimal funding structure (including CBCA and CEF). Consequently, the CBCA proposal along with all supporting analyse has been formulated in three steps including:

- Identification of project net beneficiaries and net cost bearers,
- Calculation of the necessary CBCA monetary compensation,
- Definition of the optimal funding structure from the perspective of the Project.

The CBCA proposal step has been performed in line with provisions of the Regulation 347 / 2013 and the ACER Recommendation 05/2015. Discussion of all relevant items has been done in the subchapters below.

Identification of Project net beneficiaries and net cost bearers

The aim of this step to identify countries, which should take part in the CBCA procedure as either payers or beneficiaries of the compensation sum.

Project's net cost bearers and net beneficiaries are identified on the basis of ENPV values in countries impacted by the Project implementation. ENPV is understood as a difference between discounted socioeconomic externalities and discounted TOTEX less residual value. Countries with negative value of ENPV (ENPV < 0) are considered as Project's net cost bearers, whereas countries with positive value of ENPV (ENPV > 0) are deemed as Project's net beneficiaries.

In case of enhancement of IUGS, all countries impacted by the Project implementation, i.e. Lithuania, Latvia and Estonia, reach a positive value of ENPV. As such, these countries have been identified as net beneficiaries of the Project.

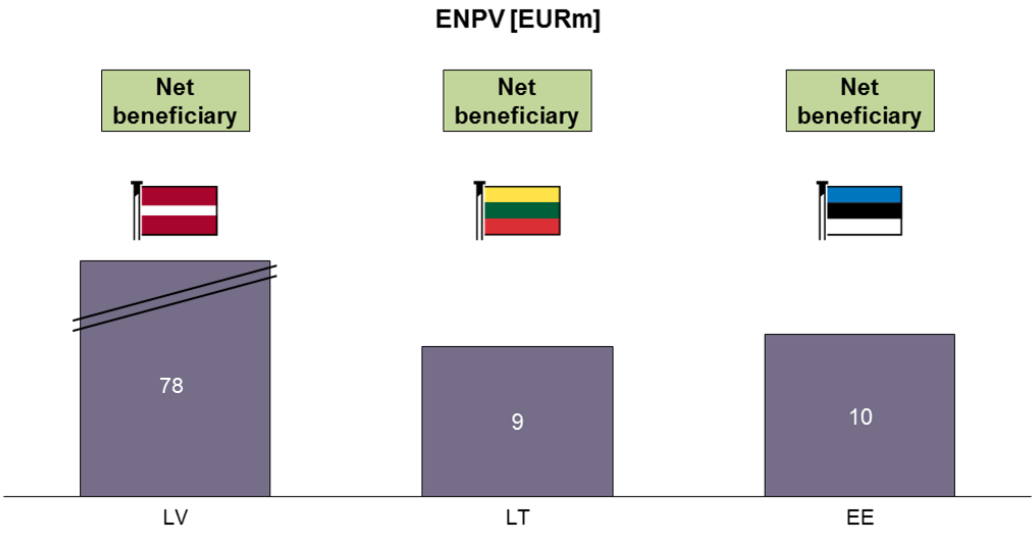


Figure 14 Identification of Project net cost bearers and net beneficiaries on the basis of ENPV values in countries impacted by the Project implementation

Consequently, the analysis reveals that there are no net cost bearers of the Project – societies in all countries significantly impacted by implementation of the IUGS enhancement are expected to benefit from its realization.

Calculation of the necessary CBCA monetary compensation

CBCA monetary transfer is a compensation to be paid out by the Project's net beneficiaries to its net cost bearers in an attempt to close their funding gaps. However, all three countries (Latvia, Lithuania and Estonia), which have been identified as impacted by the modernization and extension of IUGS, are its net beneficiaries. As a consequence, CBCA monetary transfer is not applicable to the Project due to the lack of net cost bearers entitled to receive CBCA compensation.

