Naftogaz Group: Upstream Partnership Opportunities in Ukraine

NAFTOGAZ UKRGASVYDOBUVANNYA

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Ukrainian Upstream sector and Naftogaz Group at a glance

Upstream partnership opportunities with Naftogaz Group

Ukraine was a pioneer of the oil and gas industry in Europe, and still plays important role

1912
One of **the first European gas pipelines** Boryslav-Drohobych (12 km)

1921-1924
Exploration of Dashavske gas field, **the largest in Europe** at that time, and the start of Ukrainian gas industry

1945
The world's **first export of natural gas** from Ukraine (Dashavske and Oparske fields) to Poland

1948
The **most powerful in Europe gas pipeline** Dashava - Kyiv (509 km)

1950
Exploration of the unique Shebelinka gas field - **the largest in Europe** at that time

1951-1960
The start of **gas supply from Ukraine to Russia** (Dashava-Moscow pipeline) and **Belarus** (Dashava-Minsk pipeline)

1975
68.7 bcm annually (24% of USSR gas production)
The maximum of natural gas production in Ukraine

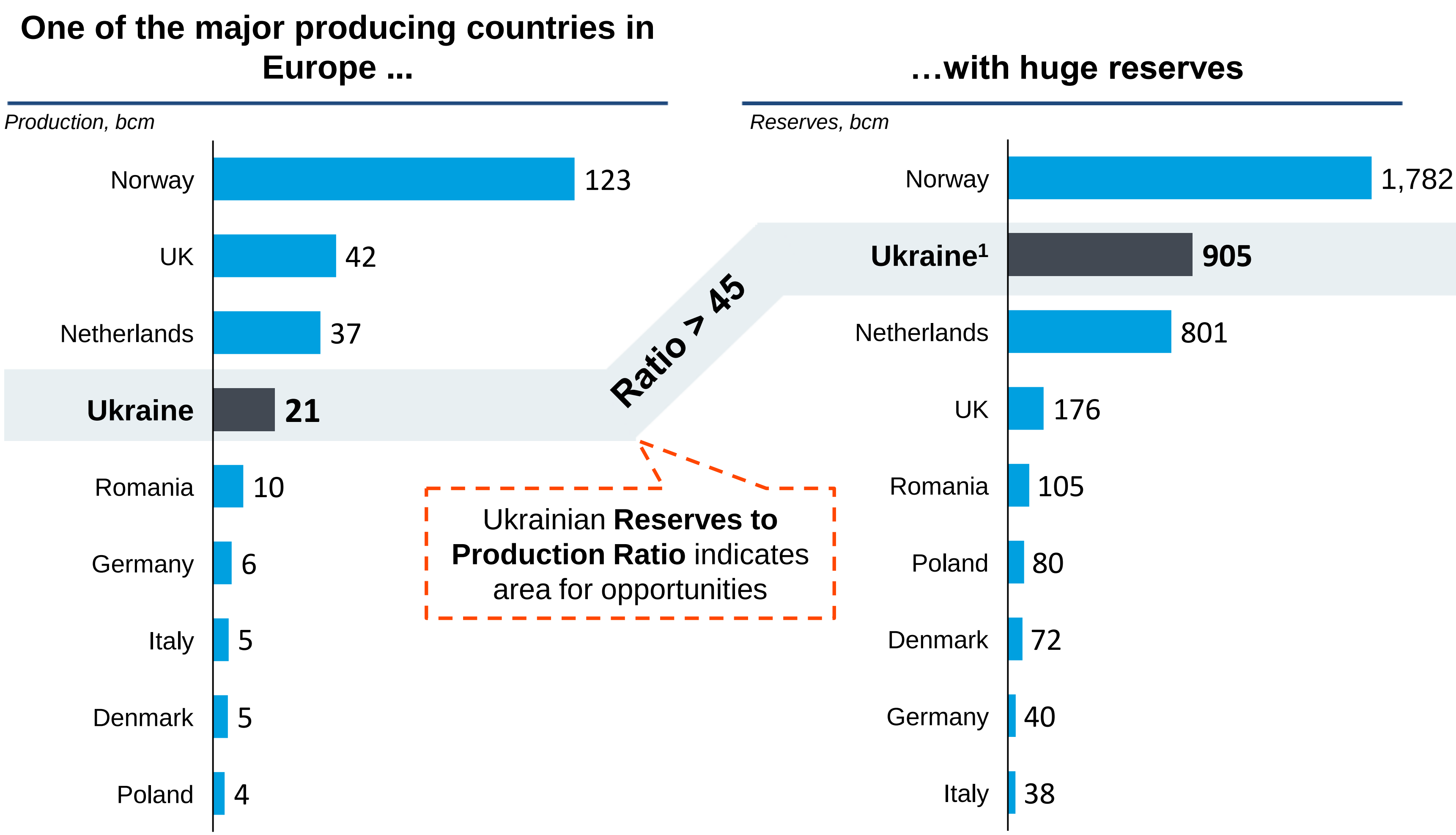
1990 - 2015
prolonged decline of natural gas production in Ukraine

