



Association
of Gas Producers
of Ukraine



UKRAINE

NATURAL GAS

PRODUCTION

PLAYBOOK 2018

TOGETHER TO ENERGY INDEPENDENCE OF UKRAINE



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FOREWORD



Two years ago, we formed a common strategic goal to make Ukraine an energy independent state and to completely abandon our dependence on imported gas. To this end, the government adopted the National Plan for the development of the gas production industry by 2020 and implemented a number of important reforms.

These included stimulating and stabilizing the fiscal regime for new gas wells, the allocation of royalties for the benefit of local communities, and the simplification of the permitting system. These momentous changes provided the necessary incentive to raise domestic gas production.

We have not stopped here. We have addressed the challenge of attracting investment and introducing high-end technologies into Ukraine's exploration and production industry through public online auctions for mineral resources, improving access to geological data, and preparing significant international oil and gas licensing rounds.

Ukraine has every means to achieve a self-sufficient gas supply, which will strengthen our energy security. I am confident that together with industry we can achieve this goal even in the short run.

Volodymyr Groysman
Prime Minister of Ukraine

TAKEAWAYS

Natural gas occupies a significant part of the energy mix in Ukraine and currently constitutes one-third of the nation's energy demand. With gas consumption at 32 bcm in 2017, Ukraine is heavily dependent on imported gas, which accounted for 36% of total needs.

The Ukrainian government views the expansion of domestic production as a strategic priority: namely, it wants to reduce import dependence and enhance the security of its gas supply. Three main factors support the belief, that Ukraine could boost its gas production.

1 PROMISING RESERVES BASE

The first factor is its promising reserves base. Ukraine has substantial conventional gas reserves and a vast untapped unconventional potential. Ukraine is ranked among the top-three European countries for gas reserves. The R/P ratio is close to 54 years compared to 12 years on average in Europe¹.

2 ATTRACTIVE PRICES

The second factor is attractive prices. Prices for commercial users are driven by the German liquid gas hub NCG, and import parity traditionally secures favorable netbacks for domestic gas producers.

3 DEVELOPED GAS INFRASTRUCTURE

The third factor is an extensive mid-stream infrastructure with surplus capacity that could allow for the rapid monetization of new petroleum discoveries.

On top of that, a qualified local workforce, wide range of oil-field services, and a well-developed domestic supply chain of key manufactured goods, also contribute to the potential for raising gas output.

Recently, the government dramatically improved the fiscal regime, successfully simplified the permitting system, and adjusted the rules for access to reserves. These steps increased the international attractiveness of Ukraine's upstream sector.

Currently, Ukraine is working to conduct international petroleum licensing rounds through online auctions and Production Sharing Agreements' tenders.

Upcoming progressive changes shall further improve the investment climate in the sector by performing transparency, facilitating free access to geological data and increasing capacity of the government institutions in charge of industry regulations.

OPPORTUNITIES FOR QUICK WINS INCLUDE:

Existing fields redevelopment – most of the reserves booked by state-run producers are mature and not fully in production due to lack of investment and knowledge. These old brownfields require comprehensive application of high-end technologies in tight cooperation with leading oil-field services companies.

Small fields development – the remaining third of reserves are spread across 367 small fields with less than 5 bcm in booked reserves. These fields require capital, affordable technology and focused attention, namely a large number of small producers developing their own niche businesses.

New large discoveries – they require investors with the ability to conduct modern seismic analysis, to carry out massive ultra-deep drilling (over 5,000 meters), and to unlock hard-to-recover reservoirs.

¹ BP Statistical Review of World Energy, 2018.

NATURAL GAS MARKET



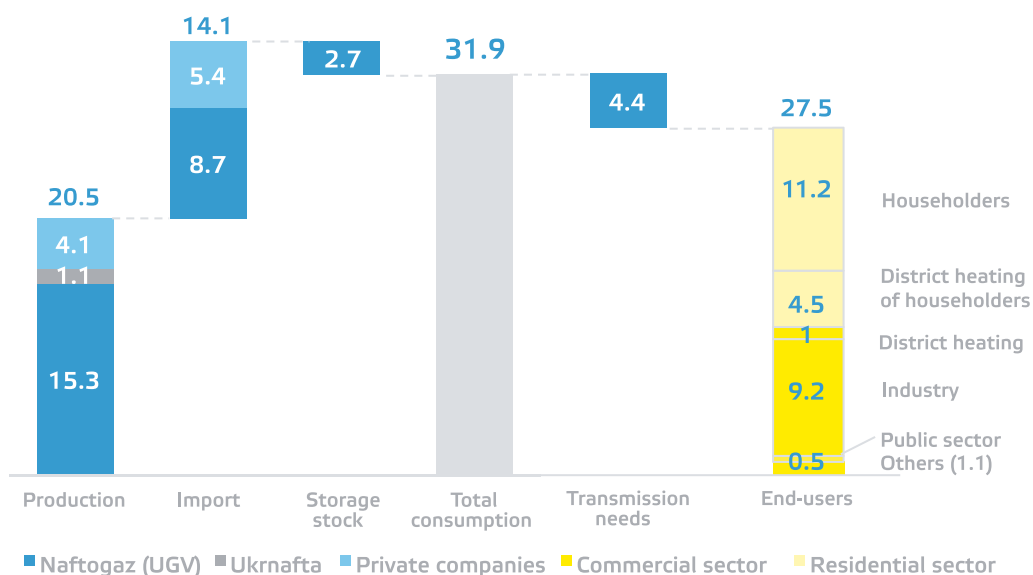


**UKRAINE HAS ALL NECESSARY CONDITIONS
TO BOOST ITS DOMESTIC GAS PRODUCTION
IN THE SHORT RUN**

DEMAND AND PRICING

Natural gas plays a significant role in Ukraine's energy mix, accounting for 35% of the country's energy needs. In 2017, gas consumption in Ukraine was around 32 bcm, making it the 7th largest consumer in Europe. Ukraine produces a large share of gas it consumes, but it still relies on imports to help meet demand (Fig. 1).

Fig. 1. Ukraine's gas balance in 2017
bcm



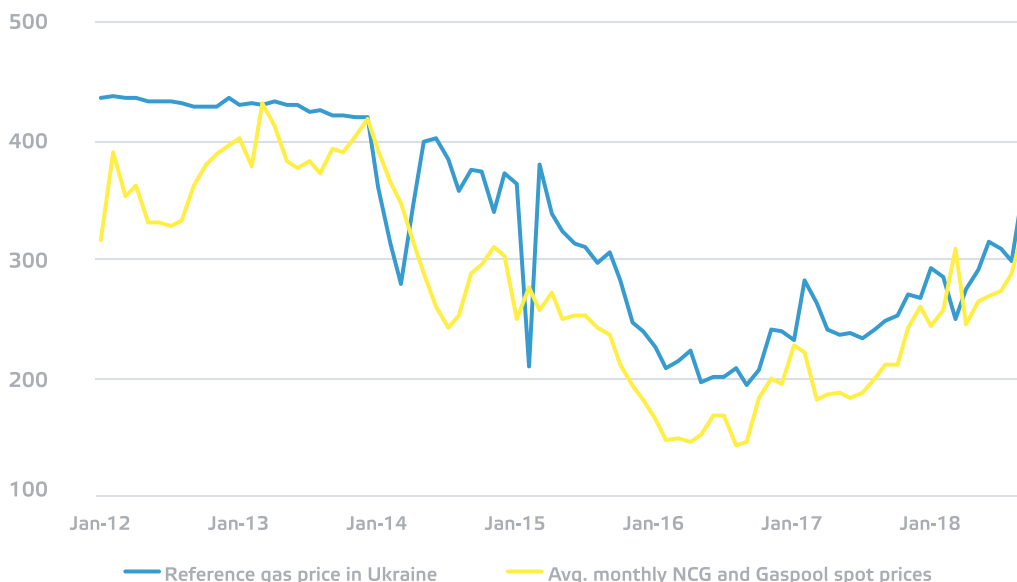
Source: Naftogaz of Ukraine.

Future gas needs will most likely stay within a range of 30 to 35 bcm per year until 2035, based on the estimates of the Energy Strategy of Ukraine.

The domestic gas market is split between residential and industrial consumers, with only the latter market fully liberalized. The residential sector still benefits from a regulated price that is expected to be increased to market level by 2020, according to a liberalization calendar sealed with the IMF.

Since 2015, commercial prices in Ukraine have been linked to gas benchmark prices in Europe and included an additional \$20-\$30 for transportation, resulting in a higher price than in European markets (Fig. 2).

Fig. 2. Wholesale gas prices in 2012-2018
\$/1000cm, net of VAT



Sources: Naftogaz of Ukraine, NCG, Gaspool, NERC (2012-15).

SUPPLY AND PRODUCTION

Ukraine has a century of experience in hydrocarbon production. Peak output was reached in the 1970s when it was over three times higher than today.

Currently, Ukraine is among the major gas producing countries in Europe with stable annual output over the last two decades: ranging from 19 to 21 bcm. Besides of that, the country remains heavily dependent on imported gas.

