



State Geologic and
Subsoil Survey
of Ukraine



Association
of Gas Producers
of Ukraine

UKRAINE's

Natural Gas Production

2020

CONTENT

1. Overview of Natural Gas Market

2. Exploration and Production Insights

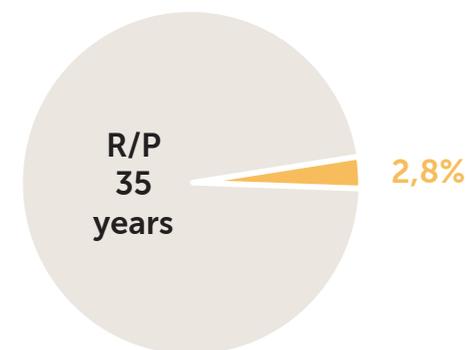
3. Regulatory Policy



UKRAINE HAS SIGNIFICANT POTENTIAL TO ENHANCE DOMESTIC PRODUCTION OF NATURAL GAS

Resource-rich country

Conventional natural gas reserves are 805 bcm (2nd in Europe) among them 2P reserves account for 350 bcm. Only 2.8% to 6% of these reserves are extracted annually.



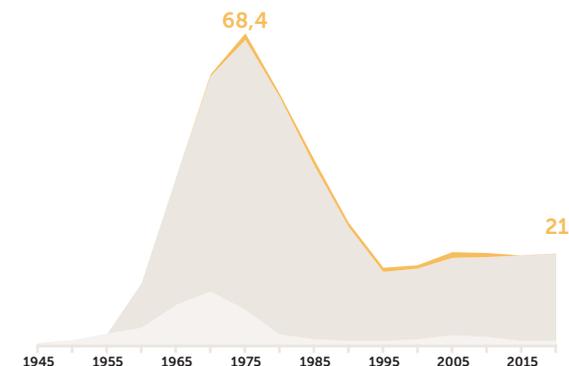
Well developed infrastructure

An extensive mid-stream infrastructure with an independent TSO allows rapid commercialization of new projects entering the domestic market (7th in Europe), with potential for gas export.



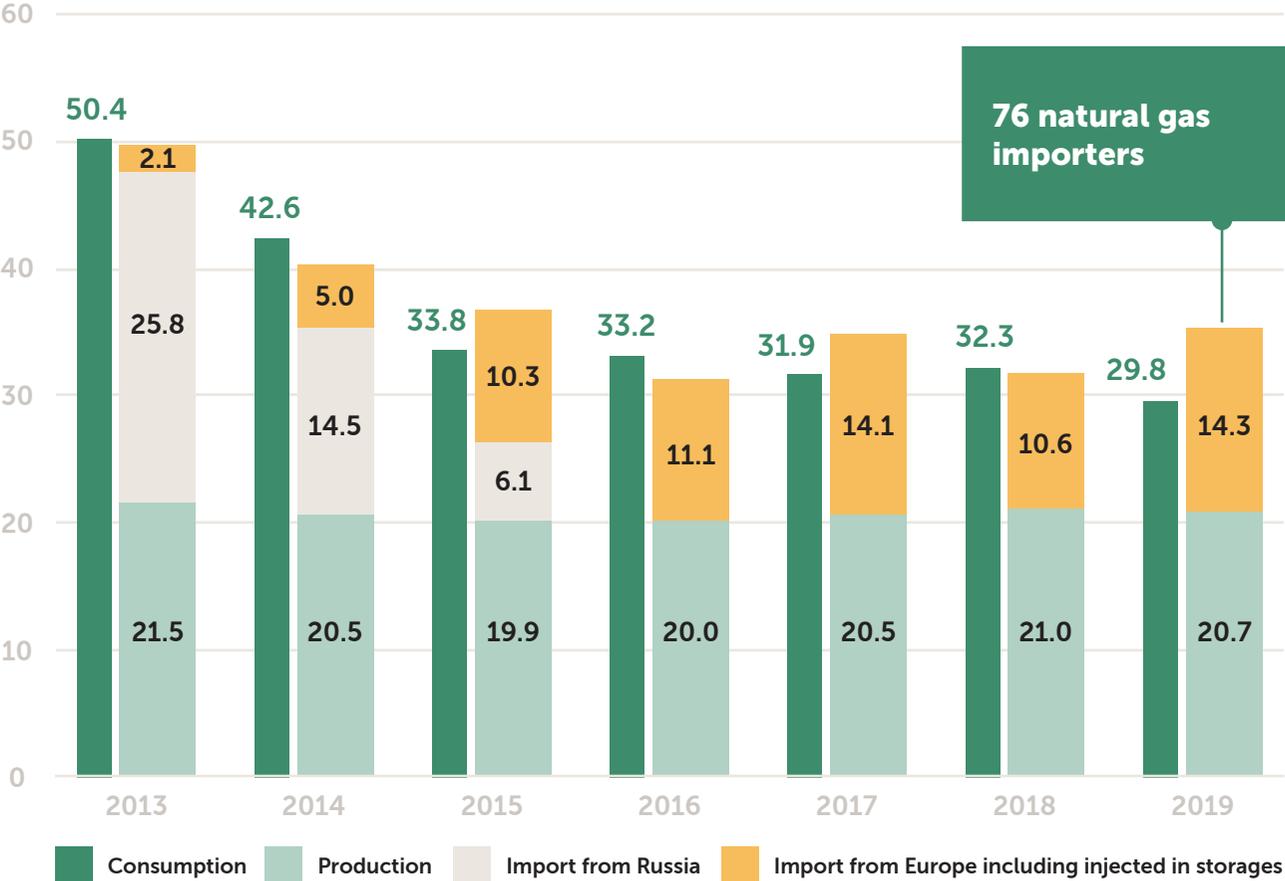
Historical legacy

Ukraine's oil and gas industry has a 100 year history. In the late 1970s, gas production was three times higher than current volume.

