



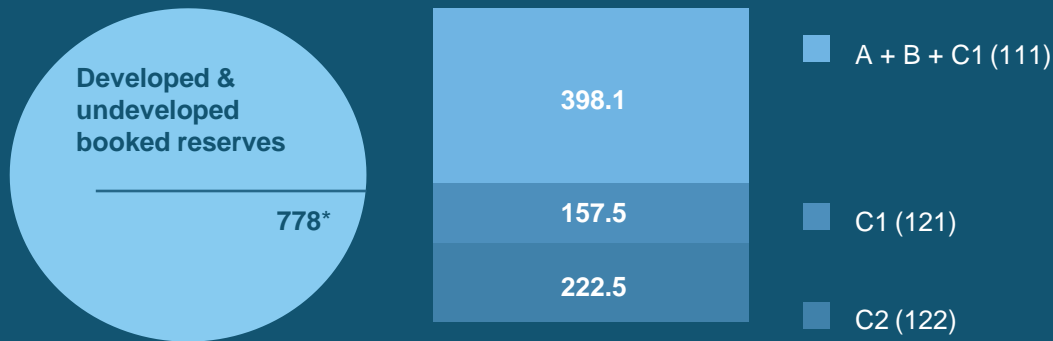
Association
of Gas Producers
of Ukraine

NATURAL GAS PRODUCTION IN UKRAINE OPPORTUNITIES & CHALLENGES

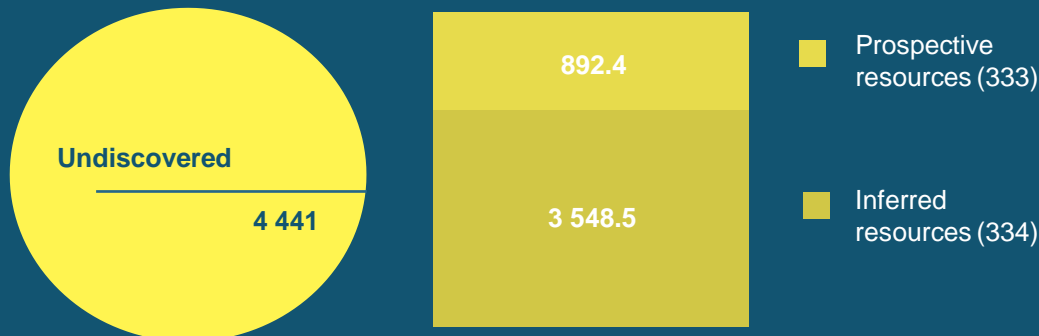
September 2022

UKRAINE WAS, IS AND WILL BE A STATE DESCRIBED WITH A GREAT PRODUCTION POTENTIAL

Information of gas reserves and resources in Ukraine, bcm

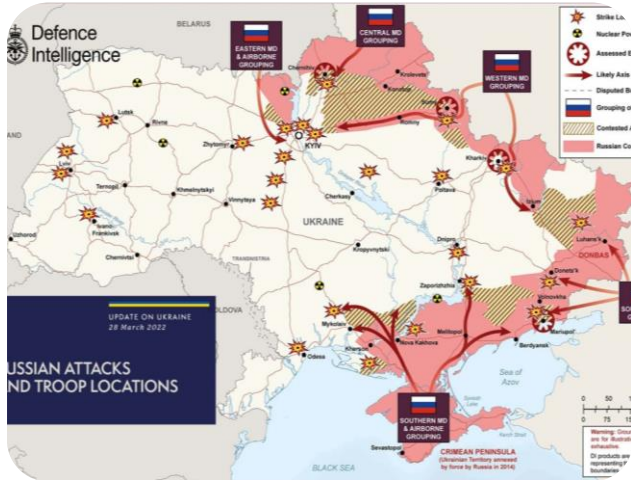


Contingent resources



- ⊙ We operate more than 770 bcm of discovered proven reserves of natural gas and more than 4.4 trln of undiscovered ones
- ⊙ Our companies voluntarily disclose data according to SPE-PRMS standards meeting the global worldwide practice of evaluation
- ⊙ The main reserves of natural gas are concentrated in the East region of Ukraine, which holds 283 gas fields (blocks) with 606 bcm of discovered booked reserves
- ⊙ In the West region – 105 bcm and 132 fields
- ⊙ In the Southern – 66.6 bcm and 43 fields

EVEN THOUGH RUSSIA TRIES TO TERRORIZE AND DISRUPT OUR STRIVINGS – WE FIGHT BACK AND DO IT GOOD



March (Peak)



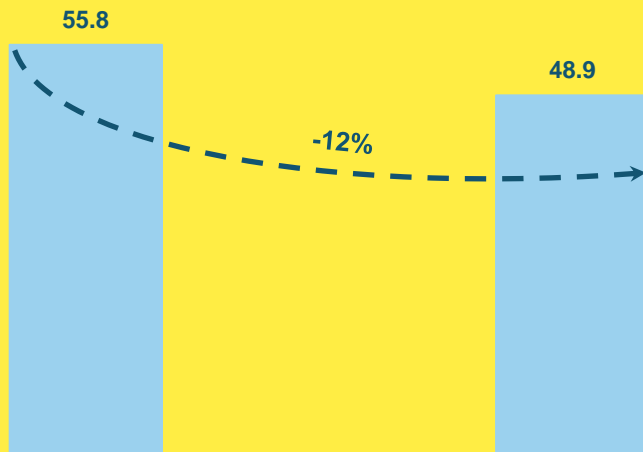
September

Ukraine successfully counter-attacks and liberates previously occupied territories