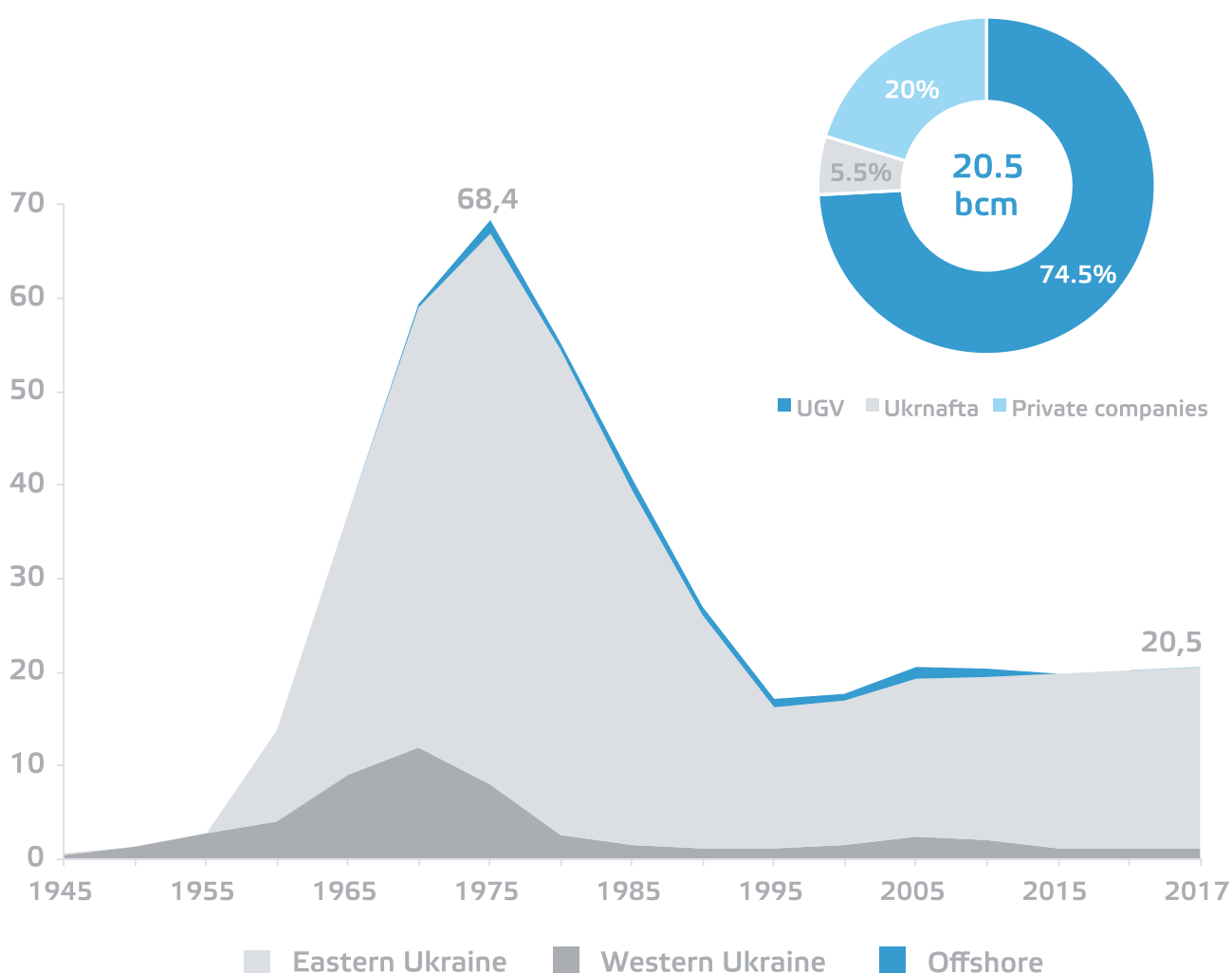
DOMESTIC GAS MARKET IS OPEN AND COMPETITIVE DUE TO MANY DIFFERENT SUPPLIERS

In 2017, imports accounted for 36% of Ukraine's total domestic consumption. Since 2016, imports have been sourced from European countries via gas pipeline interconnectors only. Ukraine has no LNG import terminals.

The national company Naftogaz of Ukraine is dominated in gas production. Its two subsidiaries – Ukgazvydobuvannya (UGV) and Ukrnafta together extract 80% of the country's natural gas (Fig. 3).

Meanwhile, a number of independent gas producers have increased their share of the gas market over the past ten years to 20%. This is a sign that Ukraine's E&P petroleum industry is also becoming more open to domestic and international private investors.

Fig.3. Distribution of gas production by regions and companies



Source: Ministry of Energy of Ukraine.

TRANSPORTATION AND TRADING

Ukraine's gas transmission system consists of 38.5 thousand km of dense networks of multiple pipelines coupled with 12 underground gas storage facilities. This well-developed mid-stream infrastructure is used both for domestic gas distribution and for the transit of Russian gas to Europe (Fig. 4).

Significant spare capacity would allow for rapid commercialization of any new petroleum discoveries.

Transporting gas is considered a service of great public interest and strategic importance. The state-controlled company Ukrtransgaz has been nominated to be Ukraine's single transmission system operator (TSO) and gas storage operator.

The unbundling of this subsidiary of the Naftogaz group, is planned for 2020 and should be certificated by respective common European authorities.

**UKRAINE HAS A WELL-DEVELOPED MID-STREAM INFRASTRUCTURE,
WHICH IS USED BOTH FOR DOMESTIC GAS DISTRIBUTION AND FOR
THE TRANSIT OF RUSSIAN GAS TO EUROPE**

The TSO ensures third-party access to the transmission system under equal, non-discriminatory and transparent terms in line with European energy legislations requirements. Gas transportation, distribution, and storage tariffs are set by the National Regulatory Commission, using Regulatory Asset Based (RAB) methodology.

TSO tariffs are in accordance with the European entry-exit booking capacity approach, and points for interconnection and domestic production are set separately. Current tariffs will be reviewed on January 2019 with the start of the second five-year RAB regulatory period.

Traded gas is mainly delivered on a month-ahead basis for a fixed price. Daily balancing will be fully launched in 2019, allowing for the introduction of short-term trading tools such as day ahead and intraday.

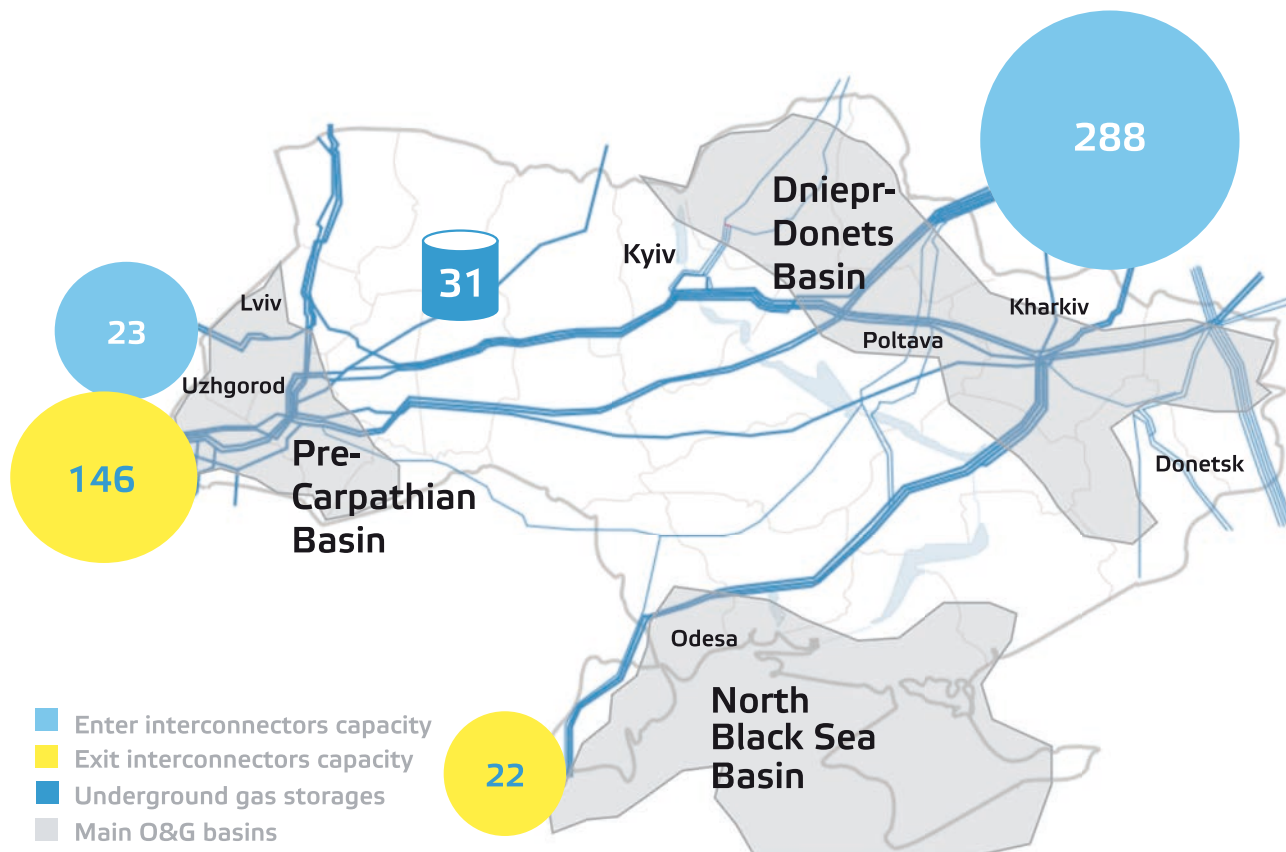
Ukraine has no restrictions or special duties on the import of natural gas or crude oil, and export of natural gas to the Energy Community member states. There is also no need to obtain permits for trade. For the purpose of supplying gas to end-users, a license must be obtained.

Domestic supply obligations — these apply to companies with 50% or larger state participation.

Currently, natural gas produced by the entity 100% owned by the state (UGV) should be sold to Naftogaz of Ukraine under the Public Service Obligations to supply gas to household consumers and district plants delivering heat to the residential sector.