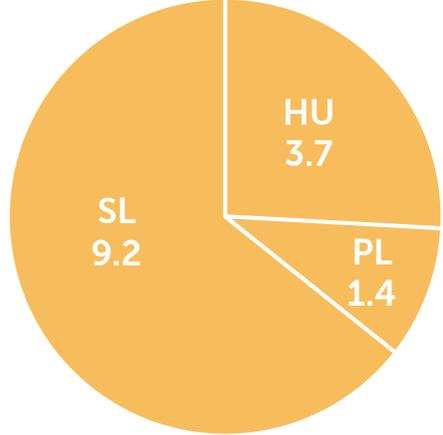


UKRAINIAN MARKET IS THE 7TH LARGEST NATURAL GAS CONSUMER IN EUROPE, HOWEVER, MOSTLY DEPENDING ON IMPORT

Ukraine's natural gas balance
bcm



Import in 2019
14.3 bcm

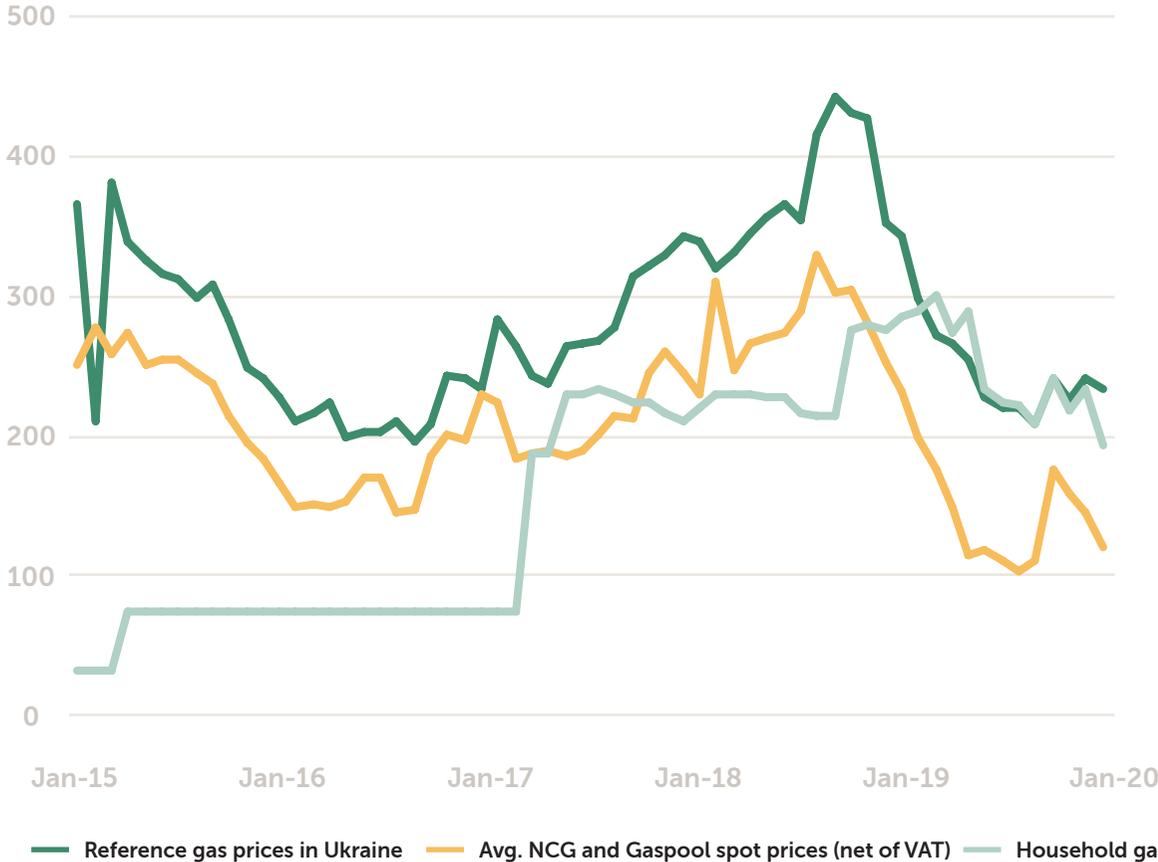


Imports meet 1/3 of Ukraine's gas demand.

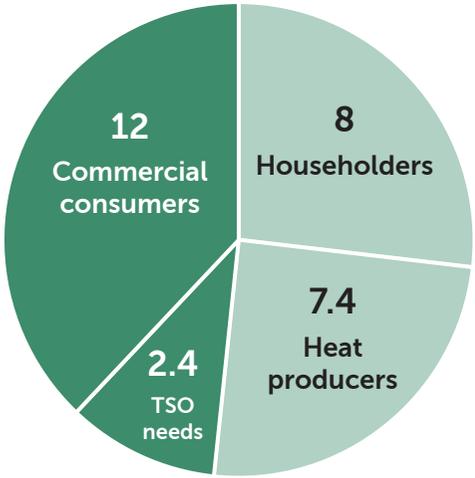
Gas imported from three European countries.

IMPORT PARITY PRICES TRADITIONALLY SECURE MARKET NETBACK FOR PRIVATE DOMESTIC PRODUCERS

Wholesale natural gas prices
US\$/thcm



Consumption in 2019
29.8 bcm

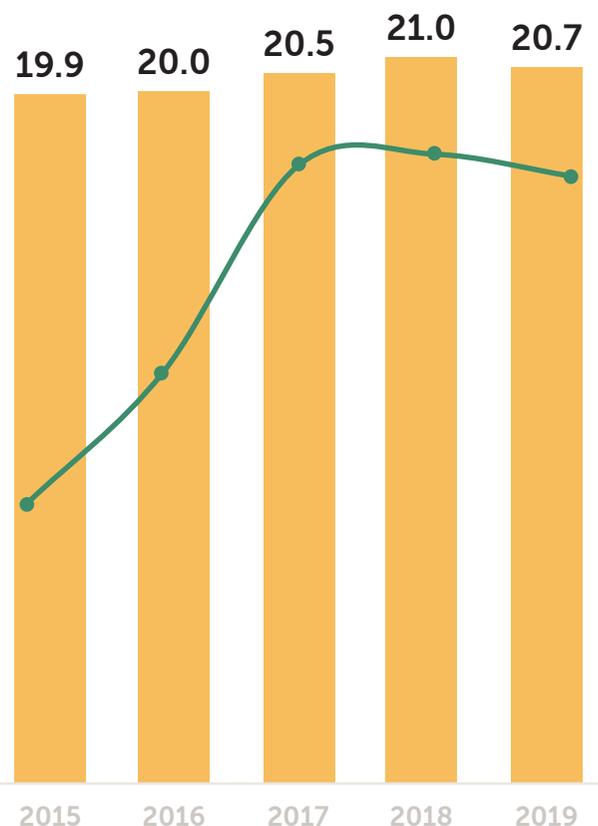


Household sector accounts for 1/2 of total consumption. Currently all prices are market based.