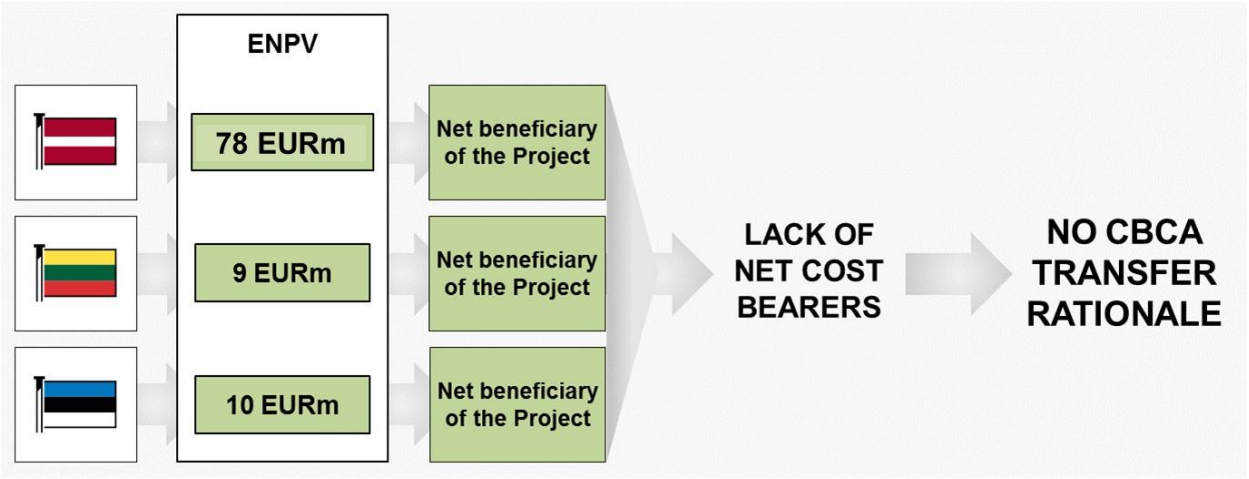


Figure 15 Value of CBCA monetary transfer related to the Project

Consequently, the Project Promoter proposes that a CBCA decision is issued, dictating that there should be no CBCA transfers between the significantly impacted countries (Latvia, Lithuania and Estonia) **resulting from realization of the IUGS enhancement.**

Identification of the optimal Project funding structure

Project-related outlays (CAPEX and OPEX) incurred by the Conexus are expected to be covered by external support in the form of EU grants (CEF) and additional revenues stemming from the tariff increase[5].

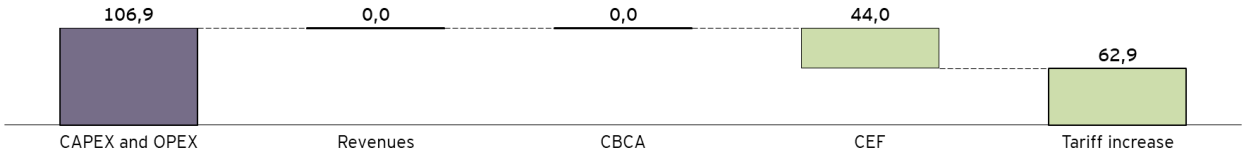


Figure 16 IUGS enhancement funding structure [undiscounted; 2026-46; EURm]

Grants received from CEF may amount to 44.0 EURm, which constitutes 50% of the overall value of Project- related CAPEX. The value of potential EU grants was calculated as the minimum of:

- Product of funding gap rate (equal to 98.2%) and eligible expenditure (equal to 88.0 EURm),
- Product of maximum CEF co-funding rate (equal to 50%[6]) and eligible expenditure (equal to 88.0 EURm).

[5] The Regulation 347 / 2013 also proposes to include „other mechanisms" (e.g. obligatory capacity bookings, revenue guarantees etc.) as measures aiming to close the funding gap. In the case of the IUGS enhancement, implementation of such mechanisms is not expected.

[6] In line with the 2018-2 CEF Energy Call, the maximum co-financing rates of EU financial assistance to be granted under this call for proposals are laid down in Article 10(3) of the CEF Regulation and shall not exceed 50% of the total eligible costs of studies and/or works. The funding rates may be increased to a maximum of 75% for Actions which, based on the evidence referred to in Article 14(2) of the TEN-E Regulation, provide a high degree of regional or EU-wide security of supply, strengthen the solidarity of the EU or comprise highly innovative solutions. In case of the Project, this degree is limited as evidenced by the results of the socioeconomic analysis that EE and LT are below 10% of benefits. Consequently, the maximum co-funding rate is equal to 50%.

