Energy Community

UA TRANSMISSION SYSTEM OPERATOR

NAFTOGAZ UKRTRANSGAZ

SHIPPERS MEETING 2024

VIENNA

NAFTOGAZ
UKRTRANSGAZ

SSO UA TODAY

BACKSTAGE OF UGS TECHNICAL SECURITY

ROMAN MALIUTIN
CEO OF UKRTRANSGAZ

UKRAINIAN GAS STORAGES TODAY

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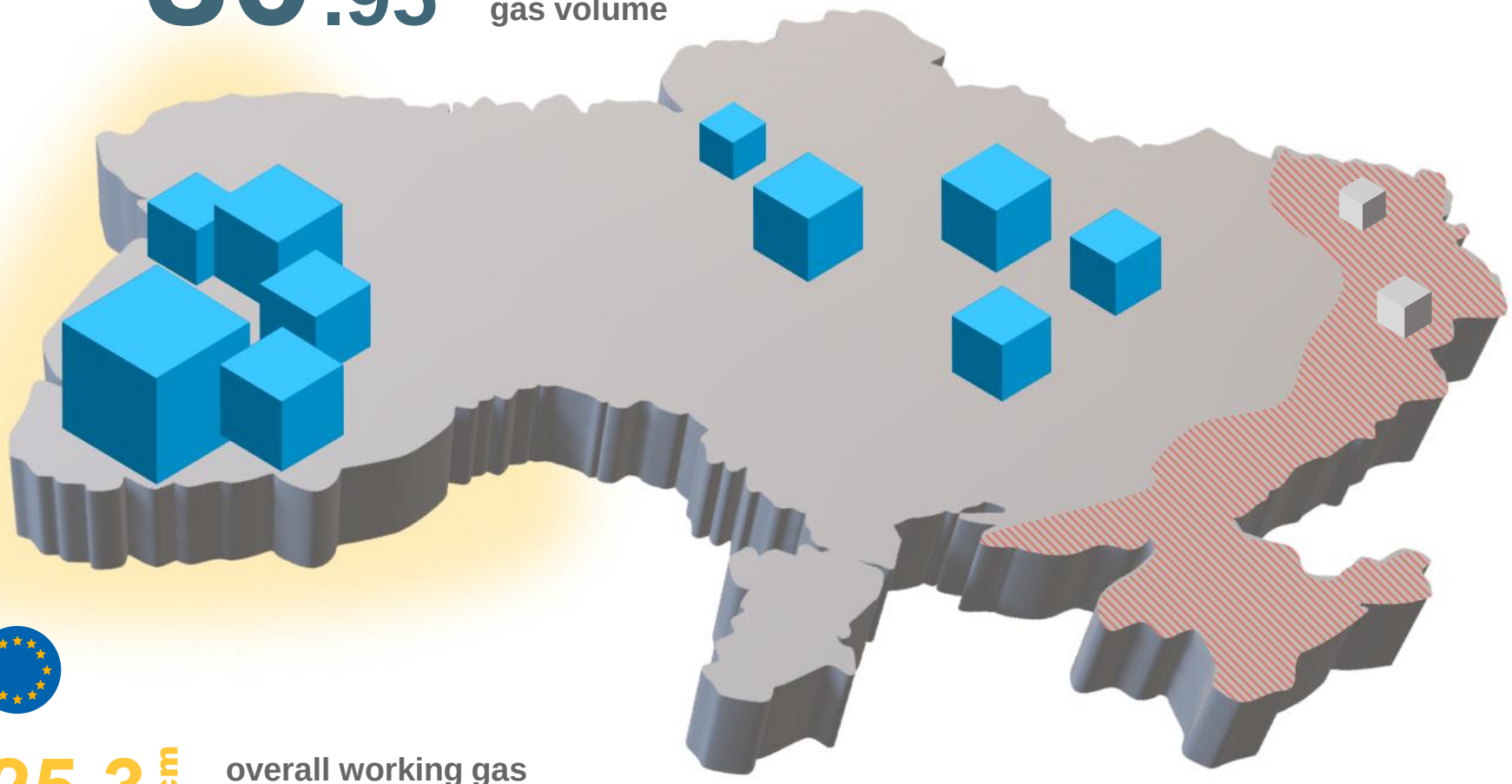
30.95 bcm overall working gas volume



25.3 bcm overall working gas volume near Europe

10 bcm working gas volume offered to non-residents

1.8 euro MWh cca full gas storage tariff <u>until April 2025</u>

CUSTOMER PORTFOLIO:

non-residents
168 +36% in 2023
41% active

residents
1110 +13% in 2023
37 % active

32 COUNTRIES

3.3 bcm Injected in CWR in 2023

UGS TECHNICAL BACKSTAGE

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Filling	Withdrawal mcm/day	Injection mcm/day
100%	230	188
50%	170	203
30%	122	222
10%	60	213

Largest gas storage area ≈ **42ha**
Smallest gas storage area ≈ **5 ha**

INDUSTRIAL ZONE
ground facilities

STORAGE LAYER
where gas is stored, outlined (white line)

WELLS
Total — 1365

WE USE*	COMPRESSOR UNITS	COMPRESSOR CAPACITY
TOTAL	97	527 MW
INJECTION	30	85.4 MW
WITHDRAWAL	19	57.3 MW

* average for 2 years

UGS WITHDRAWAL
SEASON 2023-2024

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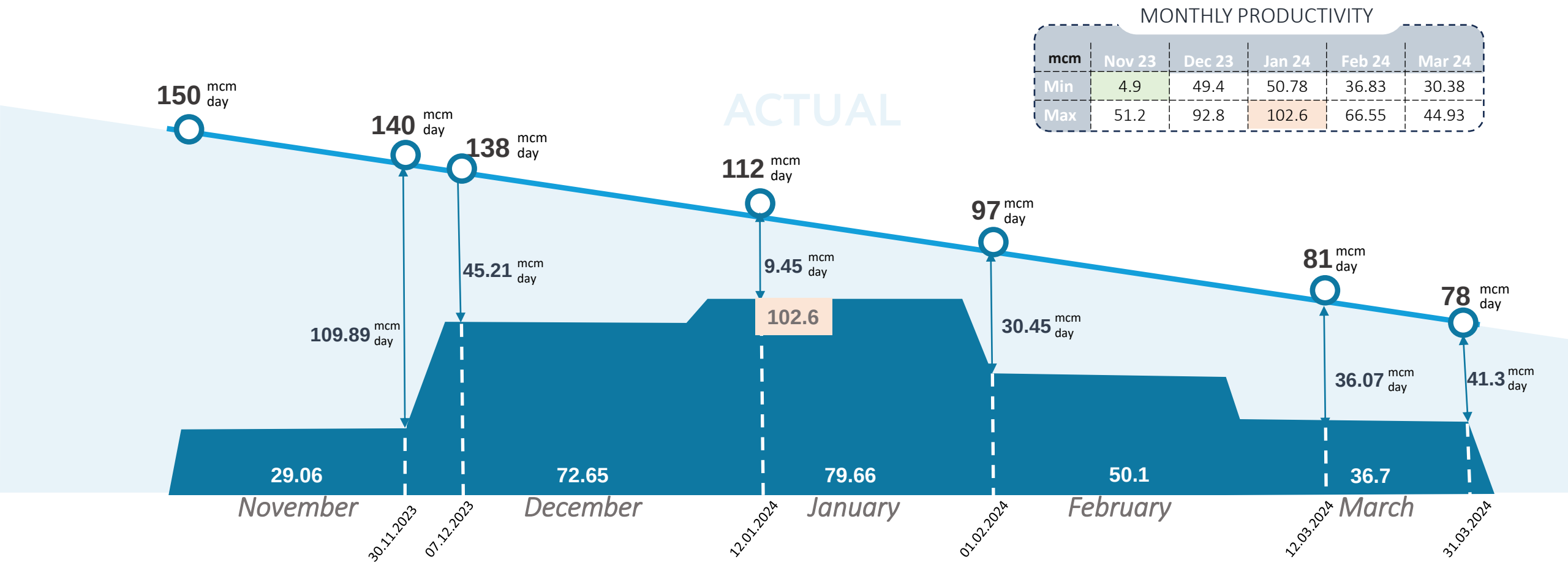
MONTHLY PRODUCTIVITY

mcm	Nov 23	Dec 23	Jan 24	Feb 24	Mar 24
Min	4.9	49.4	50.78	36.83	30.38
Max	51.2	92.8	102.6	66.55	44.93