Also, these state-run entities must sell oil and gas condensate that they produce as well as liquefied gas at public auctions, with the starting prices linked to international crude oil benchmarks.

Fig.4. Gas transmission and storage facilities in Ukraine
bcm




Source: Ukrtransgaz.



EXPLORATION AND PRODUCTION INDUSTRY



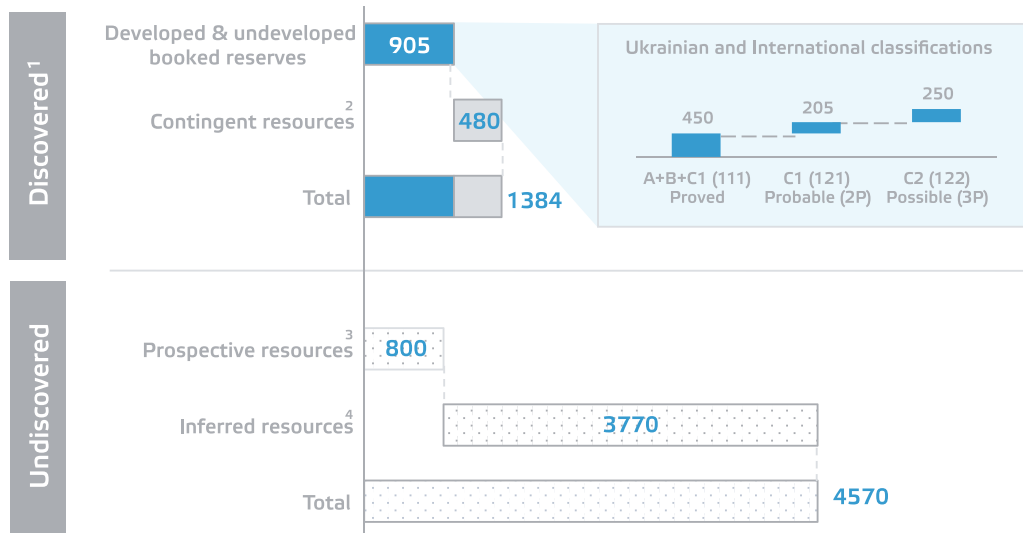
A photograph of an industrial facility, likely a refinery or chemical plant. The central feature is a tall, silver, cylindrical distillation column with a spiral staircase wrapped around it. In the foreground, there is a complex network of yellow-painted metal pipes and structural frames. A large, white, spherical storage tank is visible on the left side. The background shows a clear blue sky with a few scattered white clouds. The overall scene conveys a sense of industrial scale and infrastructure.

**UKRAINE'S UPSTREAM SECTOR
BECOMES MORE OPEN TO DOMESTIC AND
INTERNATIONAL PRIVATE INVESTORS**

RESERVES AND RESOURCES

Most natural gas reserves in Ukraine consist of non-associated gas. According to Ukrainian classification of mineral resources, developed and undeveloped booked reserves are officially estimated at 905 bcm in proven petroleum basins (Fig.5). It is assumed that much of the remaining proved undeveloped reserves can be developed through improved recovery and by successfully delineating new pools and satellites of existing fields.

Fig. 5. Natural gas reserves and resources of Ukraine bcm



Notes:

1. Developed fields and undeveloped reservoirs in proven petroleum basins.
2. According to Ukrainian classification, this is relatively booked and unbooked reserves, discovered in the past and could not be developed because of lower reservoir properties (subcategories C1,C2 (221+222)), and non-appraised reserves (C2 (332)).
3. Drillable prospects in areas with analogous hydrocarbon productivity and geological parameters. Ukrainian category C3 (333).
4. No specific prospect has been identified and drilled; instead the estimate is based on the density of exploration within a basin, information on success rates, and the expectation that future prospects will be found. Ukrainian categories D1D2 (334).

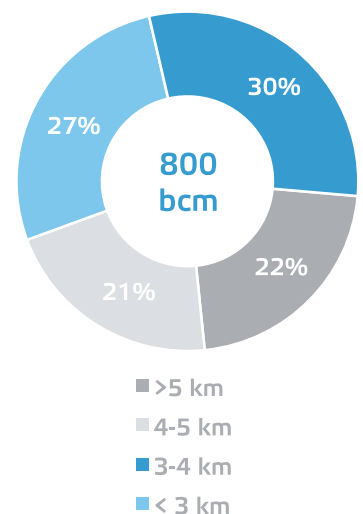
Source: State balance of mineral resources of Ukraine, 2017.

Additionally, there are another 480 bcm of contingent resources in developed fields or in undeveloped reservoirs (according to Ukrainian classification, 255 bcm is relatively booked, and 225 bcm is unbooked reserves), discovered in the past, but not developed because of lower quality reservoir properties and lack of appropriate technology and knowhow. These mostly "tight" reservoirs have relatively low porosity and permeability, which restrict the flow of natural gas.

On top of that, there are approximately 800 bcm of prospective gas resources in places delineated based on seismic data (Ukrainian category C3), but not confirmed by drilling, which are the priority target for future exploration works. Based on historical experience of gas extraction in Ukraine, chances of exploration success are about 40% and recovery efficiency rate is about 60%. It means that recoverable volume from this prospective resources is expected to be around 192 bcm.

Over 70% of prospective resources are deeper than 3,000 meters and 22% at depths below 5,000 meters. This suggests that exploitation of these resources will involve higher risks because of tighter and deeper reservoirs, increased operational challenges, and higher development costs. However, with current pricing and fiscal conditions, it is assumed that a great part of prospective resources can be transferred to the category of reserves in the nearest future.

Fig.6. Distribution of gas prospective resources by depth



Source: State balance of mineral resources of Ukraine, 2017.

**AFTER OVER
A CENTURY OF
PRODUCTION,
UKRAINE CLAIMS
LARGE CONVENTIONAL
GAS RESERVES
AND SUBSTANTIAL
UNTAPPED
UNCONVENTIONAL
POTENTIAL**

There are also inferred resources in Ukraine (categories D1+D2), located in regionally-defined geological areas where hydrocarbon productivity has been proven and not been proven. It means that no specific prospect has been identified and drilled, and they carry more risks.

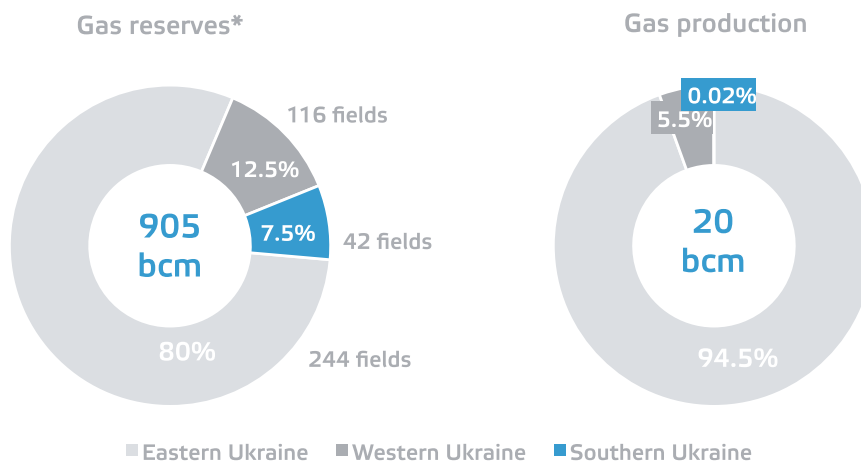
No official assessments of unconventional reserves have been published yet, and no production testing has occurred. According to the US EIA/ARI assessment (2013²) and IHS estimations (2015³), the total technically recoverable resource potential is estimated at 3.6 trillion cm of shale gas and 1.3 trillion cm of tight gas (Appendix). UGV estimates (2017⁴) that 25% of company's reserves can be classified as tight gas.

Currently, tight gas projects remain at early stages of exploration and appraisal, because new technologies, such as 3D seismic, horizontal drilling, and hydraulic fracturing, which could fully unlock this unconventional potential, have been used to only a modest degree.

There are three main hydrocarbon basins in Ukraine: Dniepr-Donets Basin, Pre-Carpathian Basin, and the North Black Sea Basin. Almost all production comes from onshore fields, although plans are underway to explore the offshore waters of the Black Sea.

About 95% of total gas production and the bulk of onshore hydrocarbon reserves are concentrated in the eastern Ukraine, primarily in the Kharkiv and Poltava regions (Fig. 6). Most of the reserves (73%) in the east are found at depths of between 3,000 and 5,000 meters and lower. In the west, 65% of reserves can be found at shallower depths: above 3,000 meters (Fig. 7).

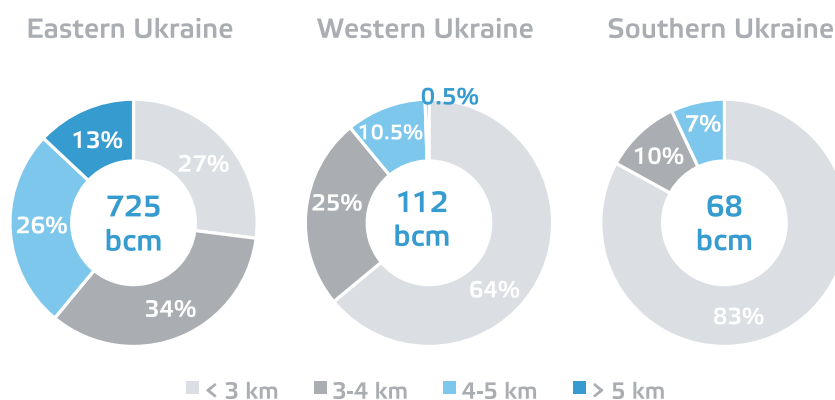
Fig. 7. Distribution of gas reserves and production across Ukraine



*including shut in fields

Source: State balance of mineral resources of Ukraine, 2017.