2019
Ukraine still plays important role in European gas market:

- Gas production began to grow after a prolonged decline
- №1 by **transit volume** of Russian gas to EU
- №1 by capacity of **underground gas storages**
- №2 in proven natural gas **reserves**
- №4 by gas **production** volume
- №7 by gas **consumption**

Source: Open sources

Ukraine today: a major player in European natural gas market with huge potential



Source: BP Statistical Review of World Energy 2018, U.S. EIA, Danish Energy Agency, AGPU

Notes:1. State balance of mineral resources of Ukraine, 2017

Naftogaz is a national integrated energy incumbent with four key operational business units

To be carved out through unbundling process

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Most of Naftogaz' business outside of Transmission & Storage belongs to UGV (JSC UkrGasVydobuvannya)

Integrated Gas

72% of exploration in Ukraine

140+ fields under operations

265bcm of 2P reserves

15.5bcm natural gas production in 2018 (75% of total Ukrainian production)

450kt of oil and condensate production

7bcm of natural gas imports in 2018

Over **21bcm** of gas sales & supply in 2018

Transmission & Storage

146bcm of natural gas transit capacity

87bcm transit volume in 2018 under operations

Gas transportation system with total pipeline length of **36k km**

Largest underground storage system in Europe with **31bcm** capacity

19bcm of Naftogaz gas in storages as of 15 Sep 2019

Oil Midstream & Downstream

National oil pipeline network with total length of 3,507km

2018 oil transportation volume of **15,4mt**, of which **13,3mt** was transit volume

600kt per year installed capacity

Production of diesel (**1%** market share), gasoline (**7%** market share), LPG (**10%** market share) , bitumen, fuel oil etc.