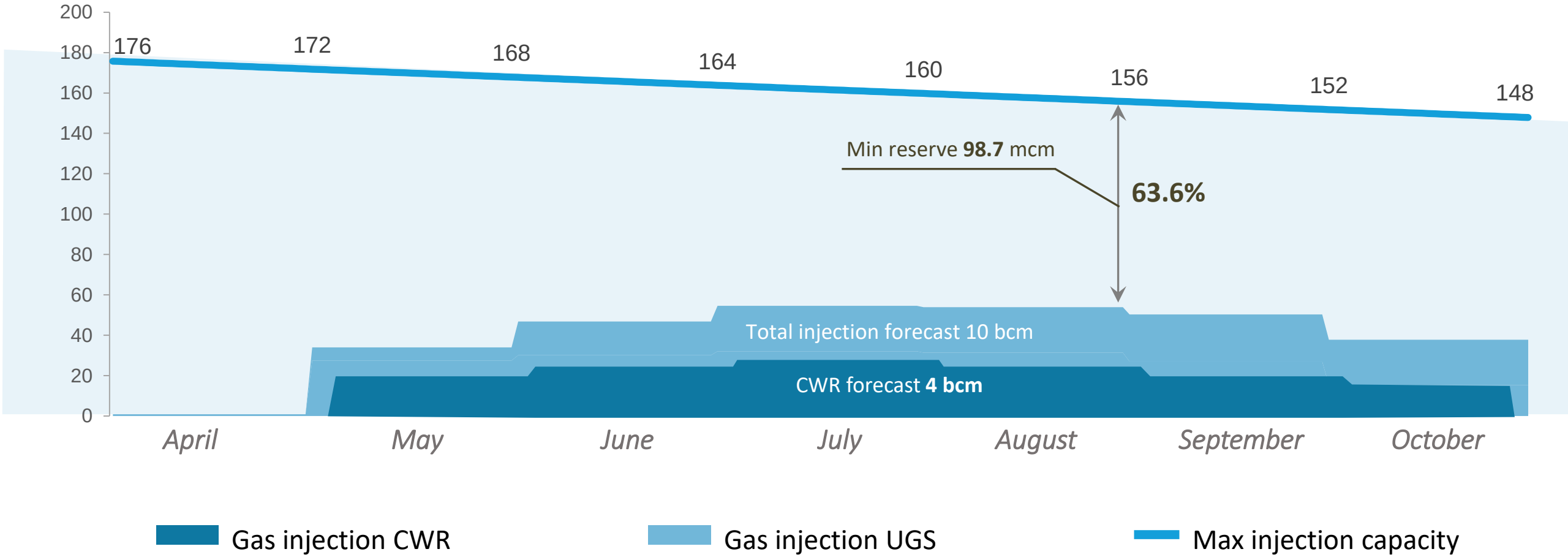


Average withdrawal/day

Max capacity reserve

Max withdrawal capacity

UGS INJECTION FORECAST
SEASON 2024



MITIGATION MILITARY RISKS

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TYPE OF RISKS	MEASURES TO MITIGATE
Physical loss of gas	There is almost 0 possibility of physical gas loss for customers: › Up to 2000 meters – depths of gas deployment in dense rock › 100% confirmed withdrawal nominations since February 2022 › **SSO shall immediately perform obligations, which were not performed due to force majeure** *Standard Agreement, art.8.6*
Withdrawal postponement/ interruption	› 10 facilities = 1 virtual storage facility *In case of one UGS facility outage, gas can be withdrawn from another UGS to confirm nomination* › Up to 5 connections to GTS › UGS classified as critical infrastructure with relevant treatment (ADS+UA Armed Forces) *Based on the Ukrainian Legislation (the General Staff of the Armed Forces of Ukraine Protocol)* › Emergency back-up power supply at each UGS facility *Fuel reserve for at least 10 days* › UGS equipment is additionally protected by special constructions › Developed emergency response plans *Including emergency response to surface equipment damage as a result of attacks* › Physical tests for maximum withdrawal capacity for each UGS facility *March 2024* › Emergency response drills ***1 274** during the last 2 years* › Stress-test scenarios for 2023/2024 *Verified and confirmed by the independent international auditor Simone Research Group* › No interruptions caused by hostilities/technical problems since February 2022

STRESS-TEST SCENARIOS

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Stress-test scenarios 2023/2024:

- Up to **2.5** bcm
- Cold/Mild winter
- **8** scenarios including **0** transit
- Critical infrastructure damage scenarios

Stress-test scenarios 2024/2025:

- Up to **5** bcm
- Cold/Severe winter
- **8** scenarios including **0** transit
- Even tougher critical infrastructure damage scenarios


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DE-RISKING GAS STORAGE IN UKRAINE: THE INDEPENDENT TECHNICAL REVIEW OF STRESS-TEST SCENARIOS FOR THE 2023/2024 WINTER SEASON

I. PROJECT BACKGROUND

In addition to
winter seaso
markets. This
it might beco
markets. This
economic co

Considering
around 90 pe
facilities in U
mitigate price
owned gas o
obstacles to

This public
interested i
2023/2024
due to pote

Ukrtransgaz inputs:

- Storages technical characteristics
- UGS volume allocation
- Gas withdrawal capacity for each UGS
- Alternative modes of gas withdrawal
- Participating in independent technical review (Prague, March 18-20)