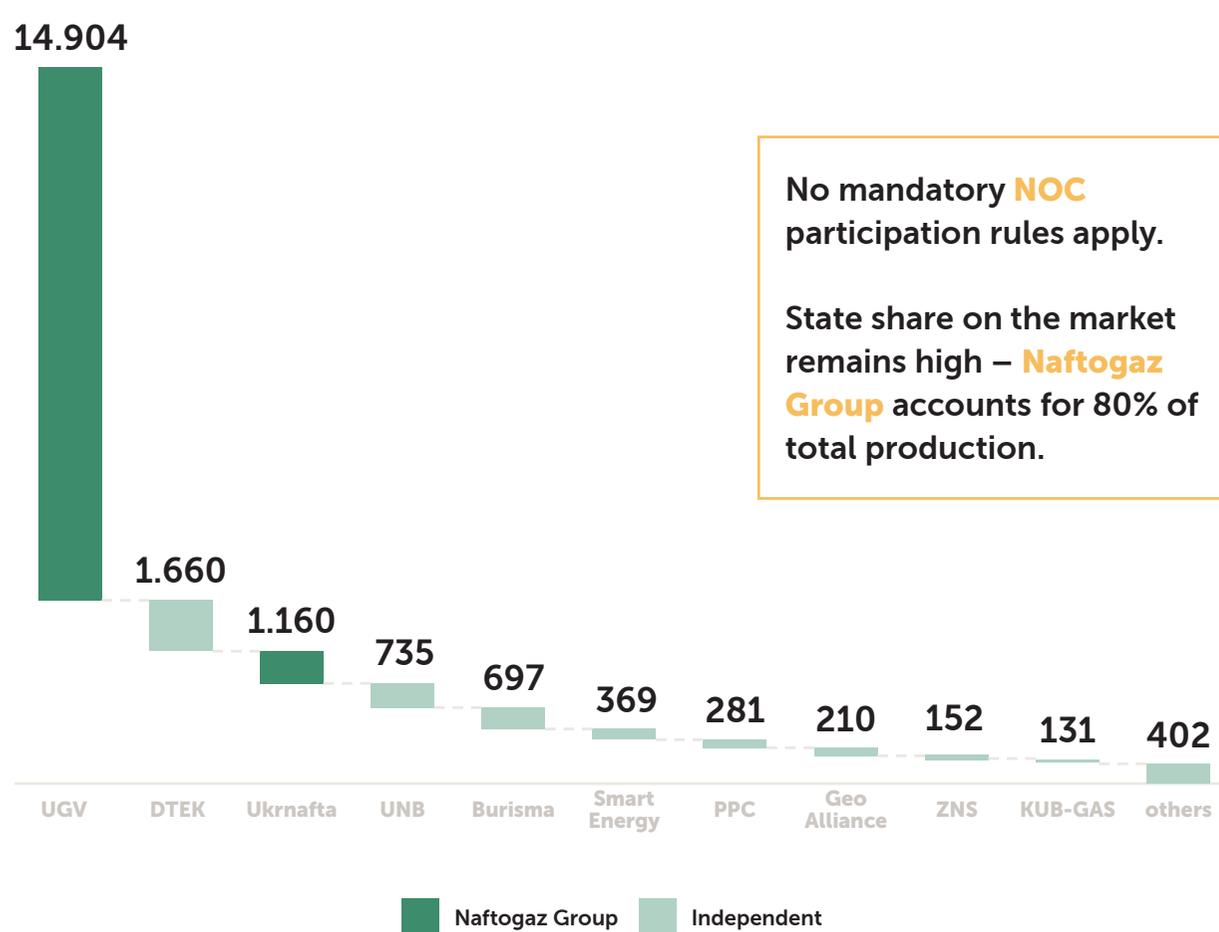
Sources: UEEX, Naftogaz of Ukraine.

OVER THE YEARS ENERGY COMPANIES CONFIDENTLY KEEP THEIR PRODUCTION RATE FLAT

Natural gas production in Ukraine
bcm



Top 10 gas producers in 2019
mmcm



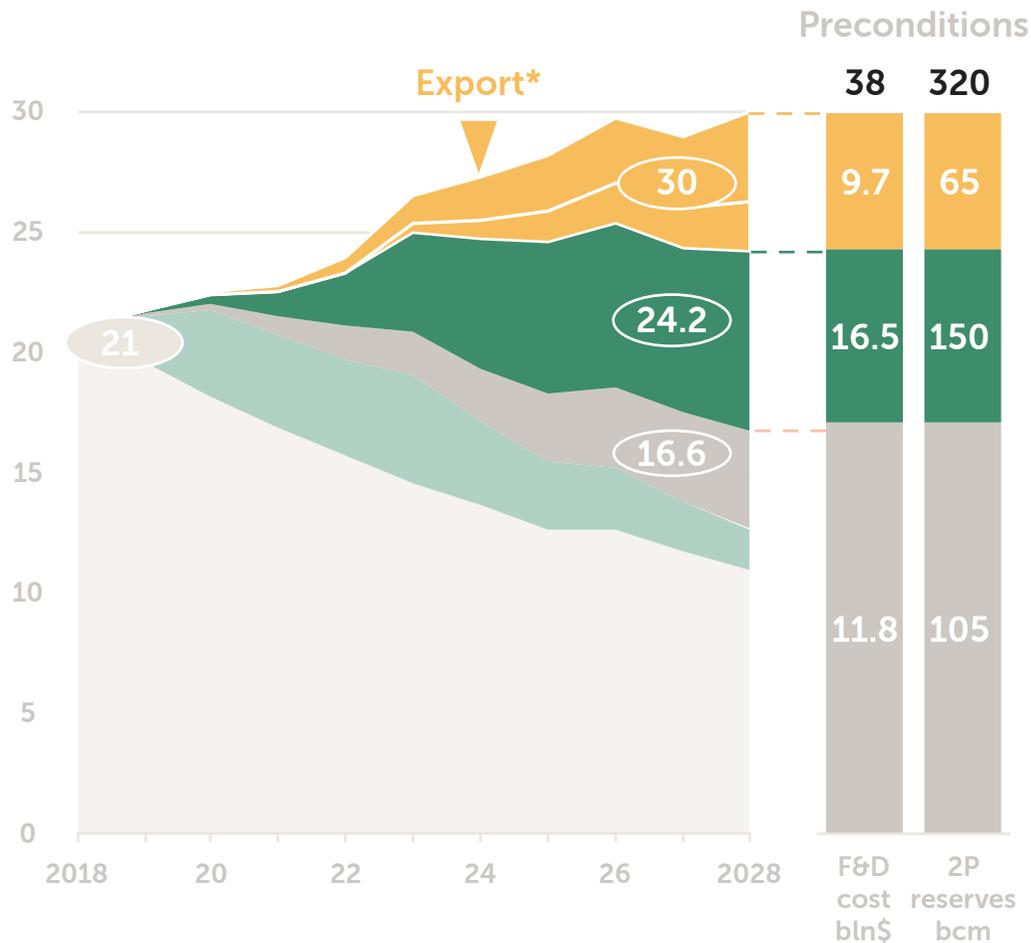
No mandatory **NOC** participation rules apply.

State share on the market remains high – **Naftogaz Group** accounts for 80% of total production.

■ Naftogaz Group ■ Independent

UKRAINE IS CAPABLE TO MEET OWN DEMAND AND EVEN TO BECOME AN EXPORTER OF NATURAL GAS BY 2028

Gas production forecast bcm



By 2028 total natural gas production may grow up to 30 bcm (by 43%).

55% of produced gas has to come from new conventional and unconventional projects (greenfields).

Gross investments in E&P sector should be increased threefold and total \$38 billion over a 10 year period.

Investments are supposed to cover E&P of additional 320 bcm of 2P reserves.

Base Enhancing of brownfields Greenfields: Conservative scenario ** Basic scenario Optimistic scenario (offshore, tight formations)

*In case if the consumption will be optimized as it planned. **Maximize economic value scenario: low price (below \$200/thcm, \$50/barrel, moderate new discoveries).