Euro 5 fuel quality

Technical

Largest OFS and midstream technology base in the country

Own drilling fleet of **65 drill rigs (including 20 brand new)**

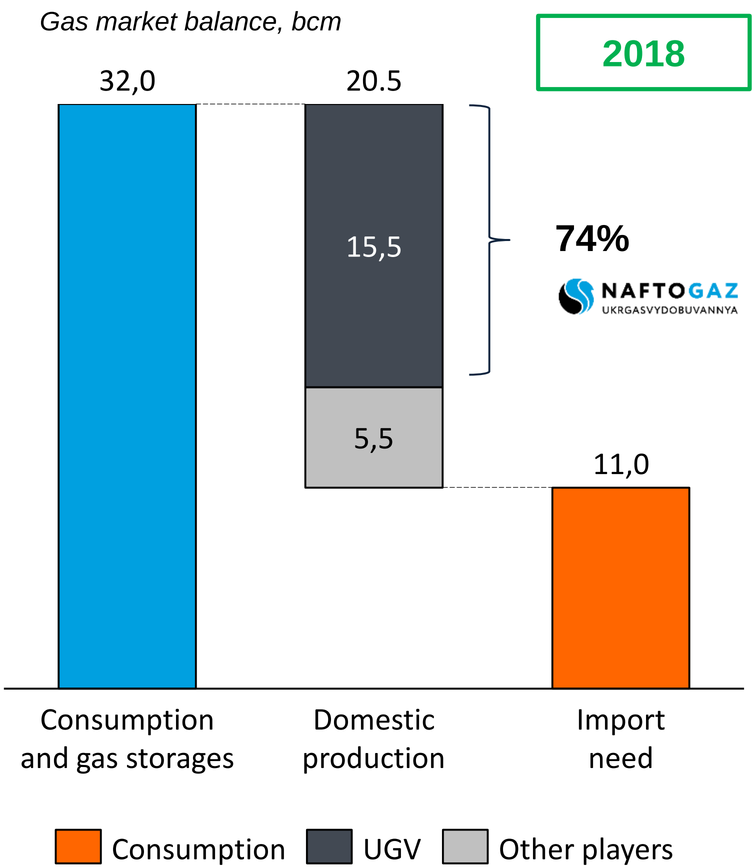
7 drill rigs of outsource contractors

64 new wells drilled an put into production in 2018

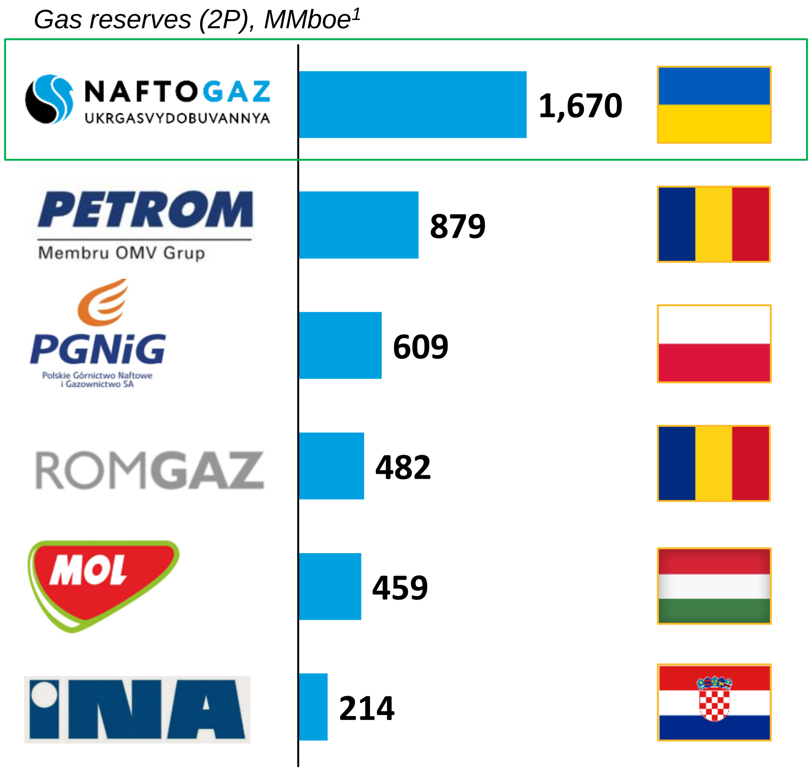
100+ hydro fracking, ~700 coil-tubing and over **150 WO operations** performed annually

Naftogaz’ UGV has the largest reserve base amongst Eastern European companies

UGV accounts for 74% of domestic natural gas production



UGV has the largest reserve base among Eastern European players



Source: Naftogaz of Ukraine
Notes:1. Miller&Lents report, 2018 (as of 30.06.2017)

UGV has demonstrated some impressive results since 2015 (after reform and management changes)

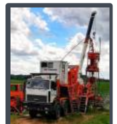
Production

25-year record of production achieved – 15.5 bln m^3 in 2018

+970 mln m^3 (+6.7%) of annual production increase since 2015

+5.35 bln m^3 of cumulative incremental production in 2016-2018

9-year record of daily production achieved – 43.9 mln m^3 in 2018



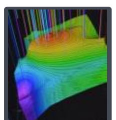
Well services

330+ Hydraulic Fracturing operations performed since 2015

1 500+ Coiled tubing operations performed since 2015

400+ Workover operations performed since 2015

4 world-leading OFSC involved in cooperation

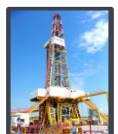


G&G

+38.6 bln m^3 of resource base increase since 2015

3.6x increase in 3D seismic volume since 2015 (2 894 km2 in 2016-2018)

8 new greenfields discovered in 2016-2018



Drilling

+123% of commercial drilling speed increase since 2015 (313k meters in 2018)

+20 new own drilling rigs procured since 2015

14 rigs of international drilling companies have been contracted

Source: Naftogaz of Ukraine

UGV has partnered with well-known international companies and organizations of multiple dimensions