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NAFTOGAZ GROUP

European Commission JOINT RESEARCH CENTRE

Ministry of Energy of Ukraine

UA TRANSMISSION SYSTEM OPERATOR

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SIMONE RESEARCH GROUP

EU STORAGE OUTLOOK

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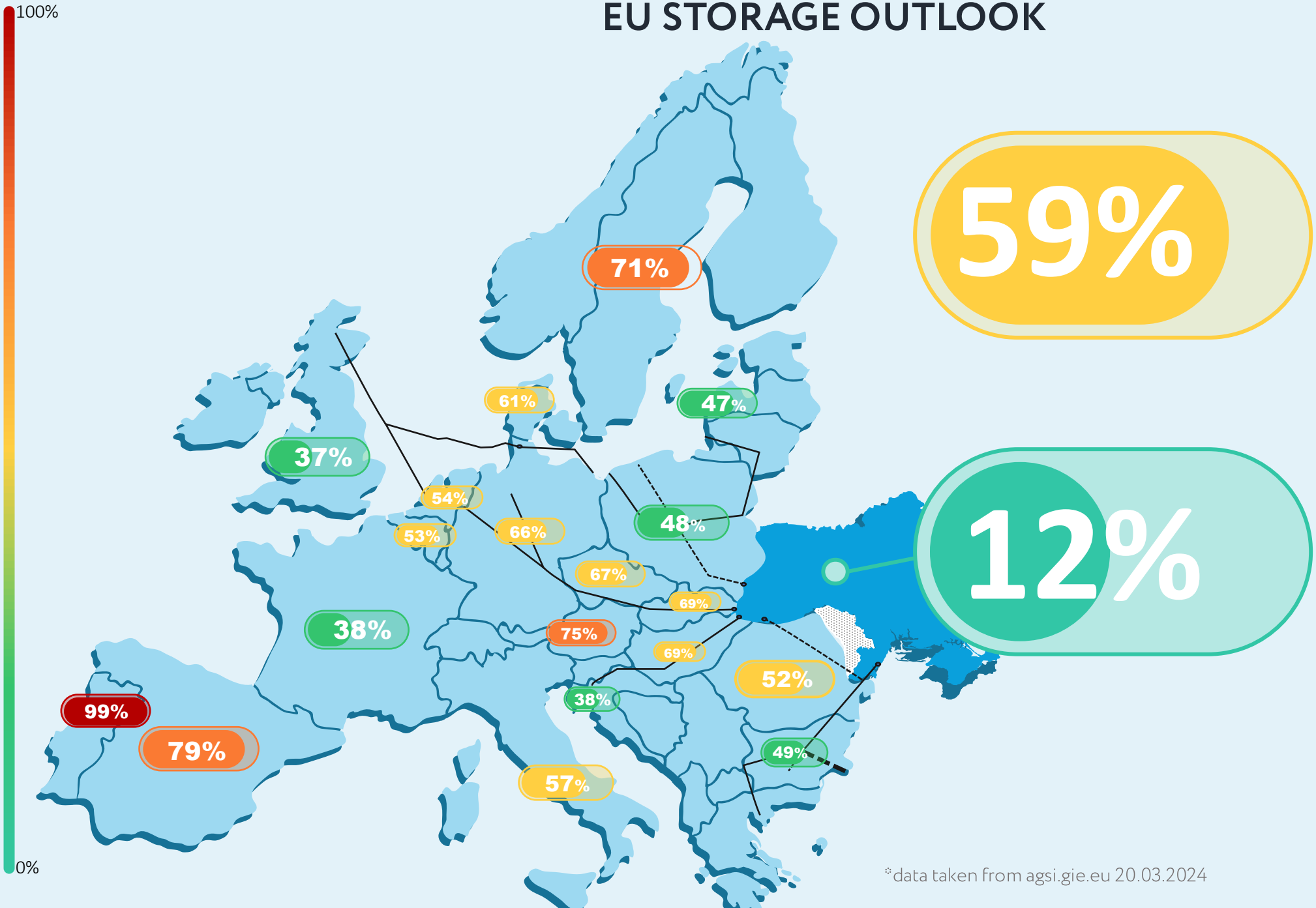


59%

THE FILLING LEVEL OF EUROPEAN UGS

12%

THE FILLING LEVEL OF UKRAINIAN UGS

*data taken from agsi.gie.eu 20.03.2024

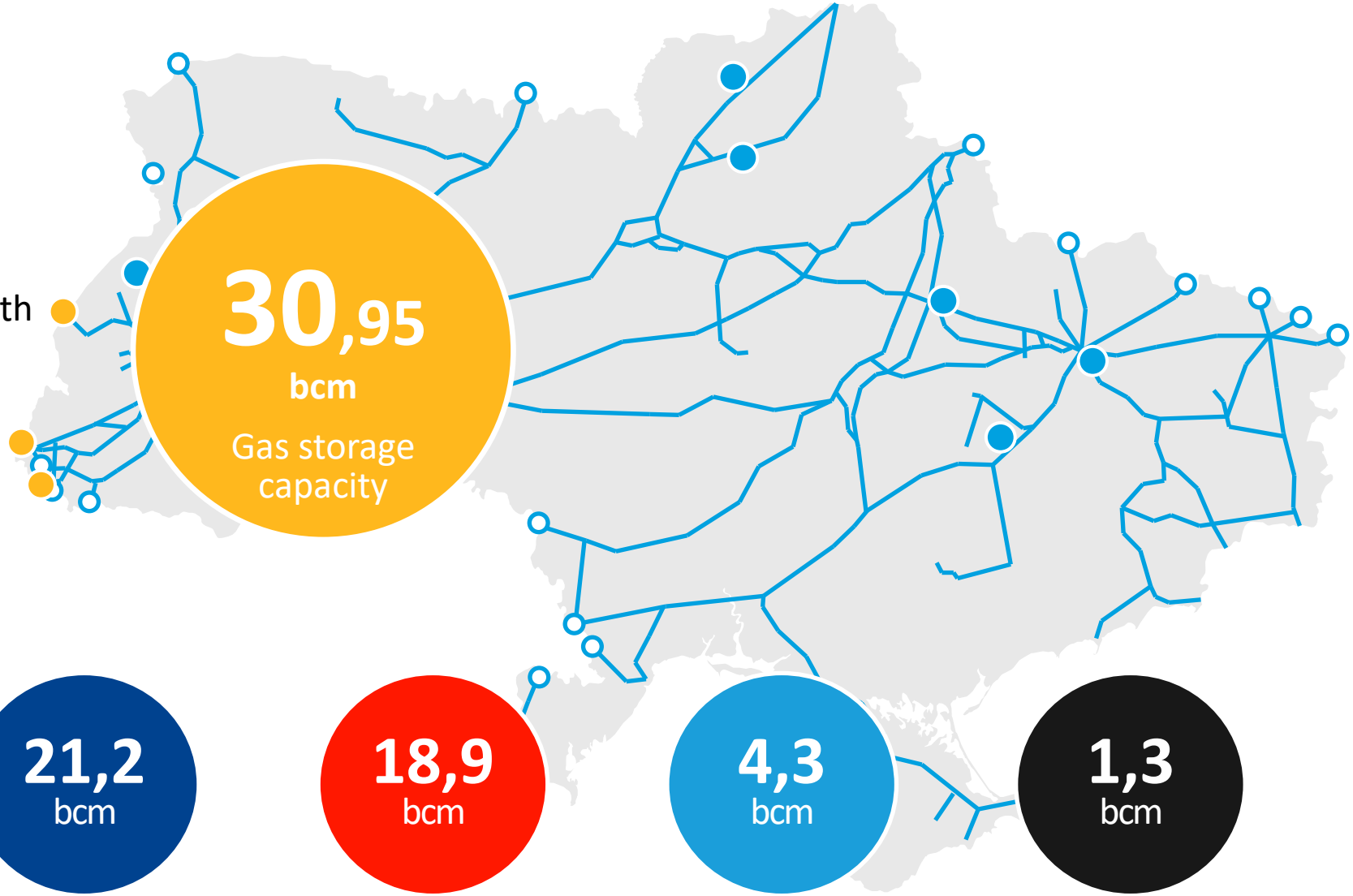
UA GAS MARKET UPDATE & DEVELOPMENT OF NEW ROUTES