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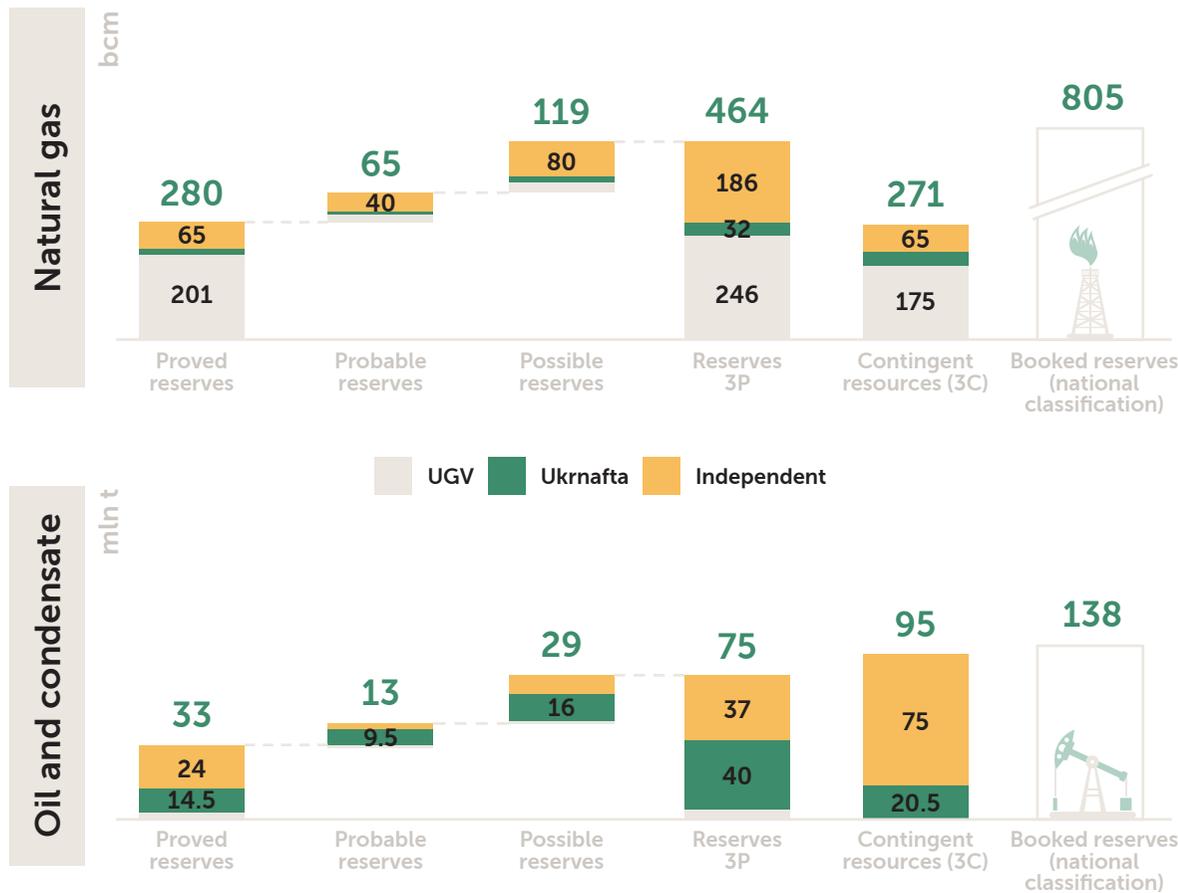
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UKRAINE HAS RICH RESERVES AND VAST UNLOCKED RESOURCES POTENTIAL

Discovered hydrocarbons in Ukraine International and national classification



Oil and Gas reserves and resources million barrels of oil equivalent (mmboe)

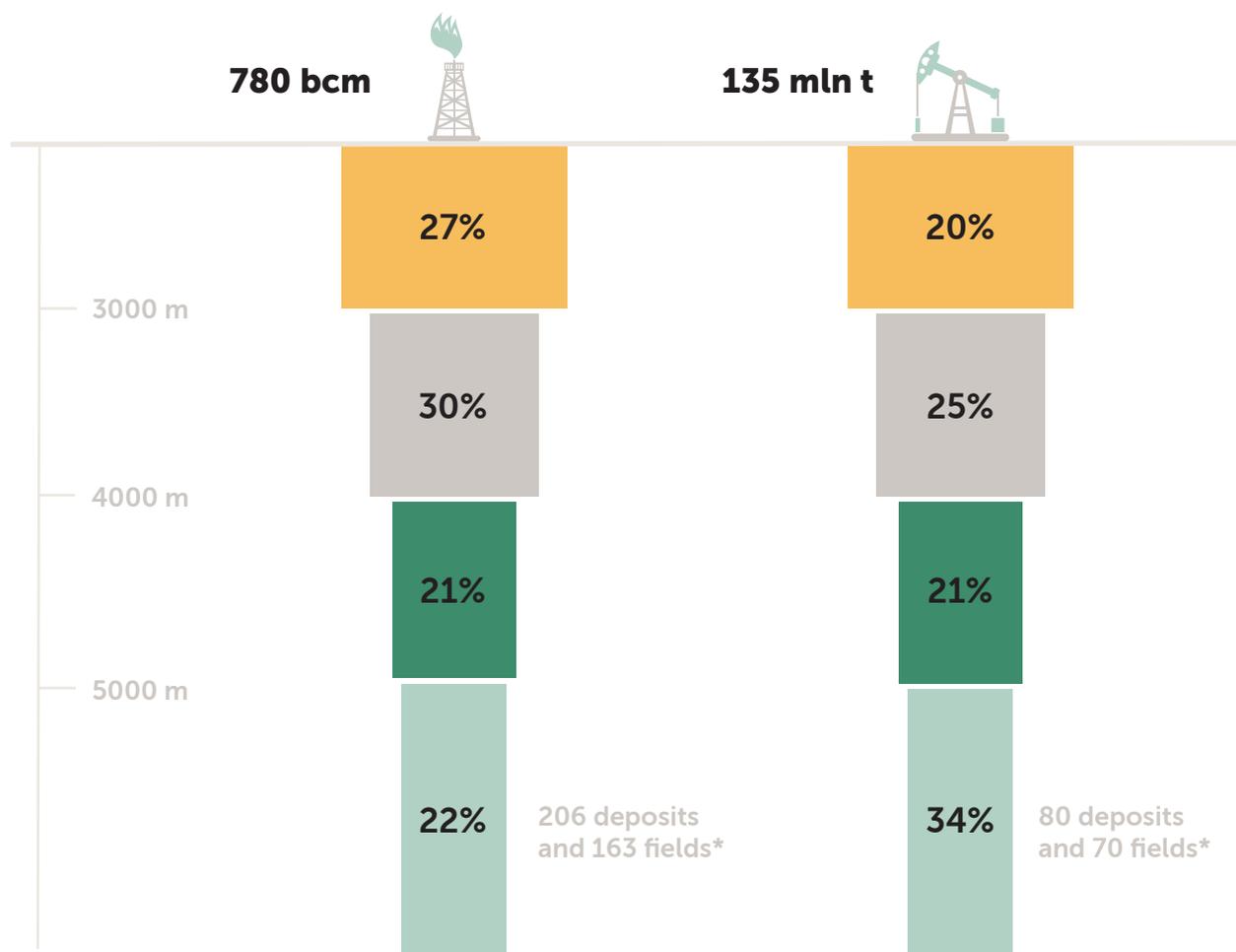


- Economically recoverable reserves
- Prospective resources
- Total discovered reserves under national classification

Note: Audit of reserves and resources conducted according to SPE PRMS for: UGV (M&L, 2017, including tight gas reservoir resources), Ukrnafta, Geo Alliance (D&M, 2016), PPC, Burisma Group (D&M, 2018), Cub Energy (R&S, 2018), Regal Petroleum, Cadogan Petroleum, Kashtan Petroleum. For the rest, calculation is carried out according to the national classification, where the following analogies have been used: Proved – 111 (1P), Probable – 121, Possible – 122, Resources (contingent) includes subcategories 211-221-222-332. Booked reserves according to the national classification, also include undistributed reserve fund of natural gas (36 bcm), crude oil and condensate (18 mln t).