1 Suppliers of goods and services

2 International professional associations and governments

3 International Financial Institutions

4 International E&P companies

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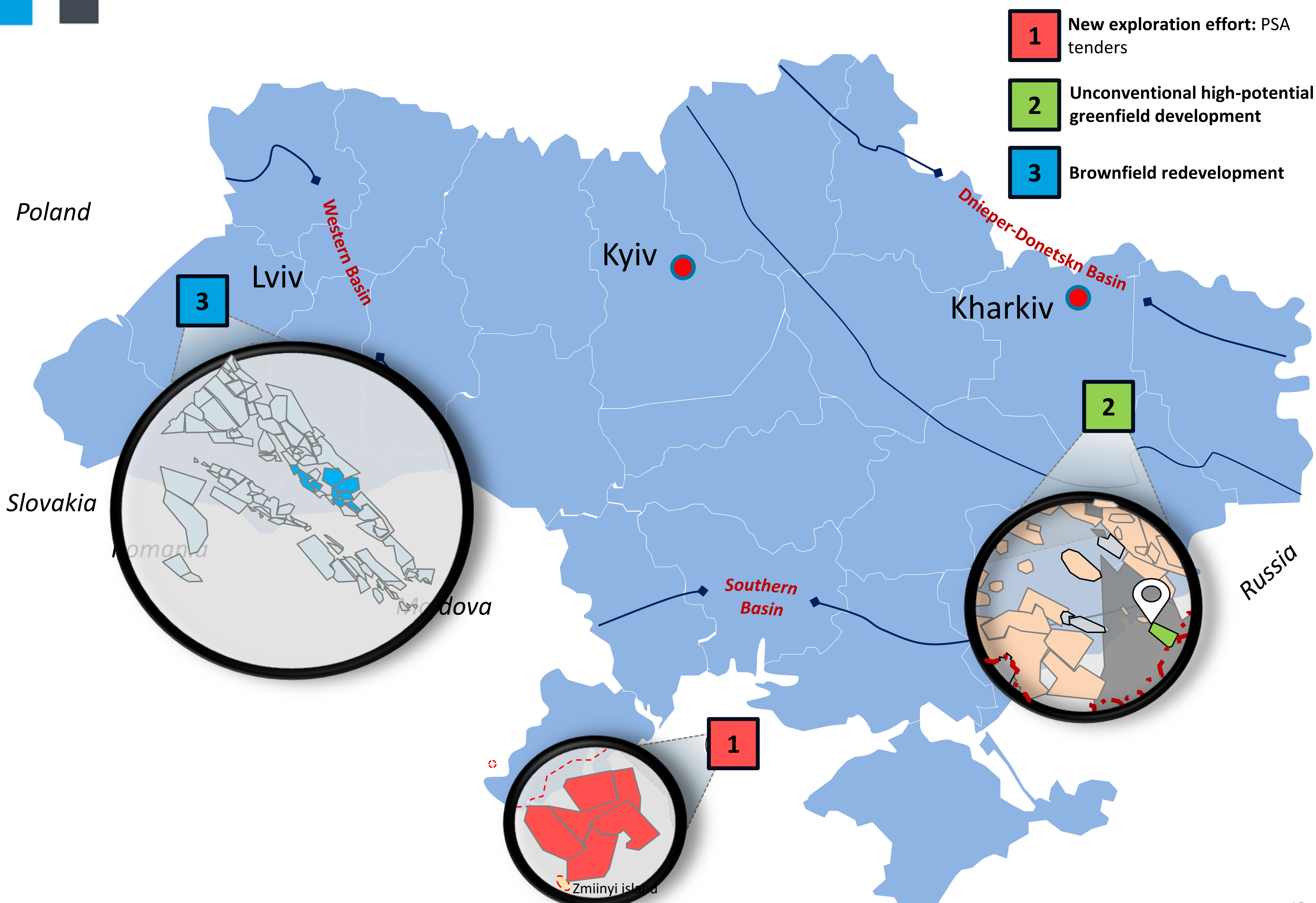
Upstream partnership opportunities with Naftogaz Group

Three major partnership areas in upstream for Naftogaz Group

	Naftogaz' key objectives	Possible contract type	Naftogaz' requirements for partner
1 New exploration effort	• Increase Naftogaz' resource base • Optimize capital and human resources allocation to pursue several exploration opportunities simultaneously • Share exploration risk • Get access to best-in-class technological capabilities in exploration & appraisal	• Production Sharing Agreement (PSA)	• Proven track record in exploration and appraisal projects; significant financial capabilities; ability and willingness to commit to $100+ mln investments and take exploration risk
2 Unconventional resources	• Commercialize Naftogaz' tight gas resources • Significantly increase (+2 bcm / year) economically justified production within next 2 years • Optimize capital allocation • Build tight-gas technological capability in-house	• TBD (possible options: PSA or Risk service contract)	• Readiness to invest and scale-up in Ukraine within 6 months, Proven track record in complex tight-gas development projects; ability and willingness to commit to $200+ mln investments and take exploration/production risks
3 Brownfield redevelopment	• Maximize value of depleted brownfield reserves • Lower production costs (OPEX) • Optimize capital and human resource allocation • Create external benchmarks across multiple business dimensions	• Production Enhancement (PEC)	• Readiness to invest and scale-up in Ukraine in 6 months; proven track record in production; ability and willingness to commit to $50+ mln investments and take production risk