DMYTRO LYPPA

CEO of Gas TSO of Ukraine

Ukrainian gas market in 2023

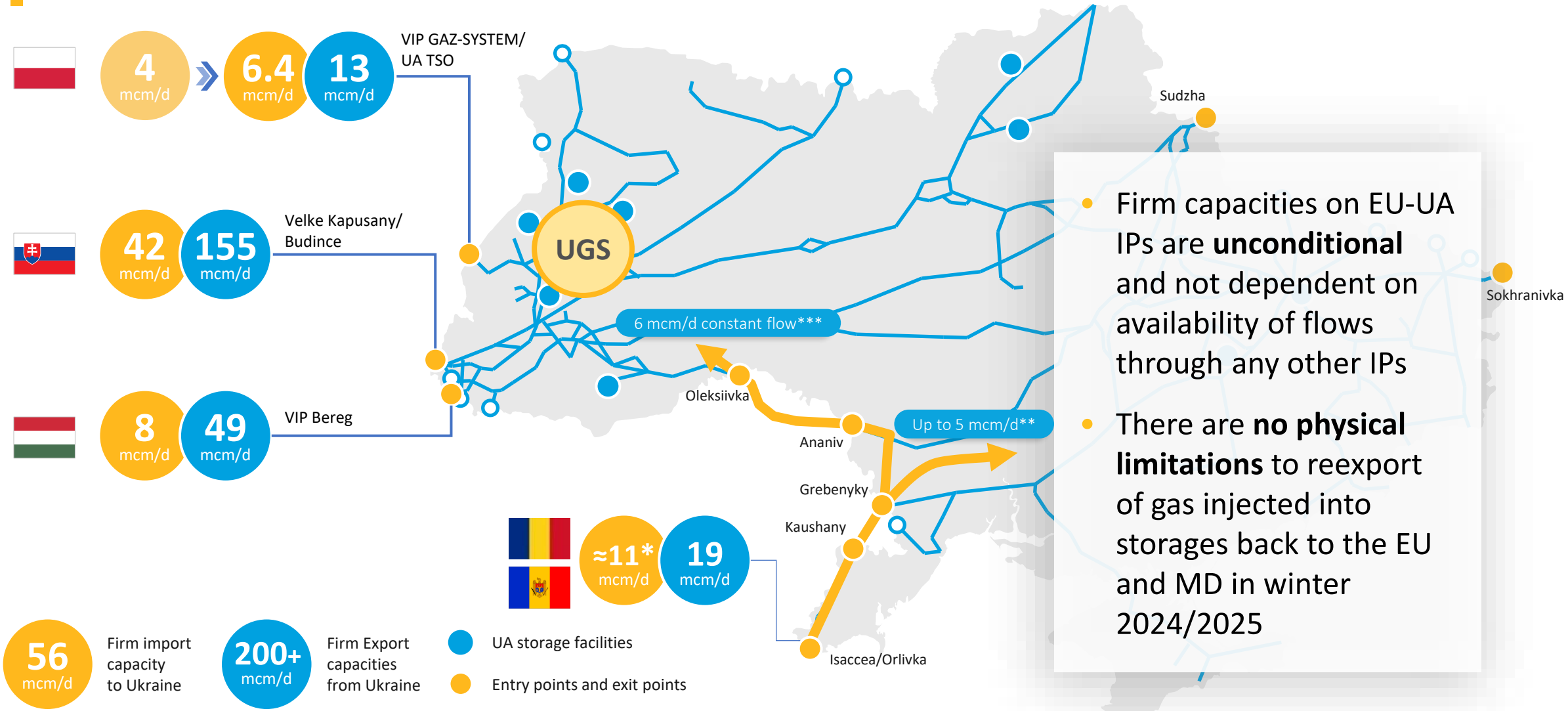
- Gas consumption is recovering after a significant drop in 2022
- Production is stable (1% growth compared to 2022)
- Foreign customers increased the use of Ukrainian warehouses by 4 times
- Transit has decreased to 10% of available capacity



14,6 bcm	21,2 bcm	18,9 bcm	4,3 bcm	1,3 bcm
Transit	Consumption	Production	Import	Export & re-export

*Data source: GTSOU calculations

Transportation capacity



- Firm capacities on EU-UA IPs are **unconditional** and not dependent on availability of flows through any other IPs
- There are **no physical limitations** to reexport of gas injected into storages back to the EU and MD in winter 2024/2025

* Use of the Trans-Balkan route requires booking the capacity of MD GTS

** 5 mcm/d of interruptible capacity in summer period is available as virtual reverse

*** Additional interruptible capacity in summer period is available of constant flow of 6 mcm/day ensured

Trans-Balkan project ("Vertical corridor"): Short-term solution (2024)

Conditions to be fulfilled to ensure maximum use of the Trans-Balkan route already in 2024

- **competitive tariffs** on the route
- common UA-MD product
- **constant physical flow of 6 mcm/day** on a stable basis

Trans-Balkan project (“Vertical corridor”): Long-term solution (2025-2028)