Illustrative presentation of CEF calculation is provided below:

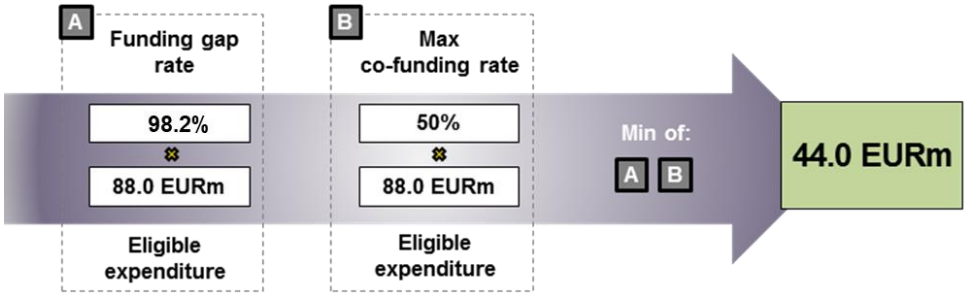


Figure 17 Calculation of the value of CEF funding

In order to cover the remaining part (62.9 EURm) of CAPEX and OPEX related to the IUGS enhancement, Conexus might increase the tariff[7]. It should be noted however, that the increase of tariff, which is conditional upon the EU support, should be minimized in order to meet the expectations of market participants.

In line with the Market Testing findings (for detailed description please see subchapter Market Testing), it is expected that volumes of gas stored at IUGS in the future will remain at the current levels. Consequently, the Project's impact on tariffs is understood as an increase of Conexus's tariff cost base caused by Project-related CAPEX and OPEX.

In case of no EU support in the form of CEF grants, the average total tariff cost base after the implementation of the Project would increase to 27.7 EURm, (including the RAB from the Project in the investment period) from the existing cost base of ca. 20.8 EURm[8], producing a +33% increase in tariffs[9]. If a 50% CEF grant is awarded, the impact on the tariff cost base could be limited – the total cost base would increase to 24.6 EURm, reducing the impact on tariffs to 18%.

Analyzing only the incremental cost base, the award of the CEF grant would limit the cost base increase from 6.9 EURm to 3.8 EURm (a 45% reduction in tariff increase).

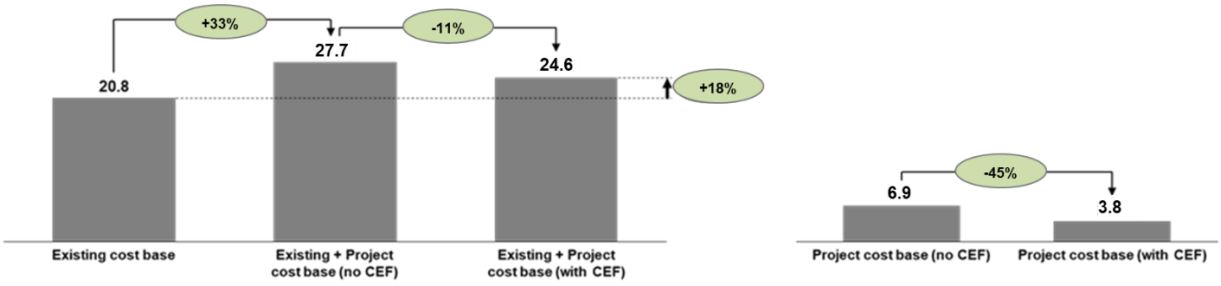


Figure 18 Average IUGS tariff cost bases and impacts onm tariffs without / with CEF scenarios [EURm; 2019 – 2046]

The above tariff impacts is based on average figures. For more detailed tariff impact analyses please refer to the MS Excel model, which is an integral part of this Investment Request.

[7] If the decision is made to increase the tariff, Conexus expects to increase the regulated asset base by the amount of construction-in-progress value of the Project, as permitted by the article 12 of the Storage tariff calculation methodology (issued by Public Utilities Commission of Latvia)

[8] Tariff cost base assumed to be fixed at the 2023 level for which forecasts are available.

[9] Volumes of gas stored in the IUGS assumed to be constant over the analysis period, therefore changes in the cost base represent impacts on tariff.

ANNEXES

The figures below shows excerpts from the MS Excel model, in which all the Investment Request – related calculations were conducted. The MS Excel model is an integral part of the Investment Request and is attached to this document.

Specific results for financial calculations

The figure below relates to the financial profitability calculations for the Project.