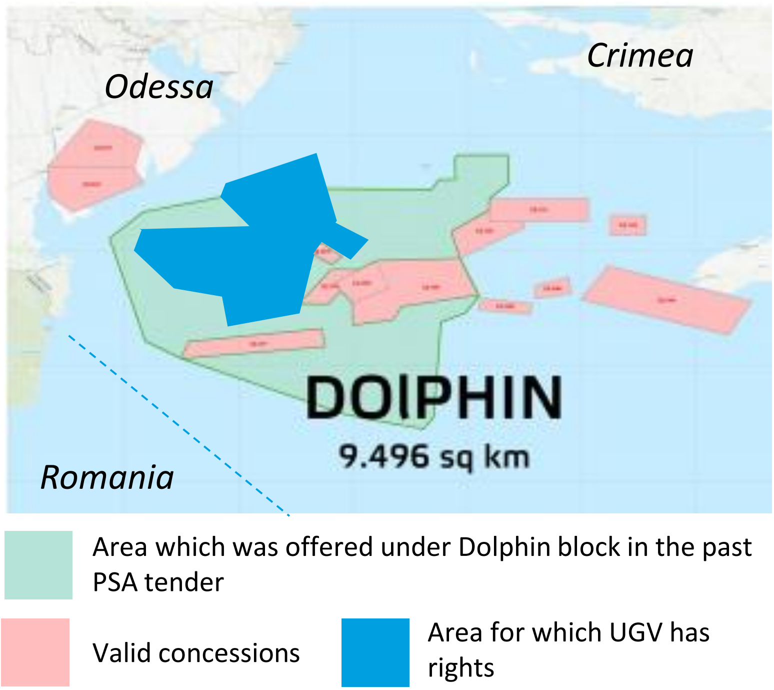
Geographic locations of Naftogaz' s partnership opportunities



Snapshot of Ukrainian PSA offshore opportunity

Key information about PSA offshore tender

- Tender for Dolphin block (~10 000 sq.km) was poorly organized, and therefore cancelled by Cabinet of Ministers of Ukraine in Sep 2019
- UGV has rights for 5 blocks with area of ~4 000 sq. km within Dolphin block
- New PSA tender (after re-shape and re-design) for offshore block will be announced in 2020



SOURCE: Association of gas producers of Ukraine (https://www.goukrainenow.com)

Key terms of the Dolphin PSA tender

- PSA duration: 50 years
- Location: NW part of continental shelf of the Black Sea
- Minimum investment requirement: USD 55 mln
- Minimum work program: Drilling of 5+ E&A wells

Key information about the Dolphin block

- Petroleum province: North Black Sea Basin
- Resources: inferred resources of the block are 286 million tons of oil equivalent (subcategory 334), the density of undiscovered resources C3 + D (subcategories 333 + 334) within the block varies from 5 to 30-50k tons of oil equivalent per sq. km.
- Wells data: 4 abandoned wells (info available)
- Geological researches: 16 reports dated 1965-2010 (info available)
- Seismic data: 9 B71 linear km of regional seismic performed in 2005, 13 regional seismic lines with about 1000 linear km of exploration seismic acquired within the Dolphin block (info available)

Case study:
UGV / Vermilion partnership under PSA

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VERMILION

Results of the first PSA round (9 blocks were tendered) for UGV & Vermilion:

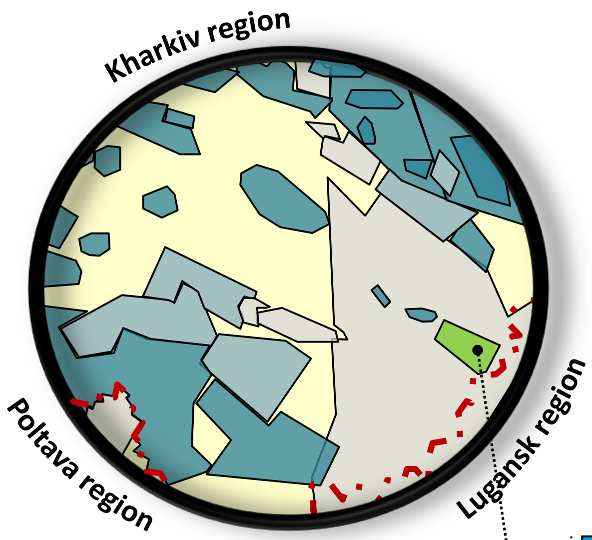
- Number of blocks applied: 9 blocks, including 4 jointly with Vermilion Energy Inc. (Canada)
- The total number of blocks received: 4, including 2 jointly with Vermilion
- Total area of the blocks won: 2 917 sq. km
- Regions: Poltava, Kharkiv, Lviv, Ivano-Frankivsk
- Total amount of committed investments: ~USD 150 mln
- Committed number of new wells: 12 (incl. 8 jointly with Vermilion)
- Start of early production: 2-3 years after PSA execution
- Potential production: up to 2 bcm in 2025
- Planned PSA execution: Q1 2020