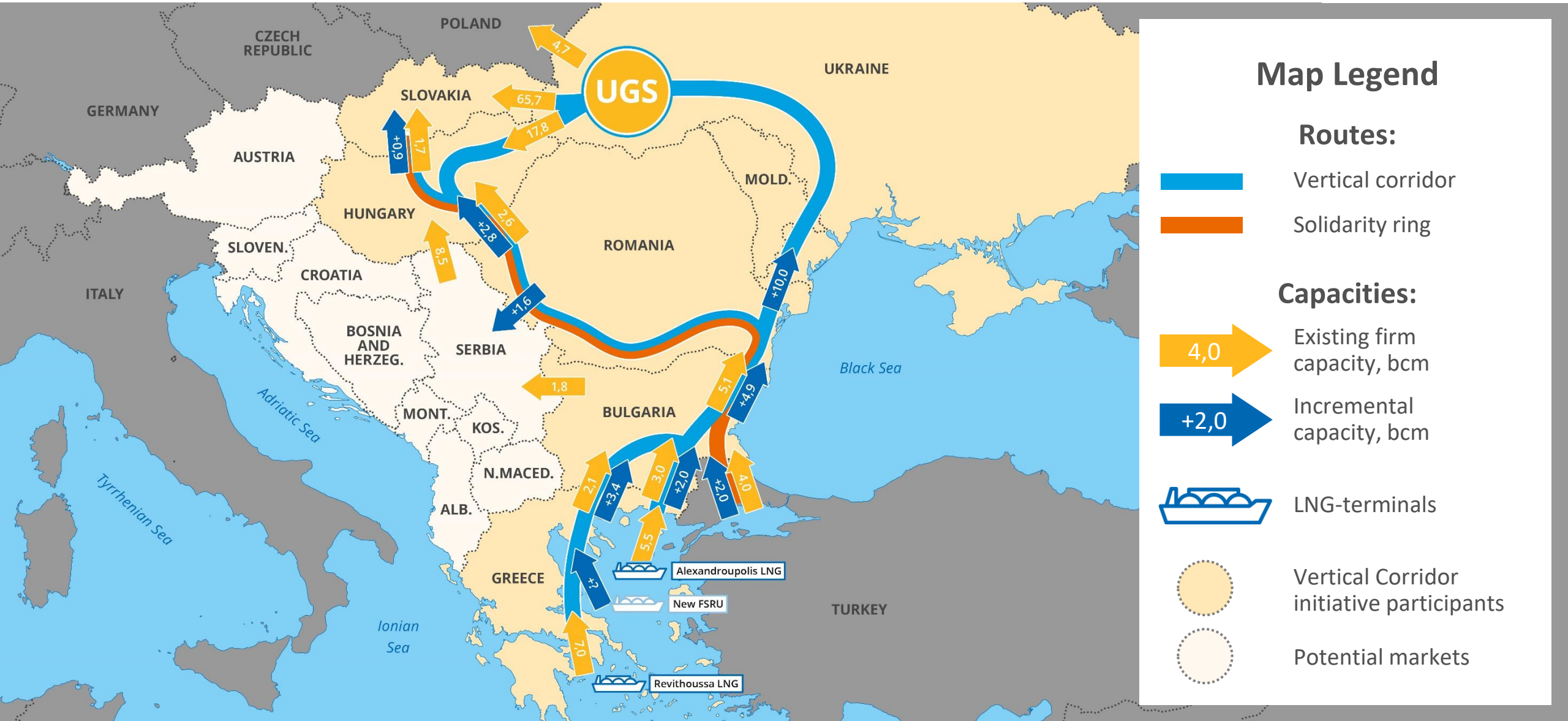
Done

- ✓ joined the “Vertical Corridor” together with Vestmoldtransgaz
- ✓ agreed of the necessary actions on the part of GTS operators from Greece to Slovakia
- ✓ consultations were held from 1 to 29 February

Next steps

- **approval of projects by national regulators** until May 1, 2024
- **holding the auction** on July 1, 2024
- **implementation of the necessary works** to create capacity until 2028

Rethinking Trans-Balkan corridor



Map Legend

Routes:

- Vertical corridor
- Solidarity ring

Capacities:

- 4,0 — Existing firm capacity, bcm
- +2,0 — Incremental capacity, bcm
- LNG-terminals
- Vertical Corridor initiative participants
- Potential markets

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COMMERCIAL BALANCE

SERVICE PORTFOLIO

—

LATEST UPDATES

AGNETA KUTSELIM
Head of Commercial

FOCUS ON VALUES FOR CUSTOMERS

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Commercial efficiency & interaction with customers

- 3.3 bcm in CWR (2.5 bcm – non-residents)
- 16% increasing Customer Portfolio
- 1st time ever at the E-World with own booth

Competitive pricing

- Draft RAB methodology prepared

resolution adoption postponed due to country's situation

Decision: fixed tariff until April 2025

Further digitalization

Project: Full I-Platform migration to SAP S/4 HANA in energy units

- **January 2024** – project start
- **2025/2026*** — go live

* *depends on the Ukrainian legislation*

Regulatory updates

Project: Service Portfolio improvement – Amendments to the Gas Storage Code & Storage Agreement

- **February 2024** – publication of amendments to the Gas Storage Code on the NEURC website
- **March 2024** —public discussion
- **April 2024** — approval
- **June 2024** — effective date

Energy Community assessment note

COMMERCIAL EFFICIENCY
WITHDRAWAL SEASON RESULTS 2024

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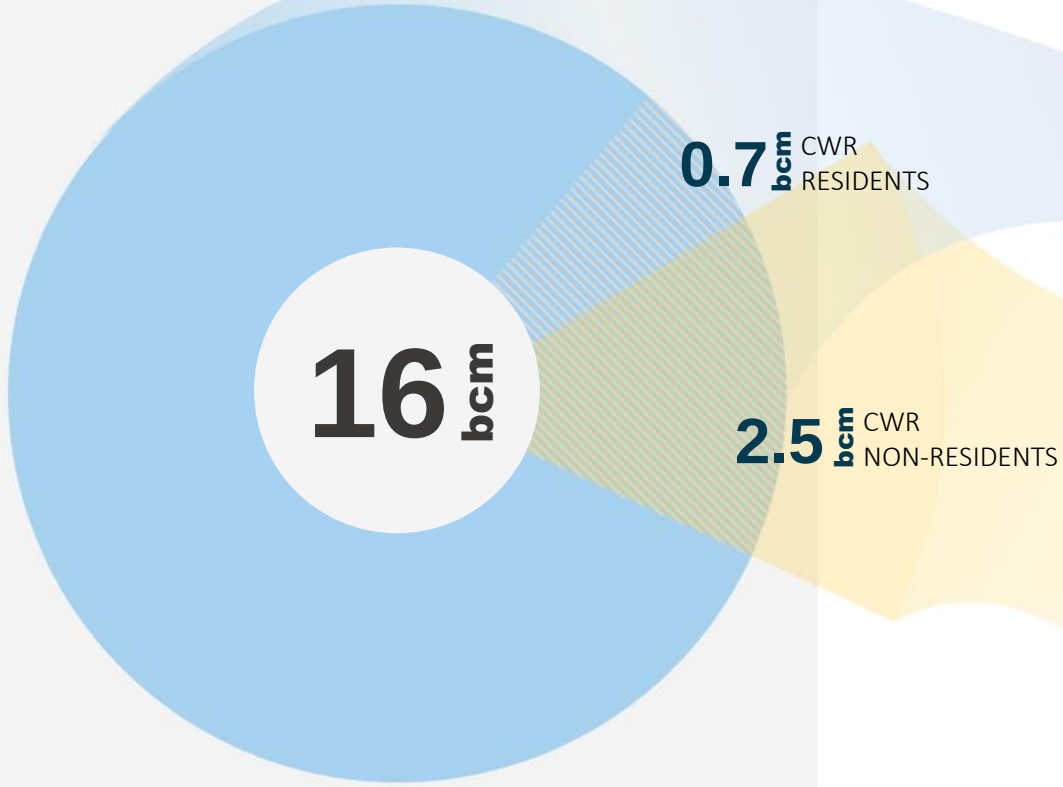
November 1, 2023



March 21, 2024

1.81 bcm RE-EXPORTS

PL	0.66 bcm (37%)
SK	0.60 bcm (33%)
MD	0.52 bcm (29%)
HU	0.03 bcm (1%)

Non-residents	*1.06 bcm*
Residents	*0.75 bcm*

1.10 bcm SHORT-HAUL

0.07 bcm CUSTOMS CLEARED

REGULATORY UPDATES SERVICE PORTFOLIO

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Re-organizing capacity types:

- Firm — **60%**
- Conditionally firm* — **30%**
- Interruptible — **10%**

90% from available capacity

** submit nomination until 3 pm D-1 for gas day D*

CURRENT				SINCE 01.06.2024			
DAILY	MONTHLY	ANNUAL	SERVICE	ANNUAL *(1-4 YEARS)*	SEASON	MONTHLY**	DAILY
		firm *(with curves)*	BUNDLED CAPACITY	firm *(without curves)*			
	firm		WORKING GAS VOLUME	firm	firm	firm	firm Interruptible
Interruptible	Interruptible		INJECTION		firm conditionally firm interruptible	firm conditionally firm interruptible	Interruptible
Interruptible	Interruptible		WITHDRAWAL		firm conditionally firm interruptible	firm conditionally firm interruptible	Interruptible