Fig 8. Distribution of gas reserves by depth across Ukraine



Source: State balance of mineral resources of Ukraine, 2017.

² Technically Recoverable Shale Oil and Shale Gas Resources: An Assessment of 137 Shale Formations in 41 Countries Outside the United States, EIA, June 2013

³ Harnessing production and revenue: toward a new fiscal regime for natural gas in Ukraine, assessment and recommendations to the Ministry of finance, IHS, June 2015

⁴ Plan to develop the tight gas resources, UGV, Myron Firman, March, 2017

RESERVES AND RESOURCES

THE DNIEPRI-Donets BASIN

The Dniepr-Donets Basin is comparatively well developed with several thousand oil and gas wells, some of which reach depths of over 7 km. There are 244 conventional oil and gas fields producing in this petroleum province.

The basin extends over an area of 75,000 sq. km. The majority of gas is trapped in the Carboniferous section below the lower Permian salt seal. The northwest part of the basin is dominated by oil and condensate deposits, and the southeast is largely made up of dry gas.

THE PRE-CARPATHIAN (FORELAND) BASIN

The Pre-Carpathian (Foreland) Basin is a 7,500 sq. km hydrocarbon province located in western Ukraine along the borders of Hungary, Poland, Slovakia, and Romania. There are 116 conventional oil and gas fields producing in the area.

THE NORTH BLACK SEA BASIN

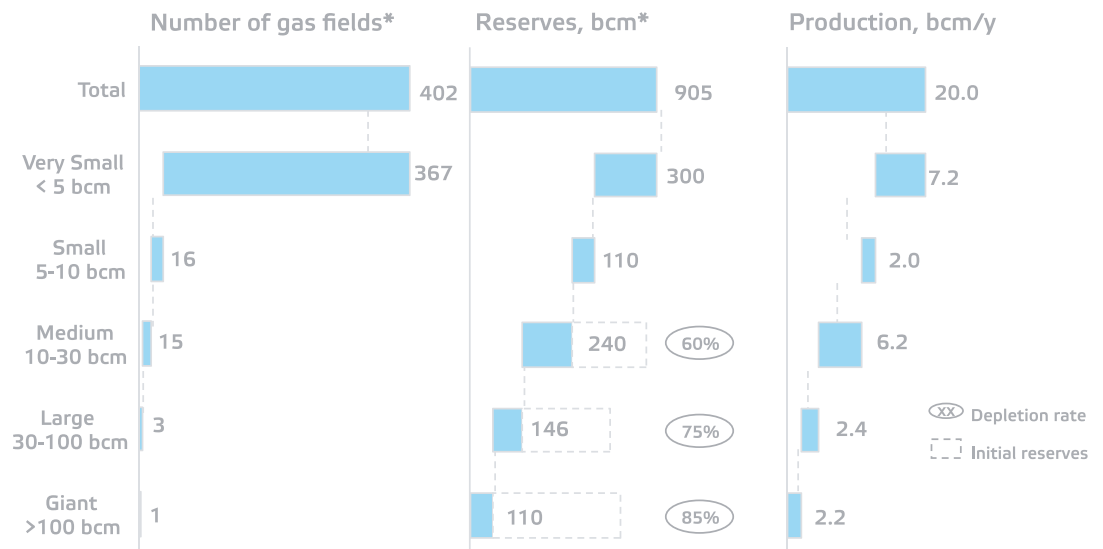
The North Black Sea Basin is less explored. There are 42 oil and gas fields, including 15 located offshore. There is promising potential for shelf and deep-water reserves, especially near the maritime border with Romania where international consortiums recently made offshore discoveries.

THERE ARE 402 PROVEN NATURAL GAS ACCUMULATIONS IN UKRAINE:
269 FIELDS ARE UNDER DEVELOPMENT
25 ARE PLANNED FOR DEVELOPMENT
58 FIELDS ARE EXPLORED
50 FIELDS WERE SHUT IN

Most of the producing gas fields have small to marginal production except for a minority that represent a large portion of total output. Among 402 gas fields, the 19 largest fields with over 10 bcm of reserves represented almost 55% of total gas production. However, their remaining reserves are considered as depleted and require the application of advanced technologies and contemporary production management to be extracted.

Over 90% (367) of marginal fields with less than 5 bcm reserves contributed 36% of total production and contain 300 bcm of total reserves (Fig. 9).

Fig.9. Distribution of gas fields by size groups



Source: State balance of mineral resources of Ukraine, 2017.

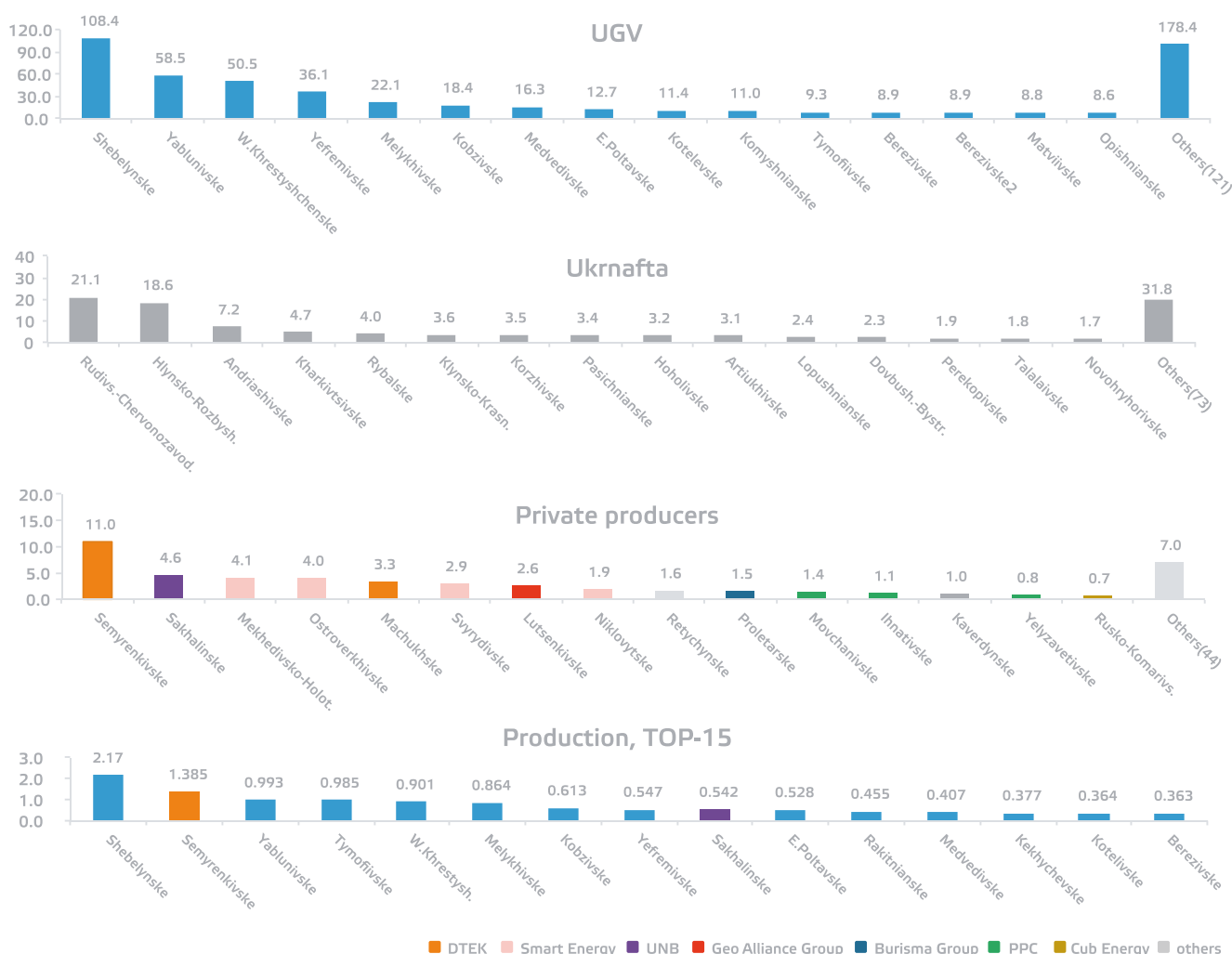
*including 50 shut in fields with 36 bcm gas reserves

Almost all large gas fields belong to state-run companies. Of the 15 largest, UGV operates 12 fields with almost 375 bcm of gas reserves, Ukrnafta operates 2 fields with 40 bcm, and the single field with over 10 bcm is owned by a private producer – DTEK Oil&Gas (Fig. 10).

In term of the reserves-to-production ratio, based on Ukrainian classification of reserves the annual rate of extraction has not exceeded 4% for Ukrnafta and UGV (according to international standards, the rate could be estimated at 7%). The extraction is close to 12% in several fields of leading private producers.

Currently, UGV seeks partnership for cooperation under the Integrated Services Contracts and Production Enhancement Contracts for development of its selected fields.

Fig.10. Distribution of main gas fields by operators, bcm



Sources: AGPU, State Geological Service.

Note: Booked reserves on production licenses, according to Ukrainian classification.

State participation in Ukraine's upstream industry remains high. Six state-run companies hold 60% of total onshore licenses.