Partnership with Vermilion:

- **Vermilion Energy Inc. is an international oil and gas company** headquartered in Calgary, Canada. It is a publicly traded company listed on the New York and Toronto stock exchanges. The company has considerable experience in developing unconventional deposits
- **UGV and Vermilion have partnered in PSA on the following terms:**
  - Investment and production allocation - 50/50%
  - Vermilion will be the operator at the stage of preparation of the work program and exploration
  - UGV has the ROFR to provide its products and services during Vermilion tenders at market conditions
- **UGV goals for partnership with Vermilion:**
  - Share exploration risks and investments
  - Benefits of using the Vermilion experience in developing and operating unconventional deposits (transfer of know-how)
  - Obtain resources (financial, technical, etc.) to develop multiple sites at once

UGV's tight gas greenfield partnership opportunity snapshot

Field location



- Field considered for partnerships
- Other UGV fields
- Other companies' fields

Area: 126 km2

Gas in place: 300+ bcm

Recov. resources: 58 bcm

40 km

Field 1

Field properties & comparison	Field 1	Pinedale
Pressure gradient, bar / 10 m	1.1 – 1.7	1.61 - 1.7
Net pay, m	>100 m	>60 m
Porosity (Phi), %	3 – 12%	7 – 9%
Permeability ($К_в$) range, mD	0.1 – 0.001	0.1 – 0.01
Brittleness, %	>60%	>60%
Resources, bcm	> 50 bcm	> 100 bcm
Depth range, km	4 – 4.5 km	2 – 5 km
Life cycle	Exploration	Production

Scope of work

Drilling & completion	
# of new wells to be drilled	30-60
# of rigs to be involved	4 – 8
# of fracks to be performed	200+
Infrastructure	
Integrated oil & gas treatment units	2
Km of pipeline	100-200
Transfer merering stations	2-3
Booster compressor stations	2

Tights gas project development up to date

Knowledge about reservoir:

- Obtained knowledge about permeability, porosity and pressure of the reservoir, PLT analysis of a fracked well performed
- Wide angle and wide azimuth 3D seismic was performed, its processing and interpretation was performed by Schlumberger

Knowledge about unconventional frack technologies:

- Various completion technologies for multistage fracturing were tested
- 3 Idle wells were reactivated, 15 fracks were performed according to new technology and frack design (wells are in cleaning-up phase and produce gas, but still pumping water)

Tender amongst 4 world-leading oilfield service companies was carried in Autumn 2018, but decision was made not to go into Full field development

UGV has portfolio of 13 fields with overall tight-gas resources estimated at 250+ bcm

2

UGV's fields with tight gas potential

#	Field title	Area, km2	Tight gas zones	Gas in place, bcm	Recoverable resources*, bcm
1	Field 1	126	C2m, C2b	300	58
2	Field 2	223	C1s2	134	80
3	Field 3	212	C2m	64	38
4	Field 4	23	C2b, C1s2	12	7
5	Field 5	350	C2m, C2b	22	16
6	Field 6	108	P1, C3	5	3
7	Field 7	55	C2m	22	13
8	Field 8	273	C2m, C2b	24	8
9	Field 9	483	C2m, C2b, C1s2	18	5
10	Field 10	87	C2b, C1s2	5	3
11	Field 11	496	C2m, C2b	22	9
12	Field 12	196	C2m, C2b	20	12
13	Field 13	4	P1, C3	1	0.5
TOTAL				**646**	**253**

Tight gas zones legend:

C2m – Moscovian
C1s2 – Serpukhovian
C2b – Bashkirian
P1 – Sakmarian, Asselian
C3 – Gzelian, Kasimovian