***customers can book capacities for a month or several months*

REGULATORY UPDATES

CAPACITY ALLOCATION
FOR A MONTH

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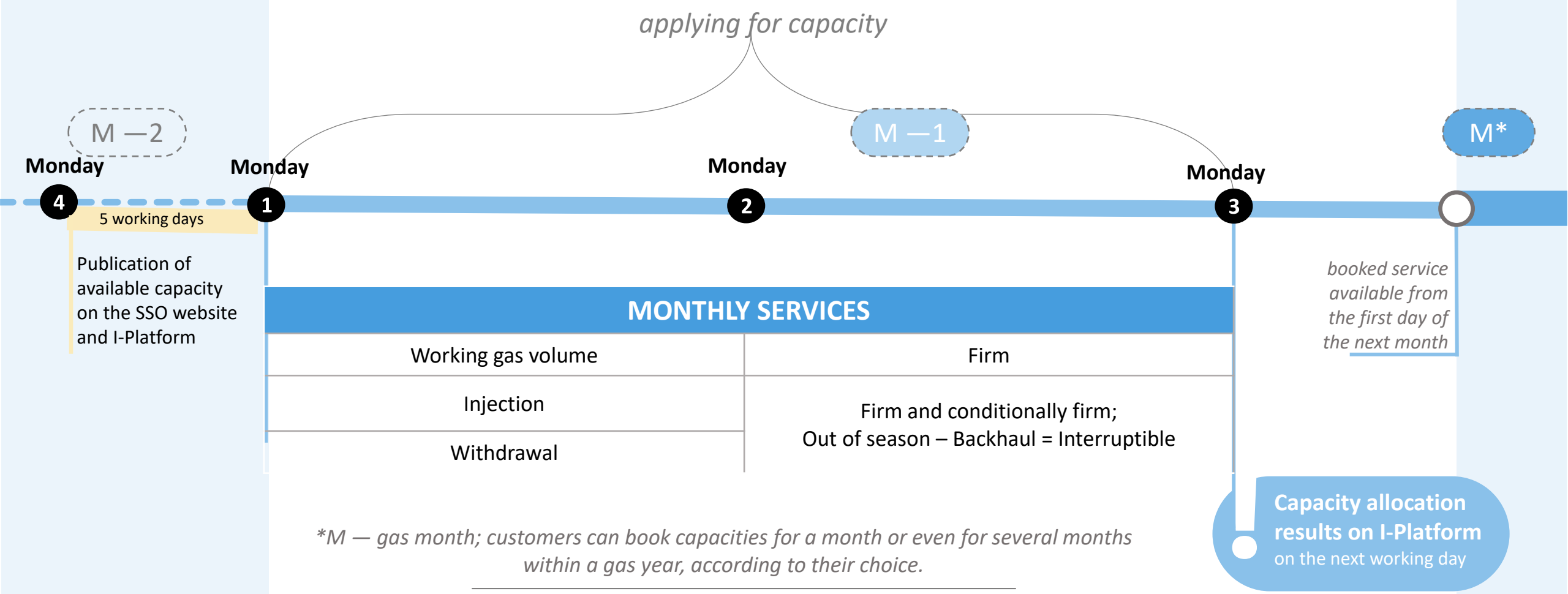

M — gas month; customers can book capacities for a month or even for several months within a gas year, according to their choice.

REGULATORY UPDATES

CAPACITY ALLOCATION
FOR A YEAR/SEASON

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April - April
storage year

ANNUAL		
Working gas volume	Firm	For 1-4 years
Bundled capacity		

Monday 4 — JANUARY — **Monday** 1 — FEBRUARY — **Monday** 2

30 working days

Publication of available capacity on the SSO website and I-Platform

April - September
injection season

INJECTION SEASON	
Working gas volume	Firm
Injection	Firm & Conditionally firm
Withdrawal	Out of season – Backhaul = Interruptible

Capacity allocation results on I-Platform
on the next working day

Monday 4 — JULY — **Monday** 1 — AUGUST — **Monday** 2

30 working days

Publication of available capacity on the SSO website and I-Platform

WITHDRAWAL SEASON	
Working gas volume	Firm
Withdrawal	Firm & Conditionally firm
Injection	Out of season – Backhaul = Interruptible

October - March
withdrawal season

STORAGE TARIFFS

Resolution of the NEURC No. 656 dated 30th June 2022

1.8 euro MWh

injection	storage fee for a month	withdrawal
0.86 euro MWh	0.04 euro MWh	0.90 euro MWh

Formulas:

INJECTION FEE

ƒ = 243.52 UAH* **x** 1.2(VAT) **x** COEFFICIENT **/** (FX**) **/** 10.595 (GCV)

STORAGE FEE

(WORKING GAS VOLUME)

ƒ = (1 month) = n-days **x** 0.4 UAH* **x** 1.2(VAT) **x** COEFFICIENT **/** (FX**) **/** 10.595 (GCV)

WITHDRAWAL FEE

ƒ = 253.03 UAH* **x** 1.2(VAT) **x** COEFFICIENT **/** (FX**) **/** 10.595 (GCV)

Coefficient:

	Annual	Monthly	Day Ahead
Injection	1.0	1.1	1.2
Storage			
Withdrawal			

** Tariff for 1 000 m^3/day*

*** FX — Foreign exchange. The indicator depends on the UAH/EUR exchange rate*

UKRTRANSGAZ COMMERCIAL STRATEGY

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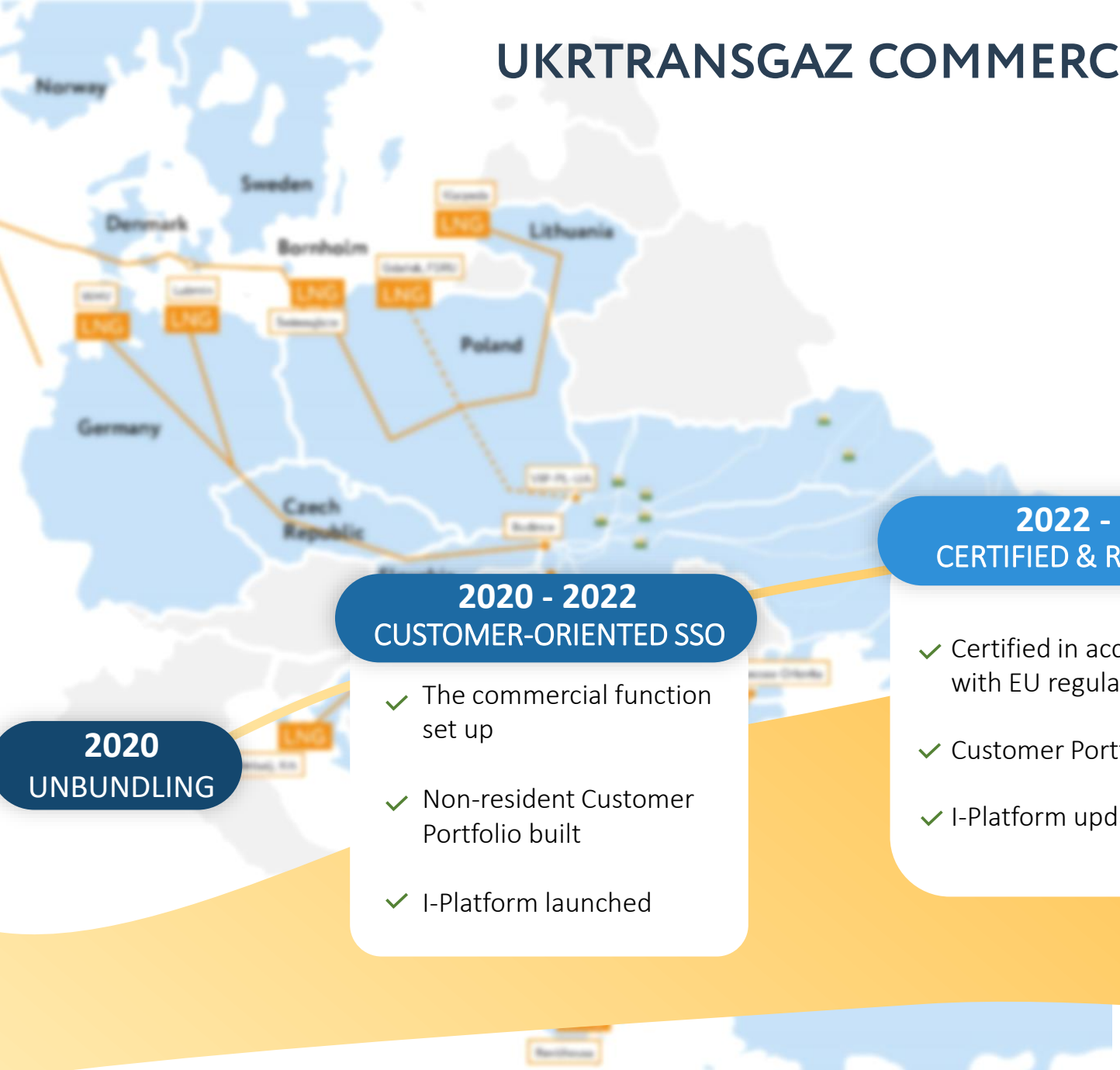