AT THE SAME TIME, PROSPECTIVE RESOURCES ARE LOCKED AT GREAT DEPTHS...

Distribution of gas prospective resources by depth
C3, subcategory 333



Over 70% of prospective resources are deeper than 3,000 meters and 22% are at depths below 5,000 meters.

With the attractive pricing and fiscal conditions, a great part of prospective resources could be transferred to a reserves category in the near future.

* Prospective resources in places delineated based on seismic data, but not confirmed by drilling.

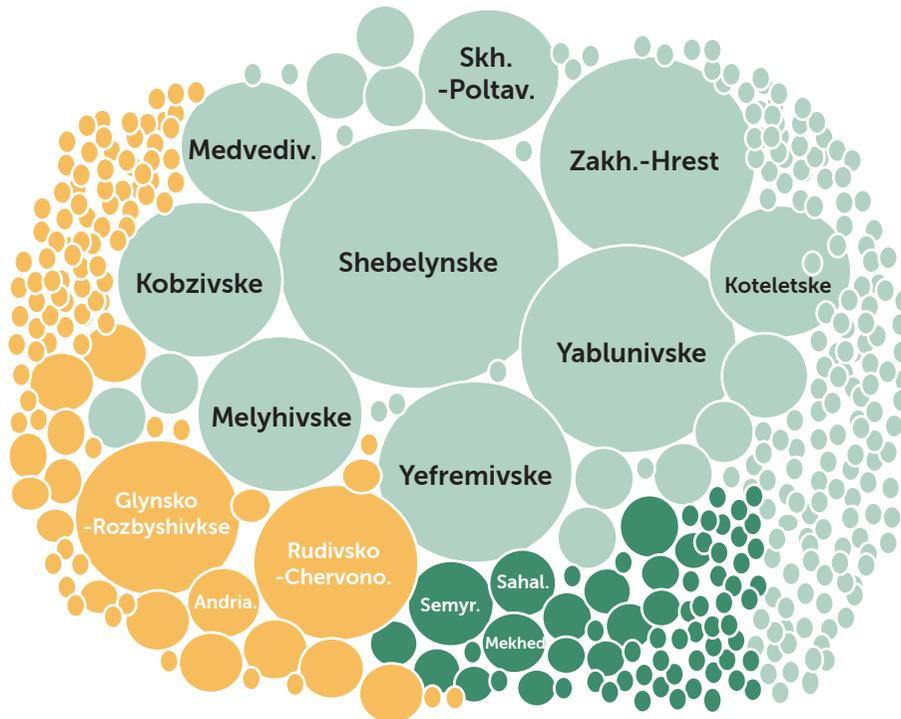
Source: AGPU, State Geological Information Fund of Ukraine.

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AND ARE SPREAD ACROSS MANY SMALL FIELDS

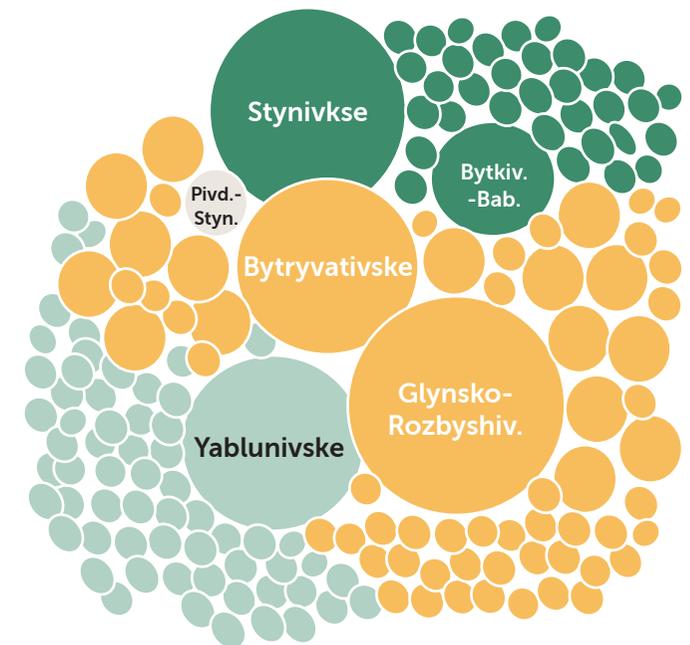
Distribution of gas fields by size

402



Distribution of oil fields by size

197



- UGV
- Ukrnafta
- Nadra of Ukraine
- Independent

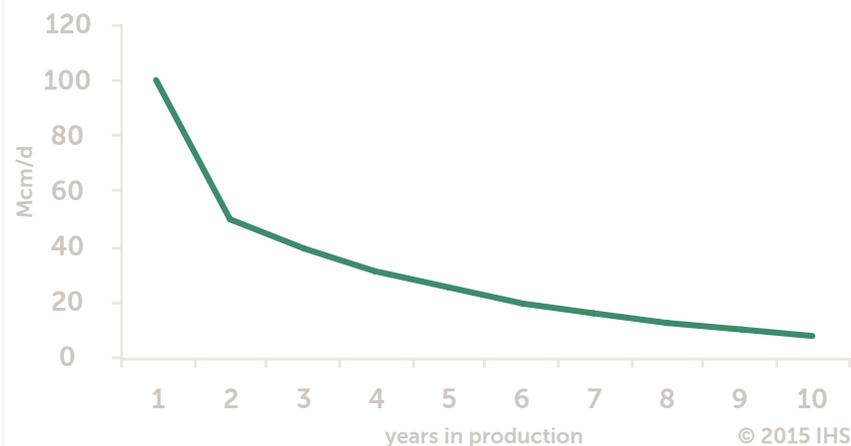
Over 92 % of fields have reserves less than 5 bcm and 5 mln t. They are considered as small and very small. Large and middle-size fields, accounting for a half of the country's reserve belong to state-owned companies. However, these fields are at the final stage of development with a depletion over 70%.

ON TOP OF THAT, UKRAINE HAS SIZABLE AMOUNT OF TIGHT GAS RESOURCES

It is hard for gas to move through tighter horizons



Tight gas wells production curve



Ukraine has significant potential of unconventional resources, including tight sands. Its technically recoverable reserves are estimated at 1.2 trillion cm.