		UNIT	TOTAL	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046
Net cash flow for financial performance indicators (not accounting for interest payments)																																
	Revenue	mEUR	**0,0**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	OPEX	mEUR	**-8,9**	-	(0,0)	(0,0)	(0,0)	(0,0)	(0,0)	(0,1)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)
	Interest payments	mEUR		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.	**Net income**	mEUR		-	(0,0)	(0,0)	(0,0)	(0,0)	(0,0)	(0,1)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)
	CAPEX	mEUR	**-72,8**	-	(6,6)	(8,0)	(11,0)	(23,6)	(20,0)	(12,5)	(6,3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Residual value	mEUR	**10,2**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	36,9
2.	**Net cash flow**	mEUR		-	(6,7)	(8,0)	(11,0)	(23,6)	(20,0)	(12,6)	(7,1)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	(0,9)	36,1
3.	**Discounted net cash flow**	mEUR	**-71,4**	-	(6,4)	(7,3)	(9,6)	(19,6)	(15,9)	(9,5)	(5,2)	(0,6)	(0,6)	(0,5)	(0,5)	(0,5)	(0,5)	(0,4)	(0,4)	(0,4)	(0,4)	(0,4)	(0,4)	(0,3)	(0,3)	(0,3)	(0,3)	(0,3)	(0,3)	(0,3)	(0,2)	10,0
Financial indicators																																
A.	**FNPV**	**mEUR**	**(71,4)**																													
B.	**FIRR**	**%**	**-5,1%**																													
C.	**FB/C**	**%**	**0,13**																													

Figure 19 IUGS enhancement financial profitability calculations [2026-46; EURm]

Specific results for economic calculations

The figure below relates to the economic profitability calculations for the Latvian society.

		UNIT	TOTAL	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046
CBA key figures																																	
Latvia			**Discounted**																														
	Costs																																
	CAPEX	mEUR	74,8	-	-	6,6	8,0	11,0	23,6	20,0	12,5	6,3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	OPEX	mEUR	9,8	-	-	0,0	0,0	0,0	0,0	0,0	0,1	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9
	Interest expenses	mEUR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.	**Total costs**	**mEUR**	**84,7**	**-**	**-**	**6,7**	**8,0**	**11,0**	**23,6**	**20,0**	**12,6**	**7,1**	**0,9**	**0,9**	**0,9**	**0,9**	**0,9**	**0,9**	**0,9**	**0,9**	**0,9**	**0,9**	**0,9**	**0,9**	**0,9**	**0,9**	**0,9**	**0,9**	**0,9**	**0,9**	**0,9**	**0,9**	**0,9**
	Benefits																																
	Saved Costs of Working Capital	mEUR	71,9	-	-	-	-	-	-	-	-	-	3,9	3,8	3,8	3,7	3,7	3,6	3,6	3,5	3,5	3,4	3,4	3,4	3,3	3,3	3,2	3,2	3,2	3,1	3,1	3,1	3,0
	Saved Costs of Gas Disruption	mEUR	78,9	-	-	-	-	-	-	-	2,6	2,8	3,1	3,3	3,5	3,7	3,8	3,8	3,9	4,0	4,0	4,0	3,7	3,6	3,6	3,5	3,4	3,3	3,2	3,1	3,1	3,0	2,9
	Residual value	mEUR	12,3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	36,9
2.	**Total benefits**	**mEUR**	**163,1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2,6**	**2,8**	**6,9**	**7,1**	**7,3**	**7,4**	**7,5**	**7,5**	**7,5**	**7,5**	**7,5**	**7,5**	**7,1**	**7,0**	**6,9**	**6,8**	**6,6**	**6,5**	**6,4**	**6,3**	**6,2**	**6,0**	**42,9**
Economic indicators																																	
A.	**ENPV**	mEUR	78,40	-	-	(6,7)	(8,0)	(11,0)	(23,6)	(20,0)	(9,9)	(4,3)	6,1	6,2	6,4	6,6	6,6	6,6	6,6	6,6	6,7	6,6	6,3	6,1	6,0	5,9	5,8	5,6	5,5	5,4	5,3	5,2	42,0
B.	**ERR**	%	4,7%																														
C.	**EBCR**	%	192,6%																														

Figure 20 IUGS enhancement economic profitability calculations - Latvia [2026-46; EURm]

The figure below relates to the economic profitability calculations for the Lithuanian society.

		UNIT	TOTAL	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046
CBA key figures																																	
Lithuania			**Discounted**																														
	Costs																																
	CAPEX	mEUR	-																														
	OPEX	mEUR	-																														
	Interest expenses	mEUR	-																														
	Total costs	**mEUR**	**-**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benefits																																
	Competition (Saved working capital cost	mEUR	9,0	-	-	-	-	-	-	-	-	-	0,5	0,5	0,5	0,5	0,5	0,5	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4
	Security of supply (disrupted demand)	mEUR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Competition (Price swing)	mEUR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total benefits	**mEUR**	**9,0**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**0,5**	**0,5**	**0,5**	**0,5**	**0,5**	**0,5**	**0,4**	**0,4**	**0,4**	**0,4**	**0,4**	**0,4**	**0,4**	**0,4**	**0,4**	**0,4**	**0,4**	**0,4**	**0,4**	**0,4**	**0,4**
Economic indicators																																	
A.	**ENPV**	mEUR	**9,0**																														
B.	**ERR**	%	**NA**																														
C.	**EBCR**	%	**N/A**																														

Figure 21 IUGS enhancement economic profitability calculations - Lithuania [2026-46; EURm]

The figure below relates to the economic profitability calculations for the Estonian society.