2020
UNBUNDLING

2020 - 2022
CUSTOMER-ORIENTED SSO

- ✓ The commercial function set up
- ✓ Non-resident Customer Portfolio built
- ✓ I-Platform launched

2022 - 2023
CERTIFIED & RELIABLE SSO

- ✓ Certified in accordance with EU regulations
- ✓ Customer Portfolio increased
- ✓ I-Platform updated

2024...
SSO UA AS A PART OF EU ENERGY BALANCE

...in progress

- Improving Service Portfolio
- Regulatory updates for biomethane storage
- Migration to SAP S/4 HANA
- Switching to ENERGY UNITS

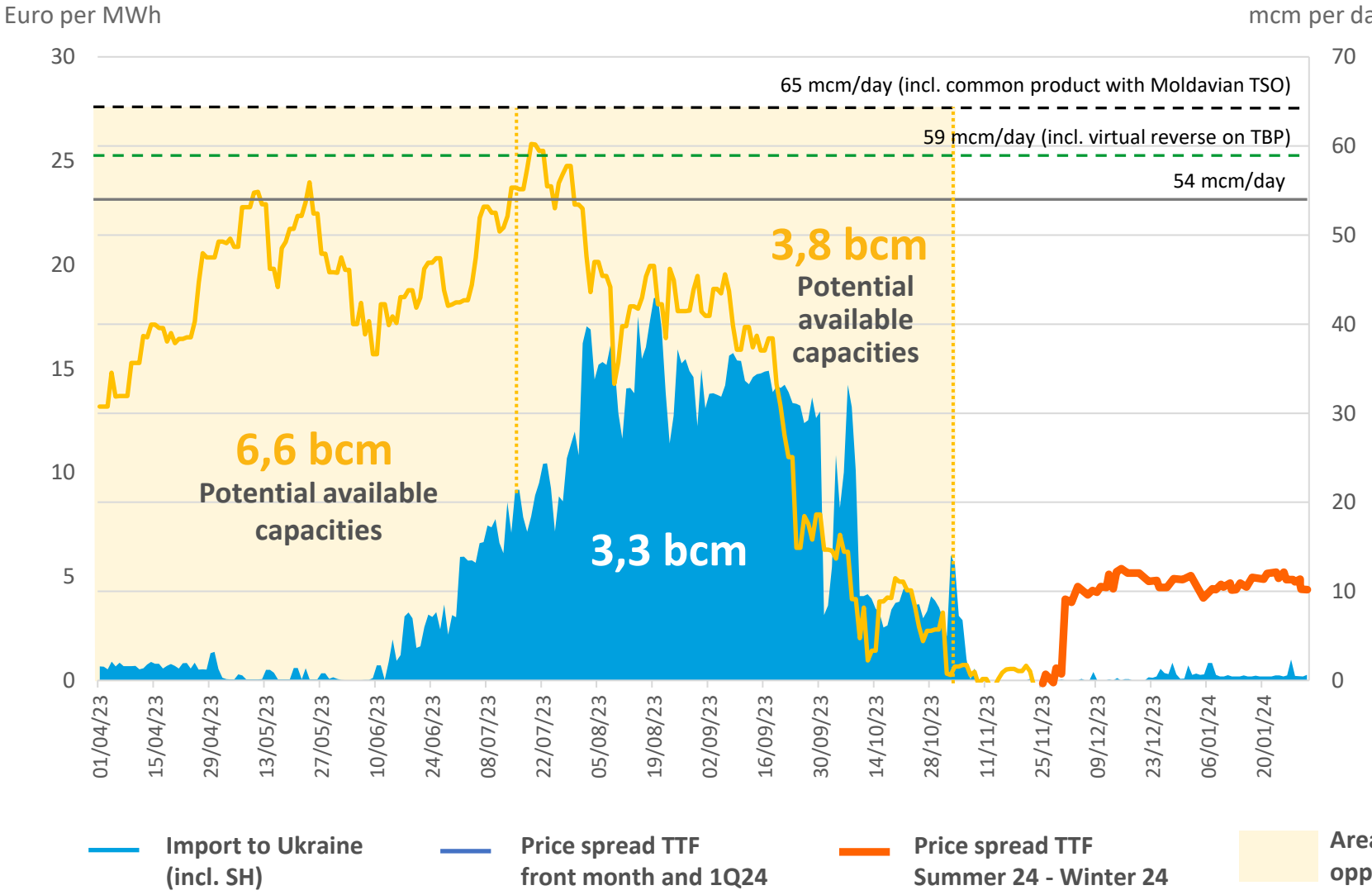
PREPARATION FOR 2024/2025 SEASON

GTS & UGS STRESS-TEST

ANDRII PROKOFIEV

Head of the Division of Cooperation
with Clients of Gas TSO of Ukraine

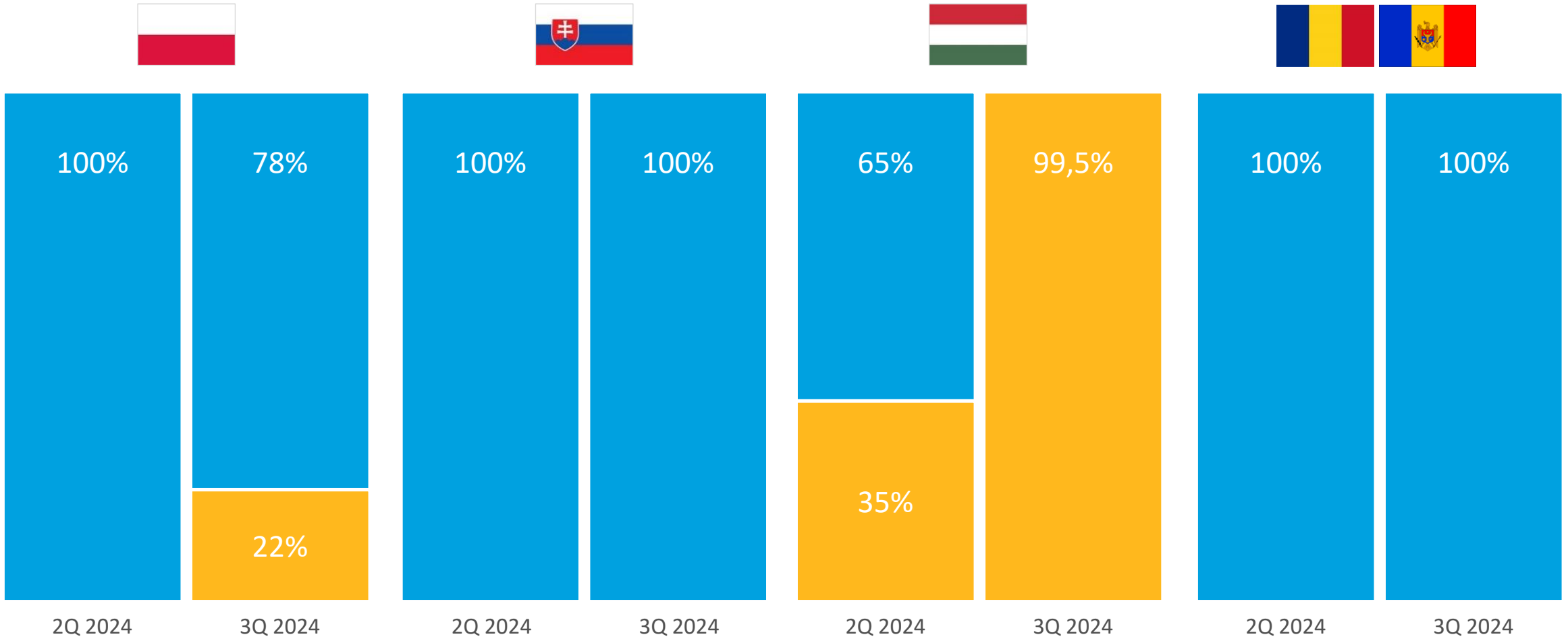
2023/2024 Season Results and Plans for 2024/2025



- GTSOU continues cooperation with adjacent TSOs **to prolong and maximize the level of firm entry capacity** to Ukraine
- GTSOU is in the process of agreement with NEURC **prolongation of current shorthaul tariffs till April 1, 2025**
- GTSOU & UTG together with other stakeholders are finalizing **new stress-test**

Data source: GTSOU calculation based on data from Argus

Cross-border capacities in upcoming season



GTSOU and UTG with the support of international partners, conducted a stress test for 2024/2025 winter season

Project tasks:

1. Determine **stress test scenarios** with combinations of possible gas infrastructure facilities shutdowns caused by the military attacks, and difficult market / weather conditions, that **are happening simultaneously**
2. **Model the operation of Ukraine's** gas transmission and storage systems under stress scenarios with potential physical damage to key storage, transmission and upstream assets, while focusing **on the zero transit assumption as a baseline**
3. Perform a **technical review** of the modeling results involving an **independent international expert**
4. Determine whether Ukraine's gas infrastructure is able to **ensure injection and further withdrawal of 5 bcm of EU traders gas** during the forecasted 2024/2025 season **under all modelled scenarios,** while satisfying the demand of domestic consumers and being in line with Regulation (EU) 2022/1032 requirements

Participants of the international expert group:

USAID FROM THE AMERICAN PEOPLE Energy Security Project

Energy Community

European Commission JOINT RESEARCH CENTRE

SIMONE RESEARCH GROUP

Ministry of Energy of Ukraine

UA TRANSMISSION SYSTEM OPERATOR

NAFTOGAZ GROUP

NAFTOGAZ UKRTRANSGAZ

** JRC participates in observer role*

Challenging scenarios were chosen for the study, simulating gas infrastructure operation under critical conditions

UA TRANSMISSION SYSTEM OPERATOR

Input data for modeled stress tests:

Input parameter	S1	S2	S3	S4	S5	S6	S7	S8
Date of the modelled event (start)	15.12.24	15.12.24	15.01.25	15.01.25	15.02.25	15.02.25	08.03.25	08.03.25
Total seasonal injection / withdrawal level in UGS's by EU traders	5 bcm	5 bcm	5 bcm	5 bcm	5 bcm	5 bcm	5 bcm	5 bcm
Domestic consumption within scenario duration, mcm/day	Forecast for the month (based on the coldest December in 2022-2024 period)	Forecast for the month (based on the coldest December in 2022-2024 period)	Last five winters January peak 5 days consumption	Forecast for the month (based on the coldest January in 2022-2024 period)	Forecast for the month (based on the coldest February in 2022-2024 period)	Last five winters February peak 5 days consumption	Forecast for the month (based on the coldest March in 2022-2024 period)	Forecast for the month (based on the coldest March in 2022-2024 period)