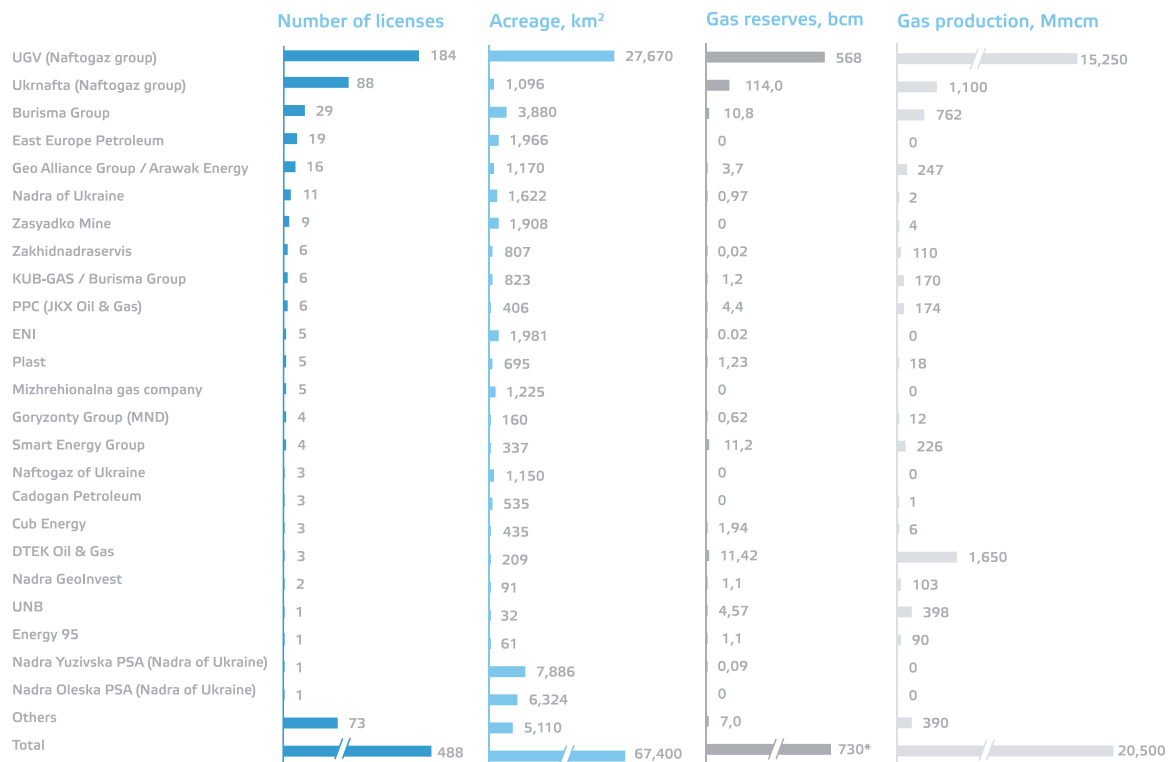
The Naftogaz group has 275 onshore licenses covering nearly 30 thousand sq.km (44%) with 85% of proved reserves, producing 16.3 bcm in 2017 – 80% of the country's total domestic gas production.

The state-owned company Nadra of Ukraine operates 11 onshore licenses and through subsidiaries is also a participant in two signed PSAs. All together, the company consolidates 15.7 thousand sq.km (23%), but with very small production.

Private firms control almost 22 thousand sq.km (32%) with 200 onshore licenses. Over 20 private companies produced 4.1 bcm in 2017. The ten largest accounted for 92% of this output, operating with 74 licenses (Fig. 11).

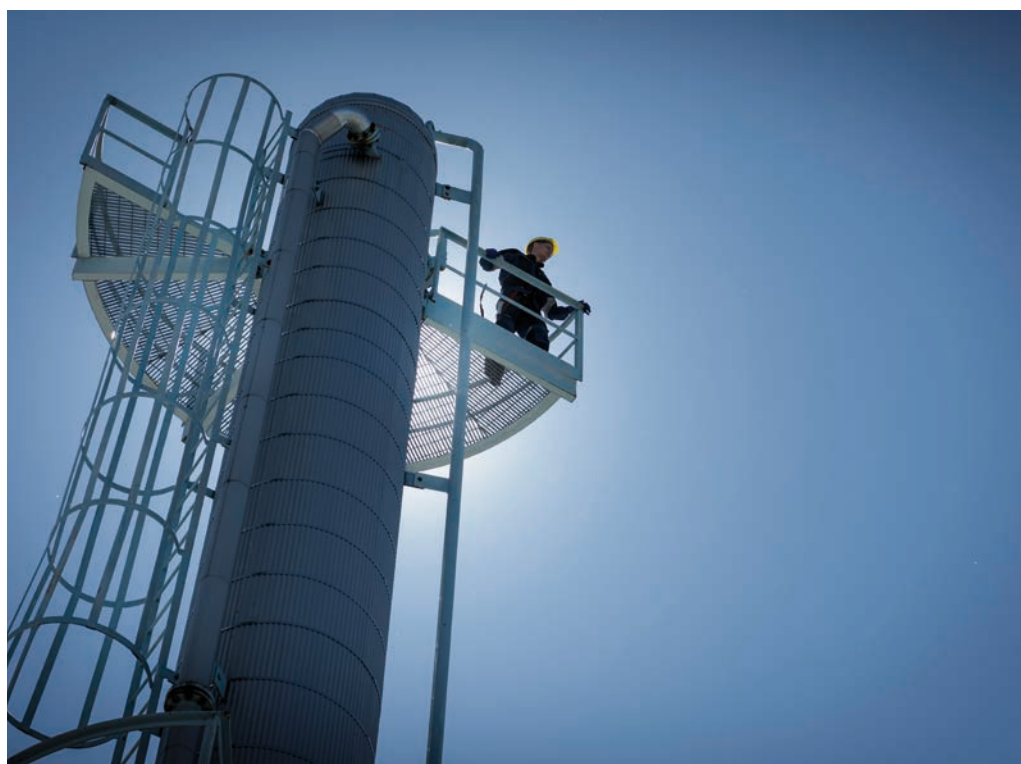
RESERVES AND RESOURCES

Fig.11. Distribution of booked reserves, acreages, and production among the largest companies



Note: excluding reserves on the balance of State Geological Service (36 bcm), and 32 licenses in Crimea and offshore, and written off reserves in 2017.

Sources: AGPU, State Geological Service.



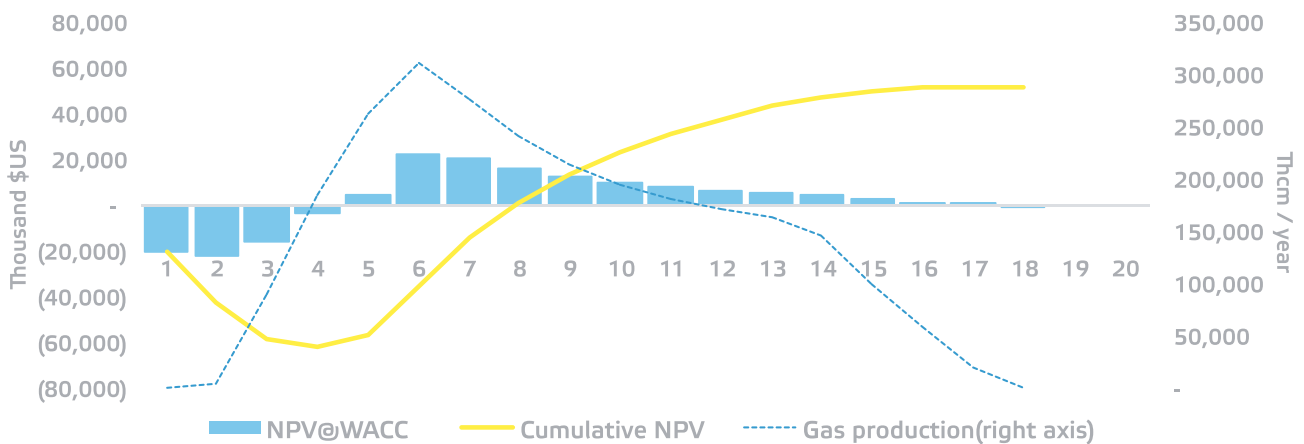
BUNCH OF SMALL FIELDS
PROVIDES VARIETY OF CHOICE

ECONOMIC ANALYSIS

The typical conventional economic projection is currently competitive. Costs are based on initial gas development. It is possible that costs could be driven down as economies of scale are realized, and drilling and completion techniques are optimized (Fig. 12).

DEEP, HARD-TO-RECOVER RESERVES, SPREADING ACROSS MANY SMALL FIELDS REPRESENT THE FUTURE OF UKRAINE'S GAS PRODUCTION INDUSTRY

Fig.12 Small deep greenfield project with EUR at 2,6 bcm in Dniepr-Donets Basin



Source: AGPU.