		UNIT	TOTAL	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046
CBA key figures																																	
Estonia			**Discounted**																														
	Costs																																
	CAPEX	mEUR																															
	OPEX	mEUR																															
	Interest expenses	mEUR																															
	Total costs	**mEUR**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benefits																																
	Competition (Saved working capital cost	mEUR	9,0	-	-	-	-	-	-	-	-	-	0,5	0,5	0,5	0,5	0,5	0,5	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4
	Security of supply (disrupted demand)	mEUR	0,7	-	-	-	-	-	-	-	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
	Competition (Price swing)	mEUR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total benefits	**mEUR**	**9,7**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**0,0**	**0,0**	**0,5**	**0,5**	**0,5**	**0,5**	**0,5**	**0,5**	**0,5**	**0,5**	**0,5**	**0,5**	**0,5**	**0,5**	**0,4**	**0,4**	**0,4**	**0,4**	**0,4**	**0,4**	**0,4**	**0,4**	**0,4**
Economic indicators																																	
A.	**ENPV**	mEUR	**9,7**																														
B.	**ERR**	%	**NA**																														
C.	**EBCR**	%	**N/A**																														

Figure 22 IUGS enhancement economic profitability calculations - Estonia [2026-46; EURm]

The figure below relates to the economic profitability calculations for the total project.

		UNIT	TOTAL	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046
CBA key figures																																	
The whole project		**Unit**	**Discounted**																														
	Costs																																
	CAPEX	mEUR	74,8	-	-	6,6	8,0	11,0	23,6	20,0	12,5	6,3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	OPEX	mEUR	9,84	-	-	0,0	0,0	0,0	0,0	0,0	0,1	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9
	Interest expenses	mEUR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.	**Total costs**	**mEUR**	**84,7**	**-**	**-**	**6,7**	**8,0**	**11,0**	**23,6**	**20,0**	**12,6**	**7,1**	**0,9**	**0,9**	**0,9**	**0,9**	**0,9**	**0,9**	**0,9**	**0,9**	**0,9**	**0,9**	**0,9**	**0,9**	**0,9**	**0,9**	**0,9**	**0,9**	**0,9**	**0,9**	**0,9**	**0,9**	**0,9**
	Benefits																																
	Saved Costs of Working Capital	mEUR	89,8	-	-	-	-	-	-	-	-	-	4,8	4,8	4,7	4,7	4,6	4,6	4,5	4,4	4,4	4,3	4,2	4,2	4,1	4,1	4,0	4,0	4,0	3,9	3,9	3,8	3,8
	Saved Costs of Gas Disruption	mEUR	79,6	-	-	-	-	-	-	-	2,7	2,9	3,1	3,3	3,5	3,7	3,8	3,9	3,9	4,0	4,1	4,1	3,8	3,7	3,6	3,5	3,4	3,3	3,2	3,2	3,1	3,0	2,9
	Residual value	mEUR	12,3																														36,9
2.	**Total benefits**	**mEUR**	**181,7**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2,7**	**2,9**	**7,9**	**8,1**	**8,2**	**8,4**	**8,4**	**8,4**	**8,4**	**8,4**	**8,4**	**8,4**	**8,0**	**7,9**	**7,7**	**7,6**	**7,5**	**7,3**	**7,2**	**7,1**	**7,0**	**6,8**	**43,7**
Economic indicators																																	
A.	**ENPV**	mEUR	**97,1**	-	-	(6,7)	(8,0)	(11,0)	(23,6)	(20,0)	(9,9)	(4,3)	7,1	7,2	7,4	7,6	7,6	7,6	7,6	7,6	7,6	7,5	7,2	7,0	6,9	6,8	6,6	6,5	6,3	6,2	6,1	6,0	42,8
B.	**ERR**	**%**	**5,6%**																														
C.	**EBCR**		214,7%																														

Figure 23 IUGS enhancement economic profitability calculations – total project [2026-46; EURm]