Domestic production within scenario duration, mcm/day	Average daily production with minor decrease				Average daily production with significant decrease	Average daily production with minor decrease	Average daily production with medium decrease	Average daily production with minor decrease
Transit volume, mcm/day	~Current (40)	0	0	0	0	0	0	0
Traders gas transport from customs warehouse to EU, mcm/day	Linear through season (baseline)	~x2 daily re-export level comparing to baseline level	Linear through season (baseline)	~x2 daily re-export level comparing to baseline level	Linear through season (baseline)	Linear through season (baseline)	Linear through season (baseline)	Linear through season (baseline)
Impact description	Set of specific assets #1	Set of specific assets #2	Set of specific assets #3	Set of specific assets #4	Set of specific assets #5	Set of specific assets #6	Set of specific assets #7	Set of specific assets #8
Emergency scenario duration	Scenario duration (in hours) defined by the timing required to recover the capacity of the damaged asset (includes emergency repair, re-routing etc.), estimated based on the combination of factors: extent of possible damage, availability of trained teams, emergency stock equipment etc.							

Key charachterisitics of the modeled scenarios

1 Each of the eight modeled scenarios includes a **simultaneous** combination of **possible emergency events causing negative impact on Ukrainian gas infrastructure** at the same time as stressful market/weather factors are applied

2 Baseline assumption for the transit volume is **"zero level" (applied for 7 out of 8 scenarios)**, including Scenario #2 which simulates termination of transit in December 2024 despite existing contract conditions

3 For all scenarios, GTSOU assets planned for **rightsizing** in FY 2024 as a measure of preparation for "zero transit" mode, are switched-off in the model, therefore, not considered as available capacity for the purposes of the study

4 All stress-test scenarios include the **simultaneous shutdown of several key gas infrastructure facilities**

International expert group confirmed Ukraine's gas infrastructure resilience under severe external conditions

International experts verified the modeling results, including the following input parameters:

1. Transport volume from UGS to the EU
2. Maximum available withdrawal UGS capacity as at the date of the scenario
3. Sets of upstream, TSO and SSO assets simultaneously damaged under every scenario
4. Compressor stations involved in operation within the scenarios
5. Volumes and pressures on key GTSOU inlet/outlet points (cross-border, DSO, SSO)

Preliminary results of the conducted study:

The results of the modeling, which were presented to the working group and verified by independent experts, **sufficiently demonstrate the technical resilience of the TSO and SSO systems to inject and further withdraw 5 bcm of EU traders gas during the forecasted 2024/2025 season under all modelled scenarios**

The final report will be issued by mid April 2024

THANK YOU FOR YOUR ATTENTION