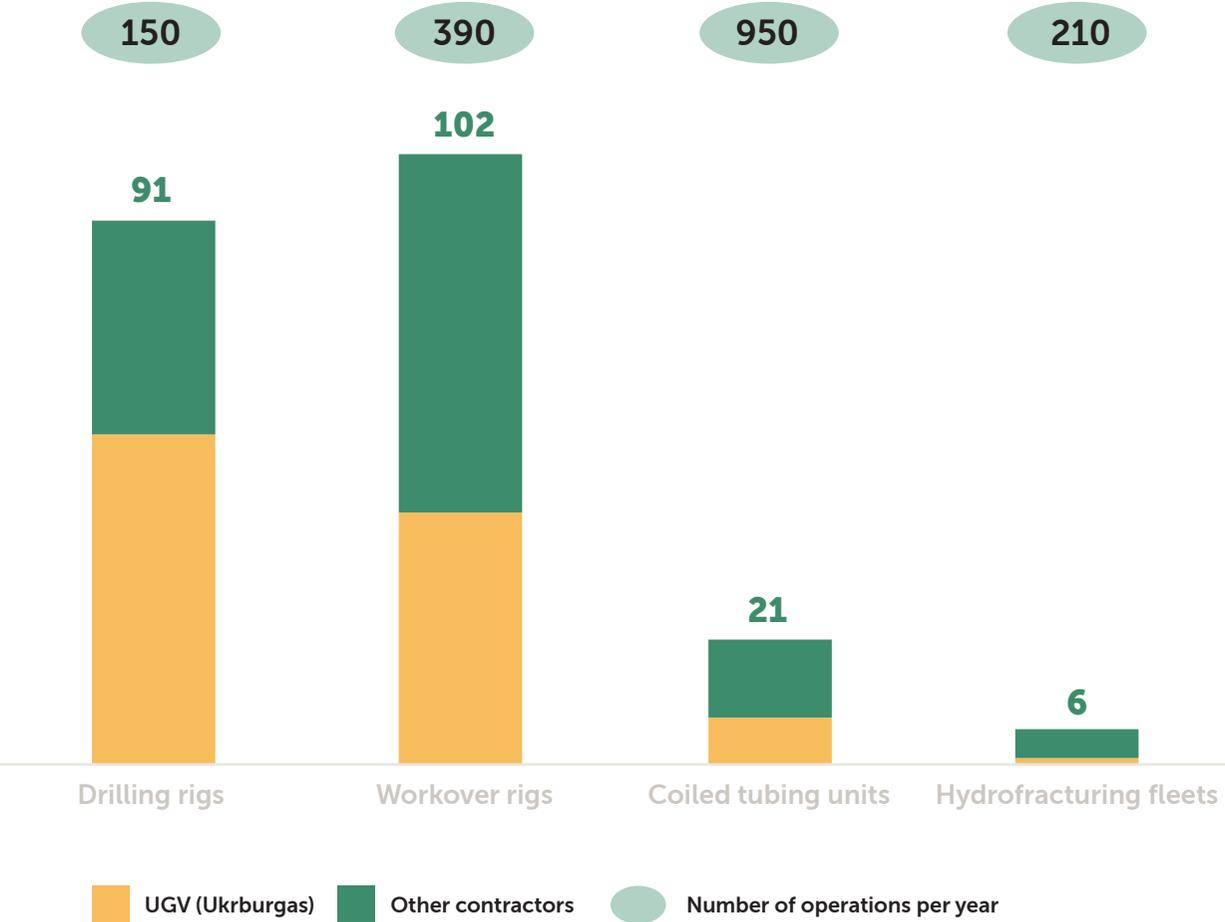
At the same time, development of tight gas horizons with low permeability and porosity is less attractive due to complexity of production:

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

These common features and such negative factors as significant depth of reserves, lack of hi-end services on the market **make unconventional gas production commercially challenging.**

UKRAINE'S SERVICE MARKET IS ONE OF THE LARGEST IN EUROPE, HOWEVER SOPHISTICATED PRODUCTION METHODS ARE HARDLY USED

Ukraine's oil field service market pcs.



Ukraine has the largest onshore rig fleet in Europe.

Availability of industry experts and competent engineering and technical staff.

Wide range of services contractors.

Well-developed supply chain of manufactured goods (pipes, cement, etc.).

Big 4 OFSC operate on the market.



Source: AGPU, Baker Hughes Rig Count.

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TO ATTRACT INVESTMENTS, THE UPSTREAM REGULATIONS HAVE BEEN DRASTICALLY IMPROVED

The growth of domestic natural gas production is a strategic priority of **Ukraine's Government**

Regulatory environment

- Attractive fiscal regime
- Modern regulations
- Independent gas transmission operator

Natural potential

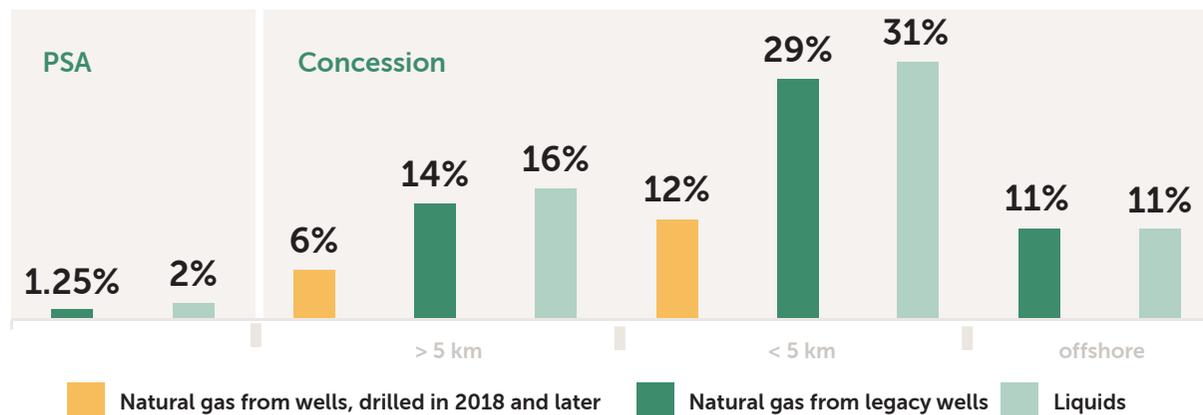
- Substantial reserves base
- Large oil field services market
- Developed gas infrastructure
- Market-based prices

Access to reserves

- Open licensing rounds 2019/20
- Easy access to geoscience data
- One stop shop

ATTRACTIVE TAXATION FOR NEW INVESTMENTS IN NATURAL GAS PRODUCTION

Fiscal regime



Friendly fiscal policy:

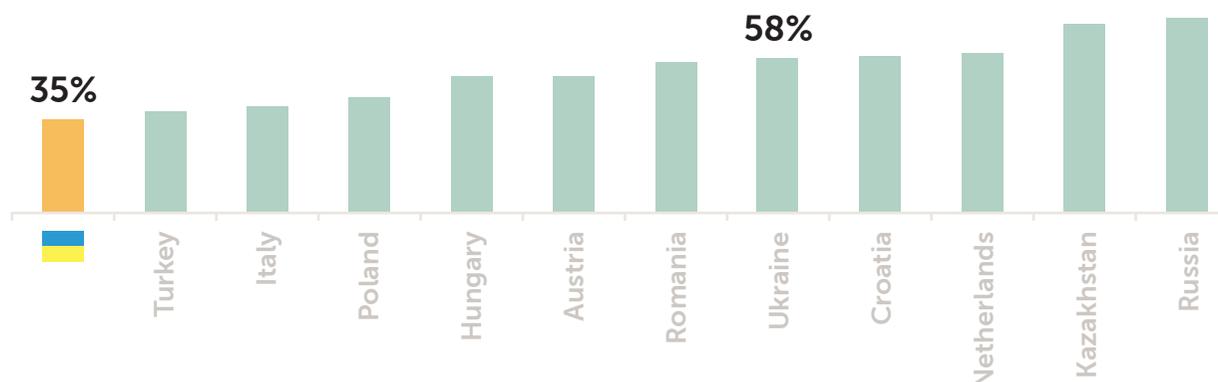
Incentive fiscal rates (6% and 12%) for new onshore gas wells drilled in 2018 and later.

The state guarantees the fiscal stability for a 5-year period.

5% of paid royalties are distributed for local communities' development.

Producers are subject to the standard CIT rate of 18 %, and VAT of 20 %.

Tax revenue to state budget (%) from gas production by countries



FIELD DEVELOPMENT REGULATIONS HAVE BEEN IMPROVED IN TERMS OF TIME AND SIMPLICITY



During 2018-2019:

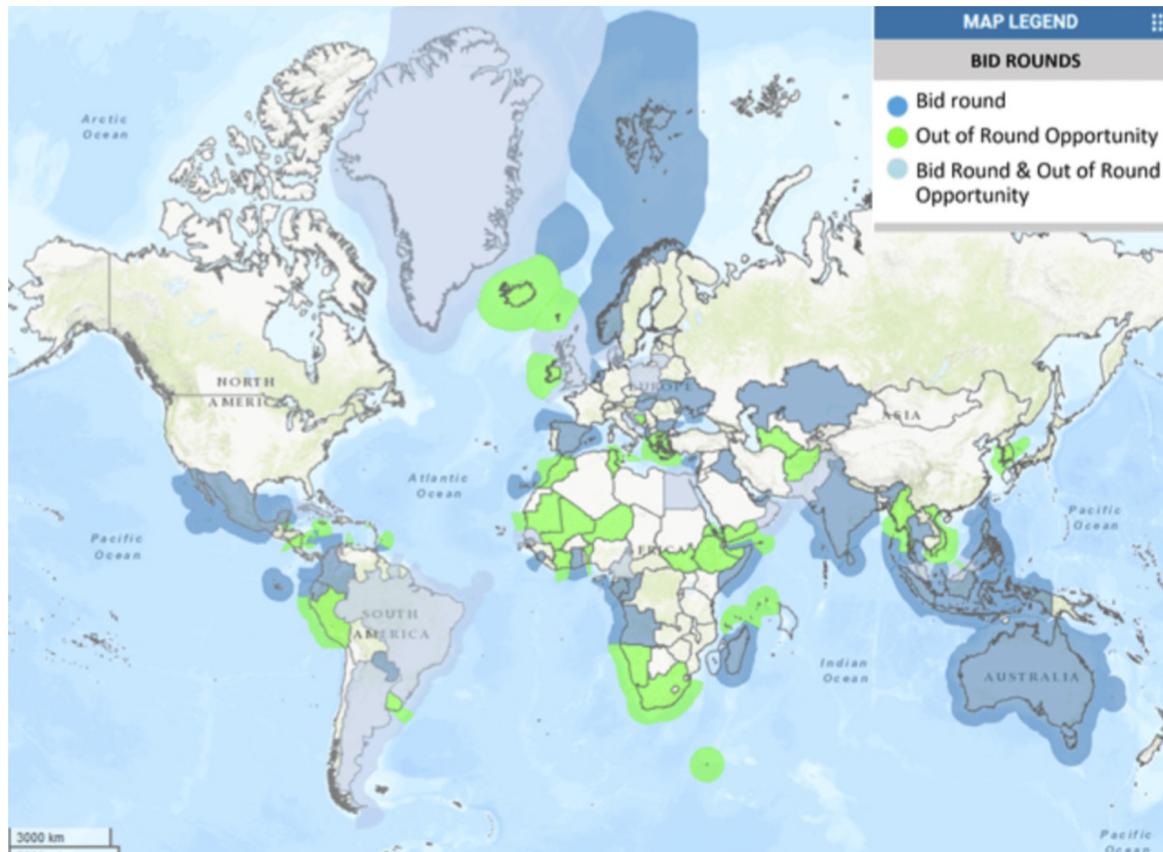
20+ permits and regulations have been abolished, providing easier access to land tracts.

Currently, there are three steps to be taken by operators:

- Acreage allotment: reach an agreement with landowner
- Wells' drilling permit: meet the safety requirements
- EIA: meet the environmental standards

IN 2019, UKRAINE ENTERED INTO A GLOBAL COMPETITION TO ATTRACT INTERNATIONAL CAPITAL

Ukraine was in the **TOP 10** countries, offering bid rounds



39
blocks

25
000 sq. km

ROUND1: MORE THAN TEN DOMESTIC AND INTERNATIONAL COMPANIES WERE AWARDED WITH 28 E&P LICENSES IN 2019

Key outcomes	Licenses number	Acreages sq. km	Reserves bcm	Best bidders
Concessions greenfields	19	2940	YTF¹	6
PSAs greenfields	9	11400	YTF¹	7
PECs brownfields	13	385	14.8	Under consideration