Project Assumptions:

- Onshore project with conventional reservoir, found at depths between 3,500 and 5,000 meters
- Overall, 2,6 bcm of gas and 131 thousand tonnes of condensate is produced
- 17 years of production: a peak in the 4th year of 850 thcm/day and a moderate decline afterwards
- 17 production wells with average initial production rate at 75 thcm/day, EUR at 173 Mmcm drilled at the onset of the project, additionally 2 wells were dry with no production
- First production in the 3rd year of the project after two years of exploration, one year of pilot development

Cost Assumptions (prices \$ US):

- Exploration and production wells drilling cost at \$8,5 million per well with tie-in
- Transportation cost (surface infrastructure) at \$650 thousand per well
- Non-drilling exploration cost (seismic) at \$2 million
- Fixed assets (production facilities, gathering pipelines, etc.) at \$8 million
- Operating cost at 35 \$/thcm (includes operating, maintenance)
- Unrecoverable input taxes at 30 \$/thcm (12% royalty rate), and 95 \$/tonne of condensate (21% royalty rate), plus CIT tax at 24,5 \$/thcm (18% rate)
- Decommissioning (field abandonment) cost at \$8 million

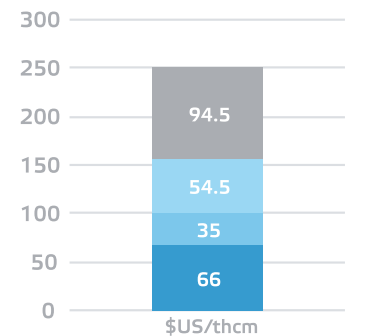
Price and macro assumptions:

- All gas sold at market at 250 \$/thcm and condensate at 450 \$/tonne (net of VAT, transportation charges)
- All values – cost and price – are annually discounted with WACC at 15%

Project internal rate of return (post-tax): 26%

Project NPV@15%: \$52 million

Average lifecycle costs for base field as for 2018-36



■ CAPEX ■ OPEX ■ Taxes ■ Margin

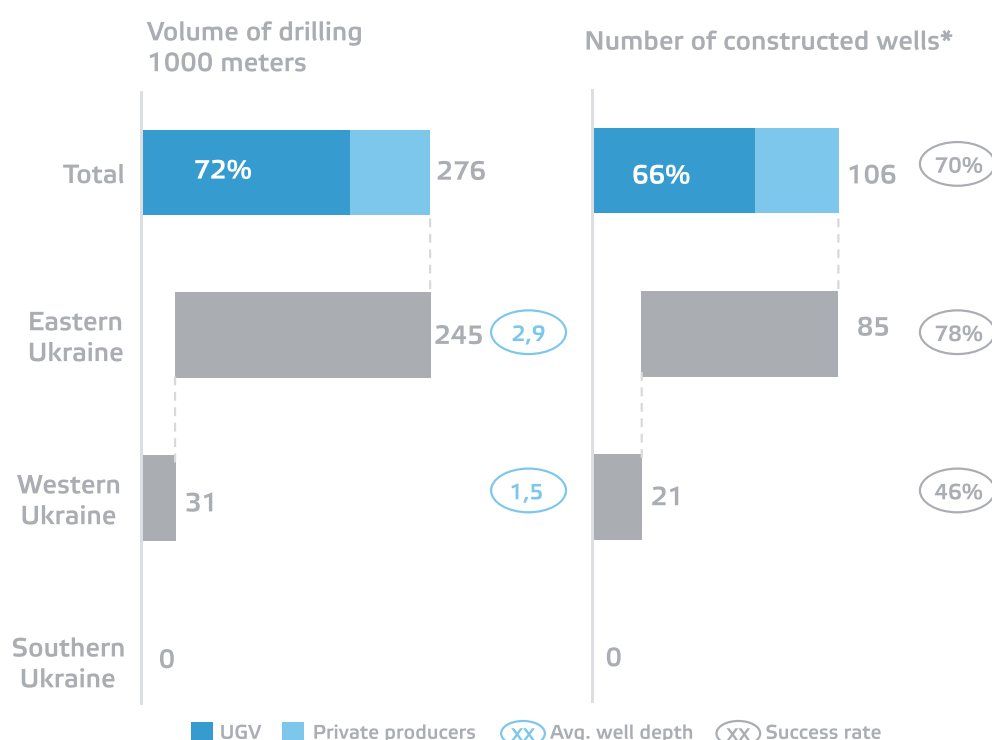
Source: AGPU.

OPERATION AND SUPPLY CHAIN

Over 10,000 petroleum wells were drilled in Ukraine since oil and gas production began. 106 gas wells were drilled in 2016, predominately in eastern Ukraine where the average depth was almost 3,000 meters. 70 wells were drilled by state-run UGV and 36 wells by private companies. Drilling success rate around the country was nearly 70% (Fig. 13).

The initial production rate varies significantly among the regions: from 50 thousand to 1 million cm per day in eastern Ukraine, and 10 to 50 thousand cm per day in the west. There is a typically a wide variation in well drilling times across different wells, ranging from 30 days per 1000 m of well depth to 150 days per 1000 m in the case of older rigs fleets with frequent break downs and significant non-production time.

Fig.13. Distribution of drilling by regions and producers, 2016



Sources: AGPU, Geoinform of Ukraine, 2017.

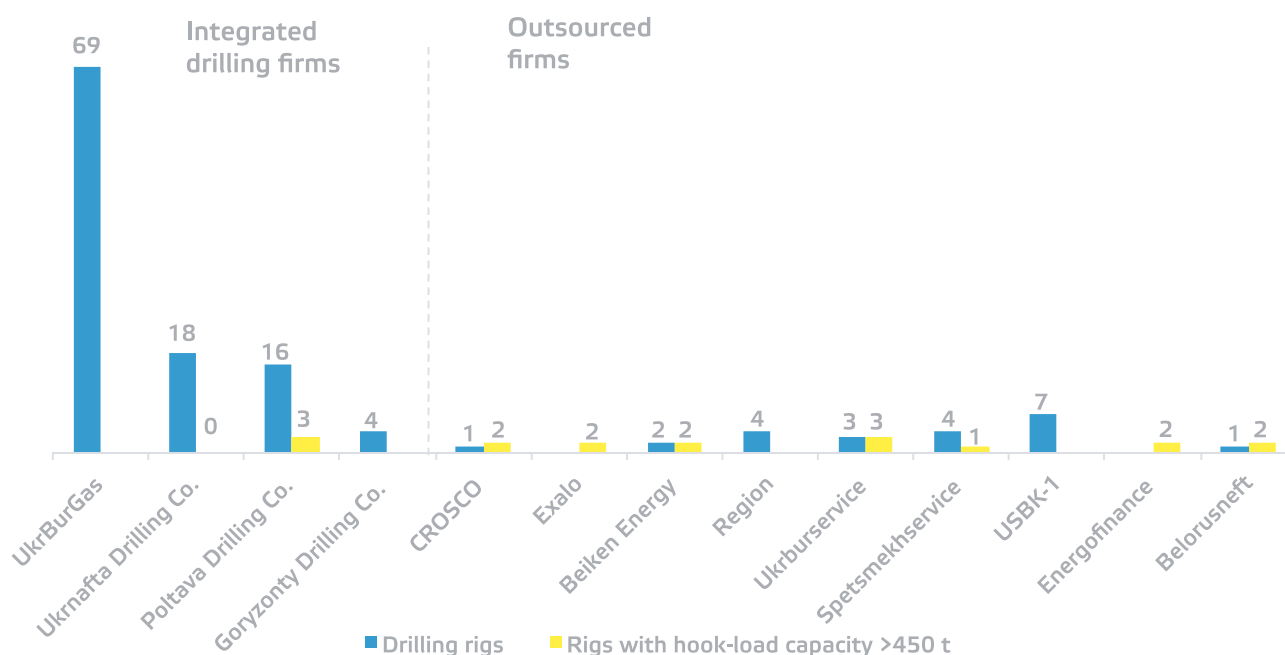
According to the National Plan for the development of the gas production industry by 2020, in order to raise the domestic production by 35%, the number of gas wells drilled should more than double – from 106 wells in 2016 to 275 wells in 2020. To satisfy that growth in the upstream sector, there is a need for more modern rigs and sophisticated production management.

In fact, today Ukraine has the largest rig fleet in Europe, which drilled 120 gas wells in 2017 and it is planned to drill over 150 wells in 2018.

As of August 1, 2018, there were 146 rigs, available to drill. Among them, 108 were active, including 17 heavy units with hook-load capacity of 450 tonnes and more. Four drilling companies, affiliated with producing companies, operate 110 rigs, predominately to satisfy their own needs. Nine outsourced contractors, domestic as well as foreign, operate another 36 drilling units (Fig. 14).

UPSTREAM SECTOR DEVELOPMENT DEPENDS ON THE APPLICATION OF MODERN TECHNOLOGIES FOR SEISMIC EVALUATION, DRILLING, STIMULATION AND PRODUCTION MANAGEMENT

Fig.14. Number of rigs, available to drill* units, August 2018



*108 units were active

Sources: AGPU, Newfolk.

Currently, there is a shortage of heavy hook-load capacity rigs on the market. To satisfy projected orders, twice as many modern rigs could be kept in use. In 2016, the drilling division of UGV – UkrBurGas – launched a massive procurement plan to modernize the existing rig fleet and to purchase 20 modern rigs, which are scheduled to be delivered in Ukraine present and next year.

Ukraine has many domestic oil-field service companies. Although it is not mandatory to involve local companies, it is considered a good business practice to use them where possible.

In general, the local providers possess knowledge and expertise, but the quality of their equipment can be poor. Large western service companies in Ukraine include Weatherford and Schlumberger, while Baker Hughes and Halliburton are planning to join them.

Hydraulic fracturing has been carried out sparingly in Ukraine since the 1950s. In 2017, there were 80 hydraulic fracturing operations carried out mainly by outsourced contractors.

Today, there is a shortage of services on the market for workover rigs, hydraulic fracturing and cementing fleets, coiled tubing units, snubbing, 3D seismic, directional drilling, wireline logging, etc., which are to be fulfilled mainly by outsourced contractors.

Currently, key input such as casing and cement are completely satisfied by domestic manufacturers.

The number of well-cementing operations is expected to reach over 700 with over 200 cement plugs in 2018. All this volumes are being supplied by Ukrainian cement plants.