Pilot project

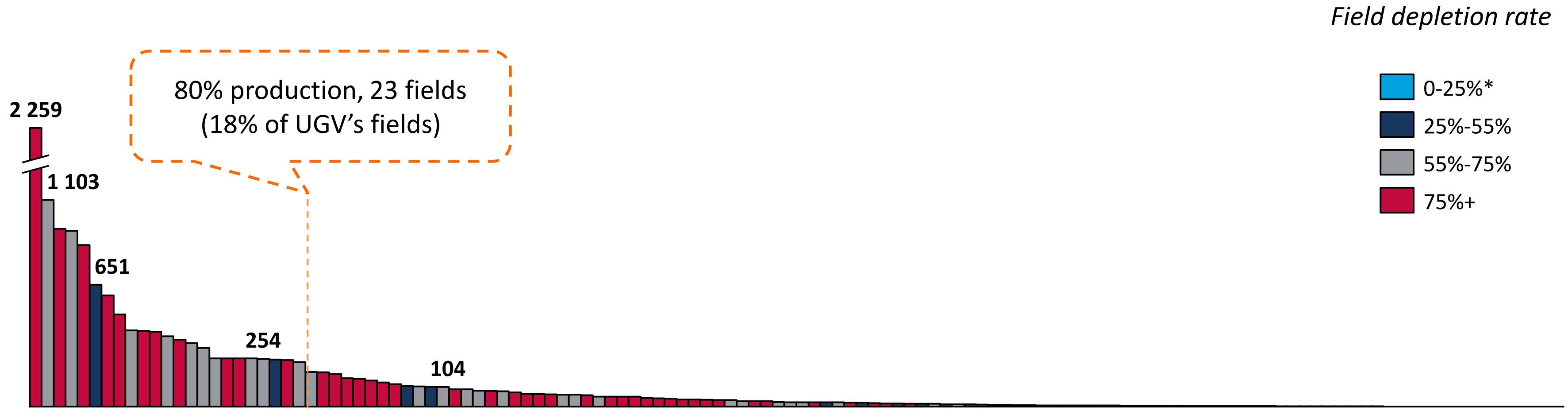
UGV tight gas resources of **253 bcm** are almost as large as its current 2P conventional reserves of **265 bcm**

Notes:

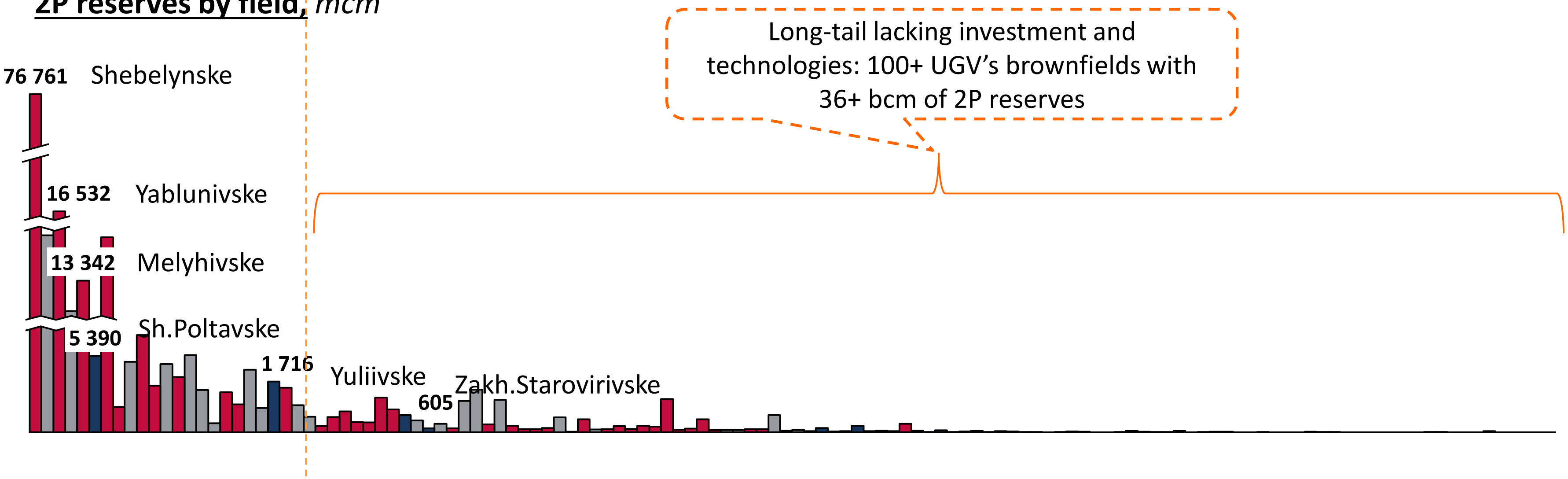
** – Mixture of unrisked discovered and undiscovered volumes with different resource categories*