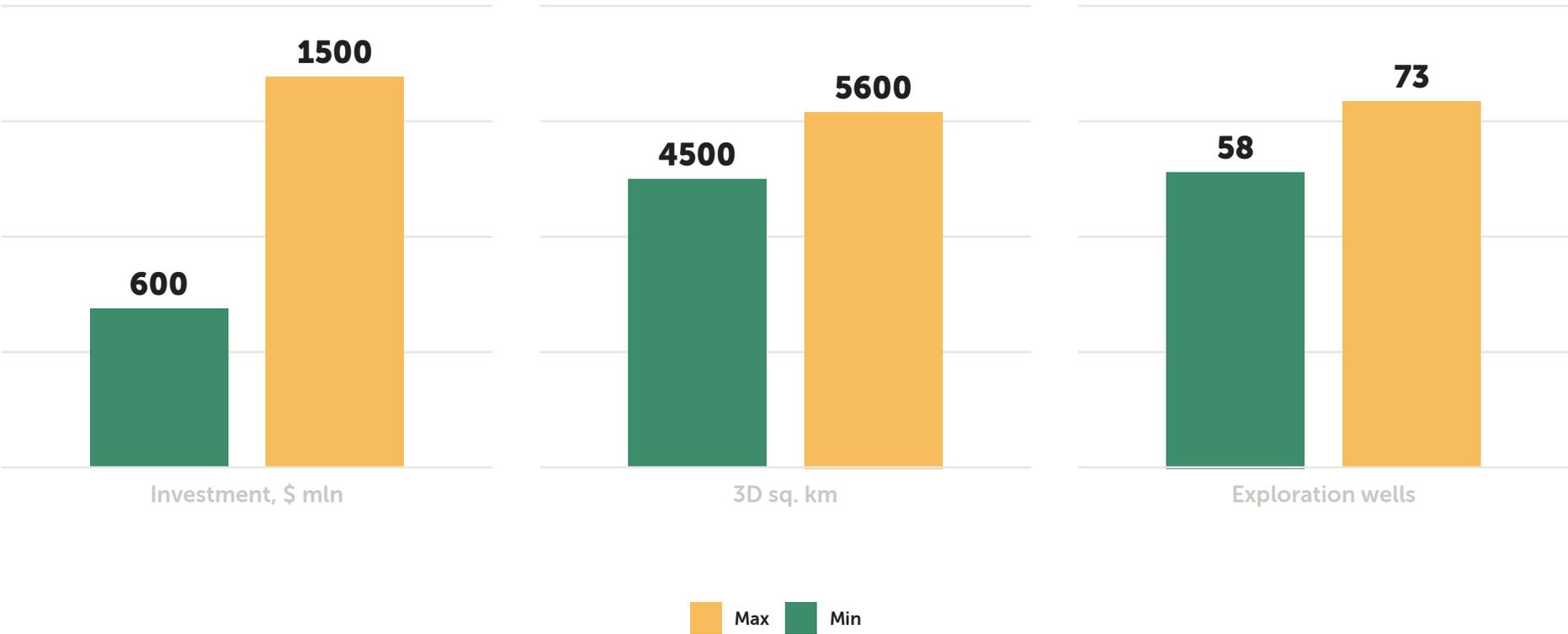


Note: 1. Predominantly, the blocks have undiscovered hydrocarbons resources estimated as inferred (yet-to-find).

ROUND 1: AS A RESULT, WINNERS COMMITTED TO INVEST \$600 MILLION TO 1.5 BILLION IN EXPLORATION DURING A FIVE YEAR PERIOD

Ukraine 2019: Licensing Rounds

5 years commitments

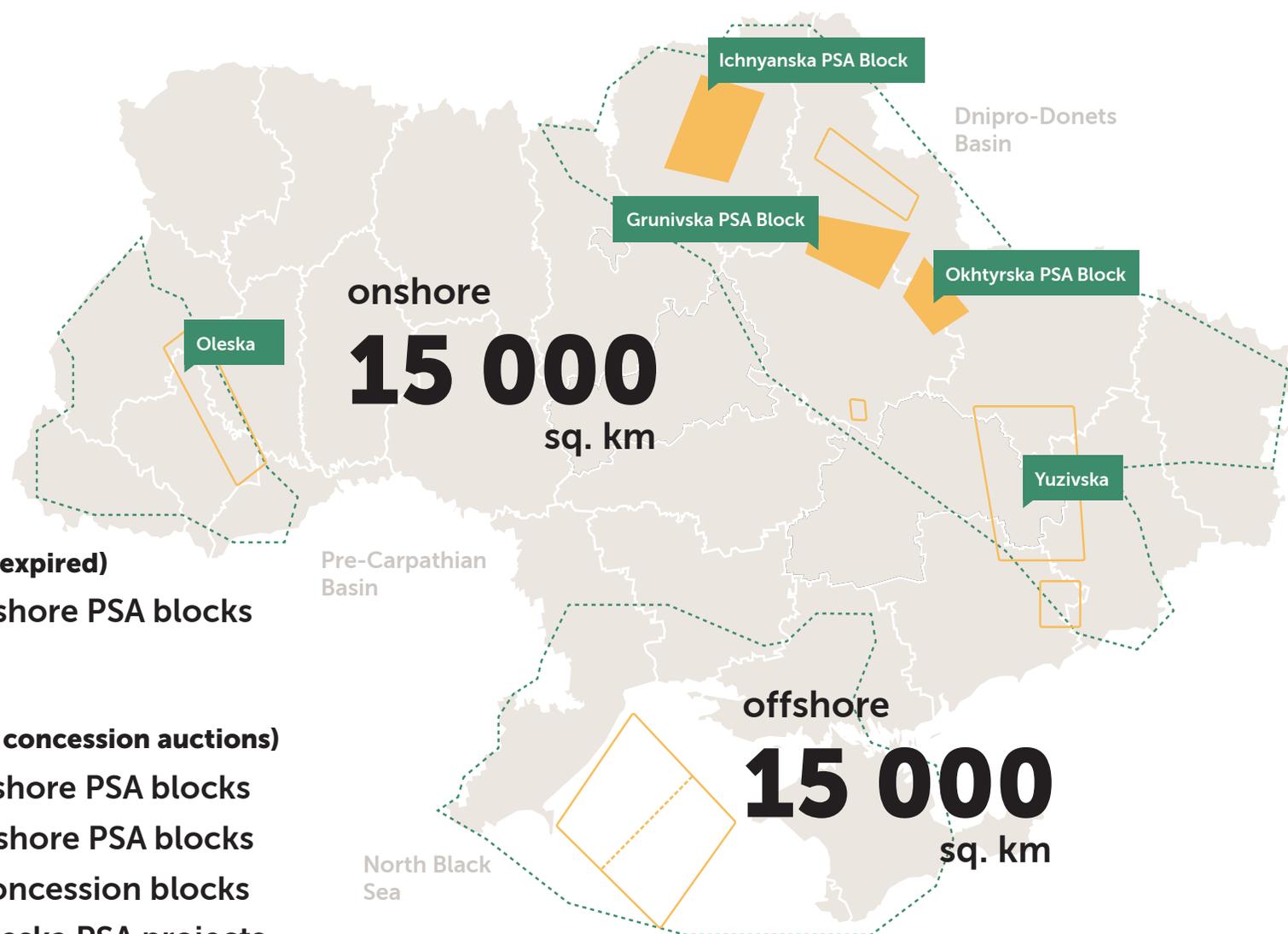


ROUND 2: SIX COMPANIES SUBMITTED PSA BIDS IN FEBRUARY 2020, HALF OF THEM ARE INTERNATIONAL PRODUCERS

Block onshore	Acreages, sq. km	Bidding* companies
Grunivska	1 082	 UGV  Vermilion Energy  EPH(NAFTA)
Ichnyanska	2 086	 York Energy
Okhtyrska	672	 UGV  Vermilion Energy  DTEK  EPH(NAFTA)  UNB

* The winners have to be selected in April 2020

OIL AND GAS LICENSING ROUNDS 2020: UKRAINE IS READY TO OFFER 30 000 sq. km OF ACREAGES



Round 2

(application deadline expired)

- February - 3 onshore PSA blocks

Round 3

(new PSA tenders and concession auctions)

- 2Q 2020 - 3 onshore PSA blocks
- 2Q 2020 - 2 offshore PSA blocks
- 30 + onshore concession blocks
- Yuzivska and Oleska PSA projects (open for partnership with "Nadra of Ukraine")

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