Moreover, to drill 250 wells at an average depth 4,500 meters, over 130 thousands of tonnes of casing tubes and 23 thousands of tonnes of tubing string must be used. This demand could be met by the largest Ukraine's producer of steel pipe, Interpipe, and meet both national and international standards (API, EN, CAL IV).

UPSTREAM REGULATORY ENVIRONMENT



An aerial photograph of a large industrial facility, likely an oil or gas processing plant. The image shows a complex network of yellow and grey pipes, several large white storage tanks, and various processing units. A central building with a grey roof is prominent. The facility is surrounded by greenery and a paved area. A yellow truck is visible near the top center.

**CURRENT REGULATION IS DESIGNED
TO MAKE UKRAINE'S E&P INDUSTRY
INTERNATIONALLY ATTRACTIVE TO BRING
MORE FOREIGN CAPITAL**

LEGAL FRAMEWORK

GOVERNMENT POLICY OBJECTIVES

The Energy Strategy of Ukraine until 2035 and the National Plan to the development of gas production industry by 2020 both provide the important objective to turn Ukraine in self-sufficient gas supply country due to significant growth of domestic gas output in the foreseeable future.

REGULATORY REGIME AND BODIES

The development of hydrocarbon resources is governed by industry-focused legal acts, mainly the Subsoil Code, Oil and Gas Law, Product Sharing Agreements Law, and other governmental resolutions and decrees.

The main state authority involved in the development of the exploration and production (E&P) sector is the State Geological Service, which issues licenses to subsoil users, monitors their compliance with legislation, and imposes sanctions for infringement of rules and obligations under license terms. The Ministry of Energy develops the national energy policy, and coordinates the execution and implementation of product sharing agreements while the Ministry of Environment is in charge of state policy for environmental protection.

RIGHTS TO HYDROCARBONS AND LAND ACCESS

In Ukraine, the mineral resources belong to the Ukrainian people. Although the people remain its owner, state authorities can grant rights to use the subsoil on their behalf. Once an extracted mineral reaches the surface, the ownership title is passed to the subsoil user. Rights to use the subsoil are provided through special permits (licenses) that are granted by the State Geological Service.

Subsoil-use rights do not include surface rights. Therefore, the rights to use the land must be obtained separately from landowners.

There are three types of hydrocarbon licenses in Ukraine:

- Exploration license with pilot commercial production, granted for 5 and 10 years for on- and offshore operations respectively;
- Production license, granted for 20 and 30 years for on- and offshore operations respectively;
- Combined E&P license, granted for 20 and 30 years for on- and offshore operations respectively, as well as up to 50 years under the production sharing agreement.

The rights to use subsoil can be obtained through different legal regimes: licensing; production sharing agreement (PSA); acquisition of a license holder; entering into a Joint activity agreement (JAA). No mandatory National oil company participation rules apply.

Under the **licensing (concession) regime**, hydrocarbons licenses are usually awarded in public auctions held by the State Geological Service. The participant with the highest price bid (signature bonus) wins the auction. It is expected that starting in 2019, these licenses are to be granted through the online auction.

Each license has a "licensing agreement" appended to it, establishing the basic rights and obligations of the license holder, including the minimum investment commitments, the timeframes and goals of the work programme, and environmental protection requirements.

The size of the block granted by the license is limited to 500 sq.km for onshore acreages and 1000 sq.km for offshore areas. Additionally, they could be expanded to 50% of their acreage at later stage.

Assignment or transfer of the license is prohibited. It also cannot be pledged or booked for banking purposes. However, the license holders are entitled to transfer the subsoil-use rights to a subsidiary company or joint venture – keeping at least 50% share as the “original” license holder. Pledging extracted minerals to be produced in the future is allowed.

Under this **PSA regime**, the license is awarded to the winner of a competitive tender who offered the most attractive bid as a result of entering into special agreement with the Ukrainian government. Under the PSA, the state receives a share of production. The investor’s share cannot exceed 70% at the cost-recovery stage. At the profit-production stage, as previous PSA tenders show, the state’s share is likely to be from 15-20%.

Unlike with the regular licensing regime, the terms of each PSA mutually agreed in a contract between the investor and the government. The PSA regime has a number of peculiarities – e.g. dispute resolution through international arbitration, a legal and tax stabilisation clause, and special terms for foreign currency and customs operations. The lifetime of a PSA is up to 50 years and the size of a block is not limited.

An investor can **purchase equity** in a company that already holds a license or executed a PSA deal.

The **joint activity (operation) agreement** is an unincorporated joint venture agreement, providing the option to jointly develop hydrocarbon reserves with a license-holding company, without booking the reserves in own balance sheet. JAA revenues, expenses and profits are allocated to each partner depending on its stake in the JAA.

FUNDING, CURRENCY CONTROL AND REPATRIATION OF CAPITAL

The **funding of a company** in Ukraine can be carried out by shareholders through contributions to its charter capital (equity injection), provision of loans or non-refundable financial aid.

Currency control rules in Ukraine are regulated by the National Bank of Ukraine, and are currently strict. These regulations require mandatory sale of 50% of the foreign currency proceeds at the inter-bank exchange, with certain exceptions. Also the so-called 180 days rule for goods/payments delivery applies to export/import transactions.

Currently, transferring foreign currency abroad from Ukraine for **repatriating investments and dividends** of previous years is allowed with monthly volume limitations set by the National Bank of Ukraine.

From February 2019, a new Currency Law will enter into force that will significantly relax existing currency restrictions.

LABOUR RELATIONS

There are no local content requirements in Ukraine.

In order to a foreigner to be able to work in Ukraine as an employee, the Ukrainian entity needs to obtain a work permit to employ a foreigner. The foreign employee will also need to obtain a long-term visa and a temporary residence permit.

There is no separate payroll tax imposed on employers. However, employers are obliged to make unified social contribution (22% of salary) on behalf of their employees, and act as a tax agent with regard to personal income tax (18% of salary) and other taxes.

DISPUTE RESOLUTION

Disputes with state authorities and regulators are adjudicated by Ukrainian local administrative courts. The PSA Law states that parties to a PSA are free to decide whether disputes should be resolved by foreign courts or by international arbitration.

LEGAL FRAMEWORK

UKRAINE'S INTERNATIONAL COMMITMENTS

Ukraine has been a member of World Trade Organisation since 2008.

In 2014, Ukraine signed an Association Agreement with the European Union that established a political and economic association.

In 2016, the Canada-Ukraine Free Trade Agreement was signed, eliminating custom duties on essentially all goods produced in one country and imported to the other.

Ukraine is a party to the Energy Charter Treaty, which covers commercial energy activities – trade, transit, and investments, including international dispute resolution procedures available to investors.

Ukraine is a Contracting Party to the Energy Community Treaty and is obliged to implement key EU energy regulations, particularly, known as the third energy package.

Ukraine is also a member of the Extractive Industries Transparency Initiative (EITI), supporting the international standard of transparency in the management of natural resources and disclosure of government revenue in the mining sector.



TAX AND FISCAL POLICY

Regular taxation related to hydrocarbons development include royalty, corporate income tax, value added tax and taxation of dividends.

Royalty is calculated as a percentage of the value of produced hydrocarbons. It is paid monthly and calculated by volume and reference price based on import parity for gas or average oil price determined by an international reporting agency. A different rate of taxation applies to different types of hydrocarbons (natural gas or liquids), the depth at which they are extracted (above or below 5,000 meters) and their location (onshore or offshore).

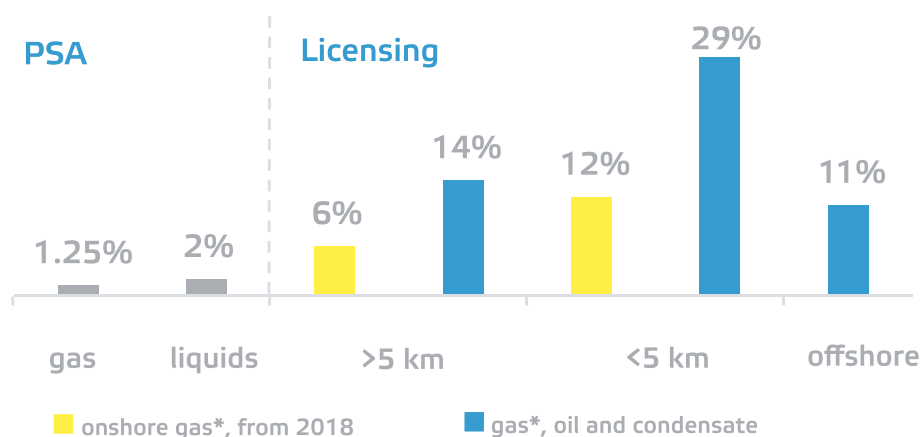
No special terms apply to unconventional oil and gas.

A new fiscal regime has been implemented for onshore gas wells drilled after 1 January 2018. Currently, gas produced from such wells is subject to 6% and 12% royalties depending on their depths (Fig. 15). Moreover, the state guarantees the fiscal stability of these rates for new wells by introducing a five-year stabilisation clauses effective until 2023.

On top of that, starting from 2018, 5% of royalties payment are allocated to the development of local communities.

These tax changes have tremendously improved the investment attractiveness of Ukraine's upstream sector vis-à-vis other petroleum producing countries (Fig. 16).