Since the enemy's forces are actively retreating, they leave behind lots of goods, which made russia the leading supplier of weapons to Ukraine

Advancing makes it possible to increase production, as part of the fossil fuel fields are now under control of Ukraine

Ukraine's daily natural gas production since the beginning of the war



Pre-war times (February 23)

During the war (Avg. in August current year)

- The Russian forces attacked from the North, East and South, and it naturally affected the hydrocarbons production
- The Regulator has prohibited the publication of information regarding the status of the energy, given the war
- Continuous airstrikes forced producers to maintain activity at facilities, where it remains physically possible
- Newly liberated territories are able to check the status of the attacked fields and, if possible, to continue the work

NOTWITHSTANDING THE WAR, PRODUCERS CONTINUE TO SUSTAIN INDUSTRIAL PROJECTS

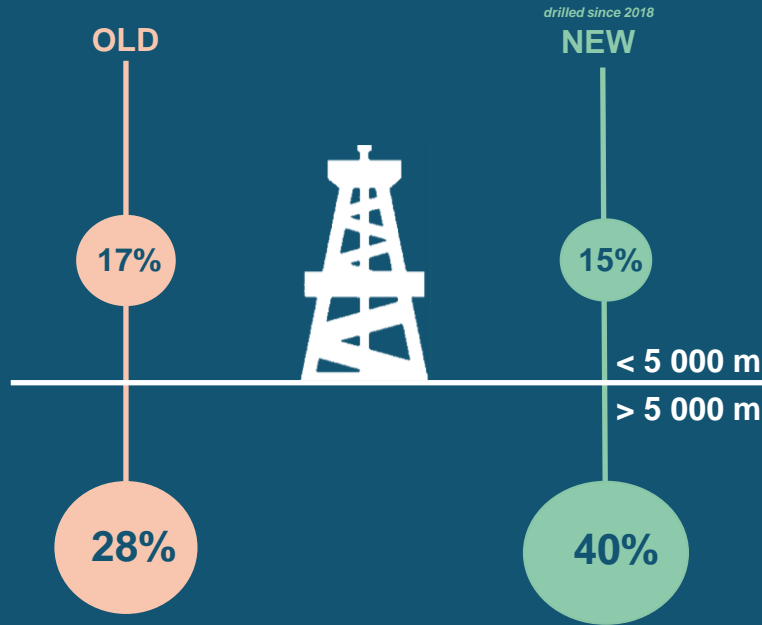
LIFE
GOES
ON—



- ⦿ For example, the first commercial gas inflows were already recorded at one of the PSAs
- ⦿ Companies maintain drilling and workover operations in safer regions
- ⦿ It continues in the Eastern region, notwithstanding the closeness to the contact line and the enemy's hostile actions
- ⦿ At the same time, since the beginning of the war, many service companies have left Ukraine, including Belarusian ones
- ⦿ Since the niche has been vacated, Ukraine needs to saturate this part of the market with professional companies

AND THIS IS A TIME WHEN PARTNERS ARE GETTING IN ON THE GAME, AS WE HAVE A BUNCH OF FRUITFUL WORK TO DO

Ukraine's gas industry is characterized by mix of wells:



- ⊙ The natural decline amounts to 15% per year
- ⊙ A high need to drill new productive wells and conduct workovers

⊙ Strong need for deep drilling (>6 000 m). As a matter of fact, in 2021 one of the private companies drilled an outstanding well

5 360 m — In 97.5 days — 300 thcm/day



The largest gas fields were discovered in the last century



Over time, the level of their depletion amounts to more than 80%, and in some – more than 90%



Majority of working gas wells lie at depth up to 4 000 m, sometimes up to 3 000 m and have an average daily flow rate of 15 000 cm



Among the existing technical solutions are PECs, which mainly is used by the largest owner of exhausting wells – state-owned UGV



Private companies also have such wells in their mix, but much less due to the drilling of new wells under tax incentives



More than 3 000 preserved and liquidated wells in Ukraine, drilled in 80-the 90s

⊙ The companies' experience proves that deep drilling is promising, and is the only way to increase production in Ukraine

ADDITIONALLY, COOPERATION PROSPECTS INCLUDE TIGHT GAS DEVELOPMENT

**100
bcm**

Tight rock collectors reserves only within the Eastern region

**> 5
km**

Depth of more than a half of reserves

**1.2
trln**

Technically recoverable reserves

It is hard for gas to move through tighter horizons



Development of tight gas horizons challenges:

- ⊙ Low productivity of wells, requiring non-stop drilling
- ⊙ Production enhancement (hydraulic fracturing) and horizontal drilling
- ⊙ Short lifetime of wells (5 years) vs traditional wells (10-20 years)
- ⊙ Rapid well flow rate decline (50% in 1 year)

Results of tight gas geological research carried out by 2 private and 1 state enterprise:

Deposit porosity within 5-8%

Core porosity in the range of 4-5-6-7% (rarely more than 8%)

Core permeability, mD – 0.01-6.73

The depth of the deposits is 5 000 – 6 200 meters

1

The company is receiving an inflow at porosities close to 8% and above

Deposit porosity within 6.5%

Minimum permeability, $1 \cdot 10^{-15} \text{ m}^2$ – within 0.9

2

41 field with 0.02 sq. microns for natural gas

Minimum open porosity – 7.6 – 9.2%

The average value of mD permeability is 1.0 – 8.8 (no commercial inflows)

3



Association
of Gas Producers
of Ukraine

Thank you for your attention!