UGV has long-tail of 100+ underperforming fields with still significant 2P reserves lacking investment and technologies; some of them to be offered under Production enhancement contract (PEC)

Production from 128 UGV's brownfields by field in '18, *mcm*



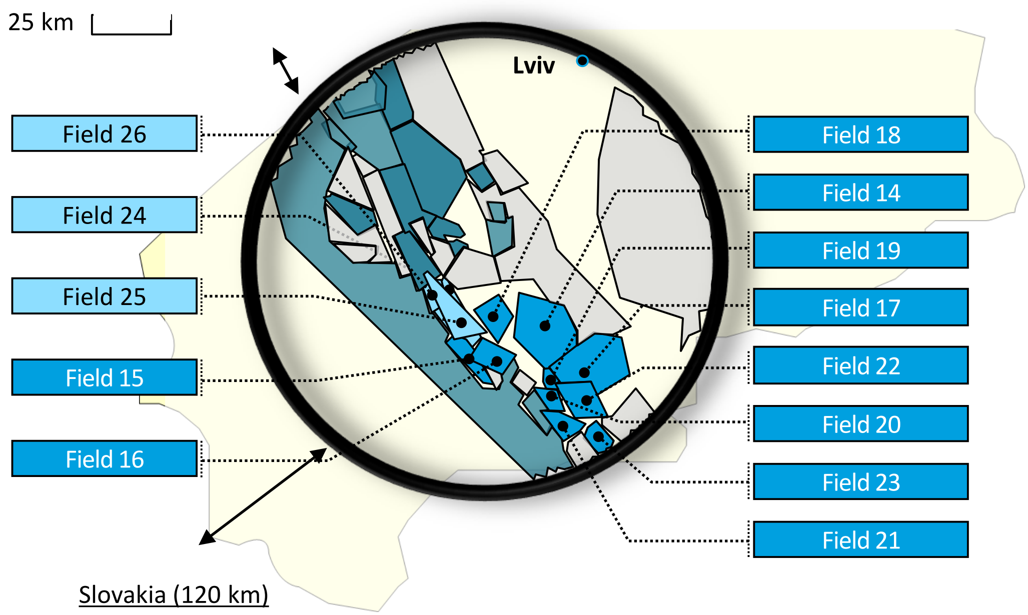
2P reserves by field, *mcm*



SOURCE: Department of Strategic Planning & Control analysis based on UGV data, According to the Miller & Lents reserve report

Brownfield redevelopment through PEC: pilot project snapshot (ongoing tender)

Field location



Package 1 | Package 2 | Other UGV fields | Other companies' fields

Key field parameters	Package 1	Package 2	Total
# of fields	10	3	13
Reserves, bcm	7.2	7.9	15.0
Production, mcm	177	117	294
# of wells (incl. liquidated)	213	101	269
# of non-liquidated wells	94	56	150
Area, km2	275	111	386
Average depth, m	794	1 167	880
% of depletion (weighted)	33%	51%	42%

Contractual framework: PEC

Short description: Development and operation (provision of the technical and managerial expertise) of the brownfields with the purpose of decreasing production costs ($ / tcm) and increasing production levels and reserves

Contract term: 15+ years

Title to reserves and production: UGV

Fixed Assets: No transfer of assets title to Contractor, all assets created during the contract duration to be transferred to UGV

Operational Control: Contractor

Management: Joint (UGV approves Work Program)

Compensation mechanism:
- Service fee: 2-stage $/tcm tariff (baseline and two types of incremental – for old and new wells); incremental > baseline
- Service fee is the only compensation to the Contractor, and covers its CAPEX, profit share, OPEX and all other expenses

CAPEX:
- 100% financed by Contractor
- MWO approved every 5 years
- Detailed Work Program approved by UGV every year

Objectives: Rejuvenate UGV's brownfields, increase production from them, control OPEX and free UGV's managerial attention

Tendering & proposal evaluation criteria
- Open tender with decision made by Naftogaz Group
- Winner defined based on highest NPV to Naftogaz
- Baseline production profile, and min capex obligation is provided by UGV and is not negotiable
- Bidders submit their proposed tariffs for base and incremental production and incremental production profile