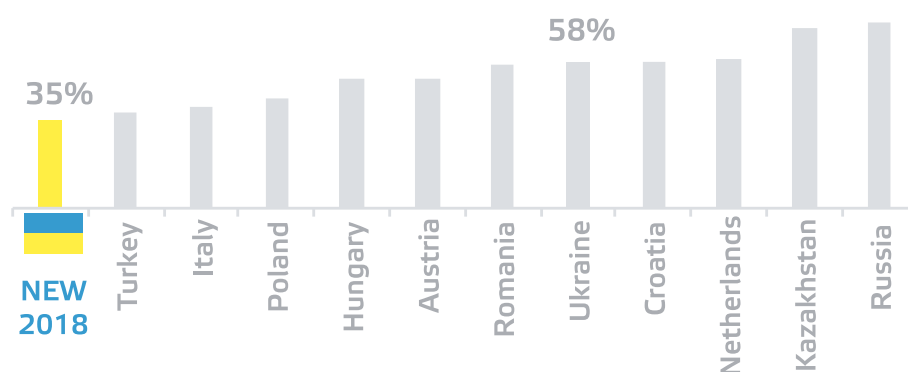
Fig.15. Fiscal regime of hydrocarbons in Ukraine



*JAA – 70%

Source: AGPU

Fig.16. Government share of pre-tax cash flow, onshore project



Note: Including all taxes, discounted rate 10%, nominal terms; 250 bcf field; long term gas price: \$6/mcf; costs: \$1.55/mcf.
Source: Wood Mackenzie, 2018

TAX AND FISCAL POLICY

Hydrocarbon producers are subject to the standard **Corporate Income/Profit Tax (CIT)** rate of 18%. CIT basis is defined as pretax financial result calculated in accordance with Ukrainian generally accepted accounting principles (GAAP)/International Financial Reporting Standards (IFRS), subject to several tax adjustments in relation to deductions of interest, royalties, depreciation, transfer pricing.

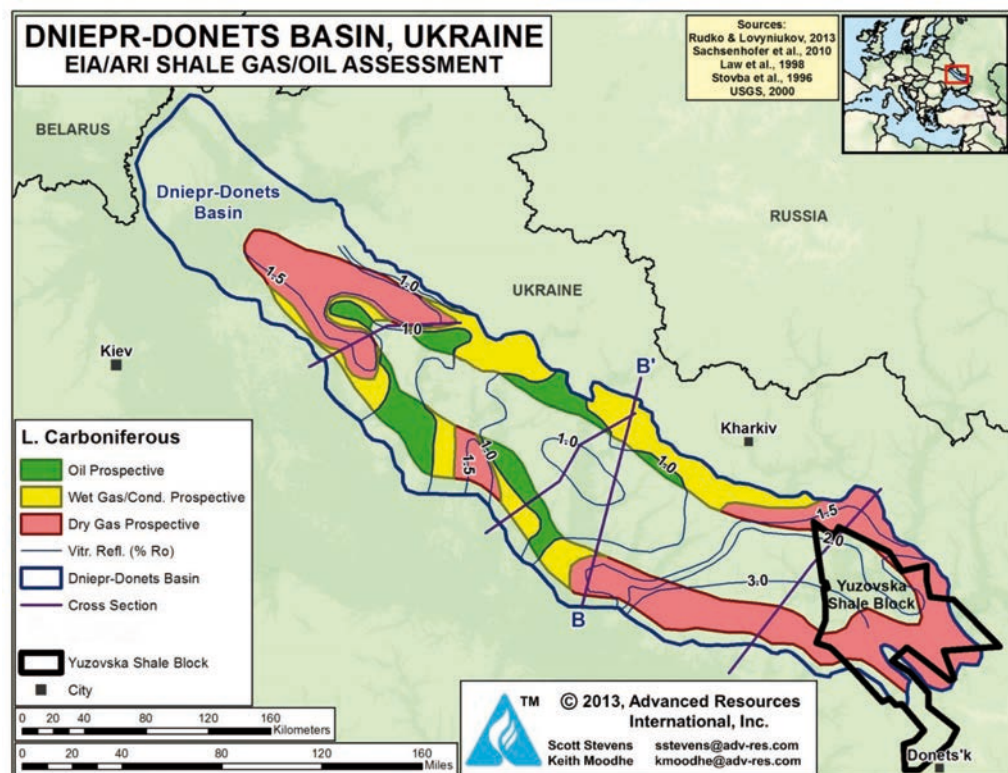
Ukraine does not in general apply ring-fencing in determining a company's CIT liability in relation to oil and gas activities. Profit from one project can be offset against losses from another project held by the same legal entity. PSAs are ring-fenced for tax purposes.

Currently, the idea to replace CIT system with a Tax on Withdrawn Capital is actively considered.

Dividends paid by domestic companies in Ukraine are subject to an advanced CIT. Dividends paid by resident companies to non-resident ones are subject to a 15% withholding tax unless the rate is reduced under an interstate treaty for avoiding double taxation.

Supply of goods and services by companies is subject to a **Value Added Tax (VAT)** of 20%. Input VAT can generally be deducted from output VAT. The positive difference is paid to the national budget while the negative difference is generally reimbursed to the company.

No taxes or customs duties are levied for Ukrainian gas exports to the countries of European Energy Community.



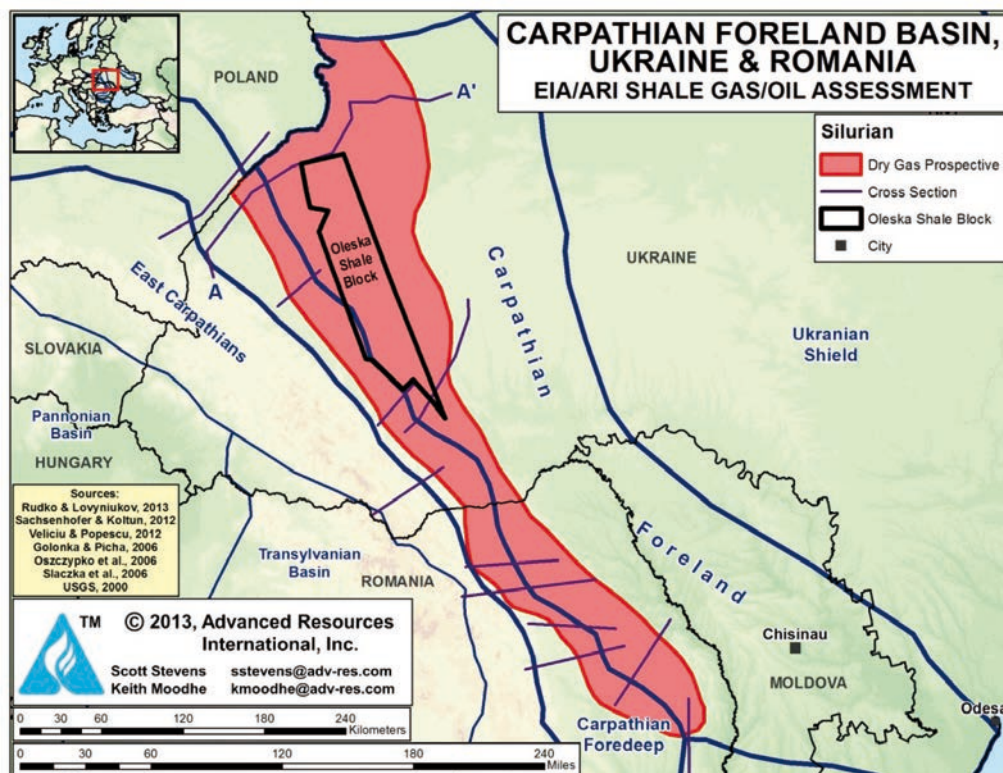
Source: US EIA, 2013

WELLS' DRILLING PERMITTING

Starting from April 2018, the permitting system for hydrocarbon producers was drastically simplified by signed law, which cut government red tape and advanced E&P regulation. Due to that, the time between the allotment of land and pilot production can be as short as a year and half.

Currently, the authorisations needed to perform well drilling include three logic stages:

- Land allotment (acreage leasing) – an agreement with a landowner, and obtaining a land-use plan approved by local authorities or the State Land Agency, depending on the ownership of the acreage;
- Health and safety scrutiny – obtaining technical expertise of the well drilling plan by the State Labour Service;
- Environment Impact Assessment – obtained through the Ministry of Ecology or local authorities, which are in charge of public hearings on the environment.



Source: US EIA, 2013

APPENDIX

Unconventional Gas Reservoir Properties and Resources

BASIC DATA	Basin		Carpathian Foreland	Dniepr-Donets		
	Shale Formation		L. Silurian	L. Carboniferous		
	Geologic Age		L. Silurian	L. Carboniferous		
	Depositional Environment		Marine	Marine		
PHYSICAL EXTENT	Prospective Area (mi ²)		16,080	1,460	2,680	6,010
	Thickness (ft)	Organically Rich	1,000	700	700	700
		Net	400	350	350	350
	Depth (ft)	Interval	3,300 - 16,400	3,300 - 16,400	3,300 - 16,400	3,300 - 16,400
		Average	10,000	11,000	12,000	13,000
RESERVOIR PROPERTIES	Reservoir Pressure		Normal	Normal	Mod. Overpress.	Mod. Overpress.
	Average TOC (wt. %)		2.0%	4.5%	4.5%	4.5%
	Thermal Maturity (% Ro)		2.50%	0.90%	1.15%	2.00%
	Clay Content		Medium	Low	Low	Low
RESOURCE	Gas Phase		Dry Gas	Assoc. Gas	Wet Gas	Dry Gas
	GIP Concentration (Bcf/mi ²)		112.7	49.2	118.5	195.2
	Risked GIP (Tcf)		362.5	14.4	63.5	234.6
	Risked Recoverable (Tcf)		72.5	1.4	15.9	58.6

Source: EIA, 2013



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