



# OIL AND GAS IN POLAND

# 17 TENDER BLOCKS

LICENSING ROUNDS:  
INFORMATION AND  
OPPORTUNITIES  
2017

**SPECIAL EDITION**  
for AAPG Annual Convention  
& Exhibition, 2-5 April 2017,  
Houston, TX, US  
2016 - 2017 tenders for the  
Polish concession blocks



MINISTRY  
OF THE ENVIRONMENT



Polish Geological Institute  
National Research Institute



POLAND

# 17 TENDER BLOCKS



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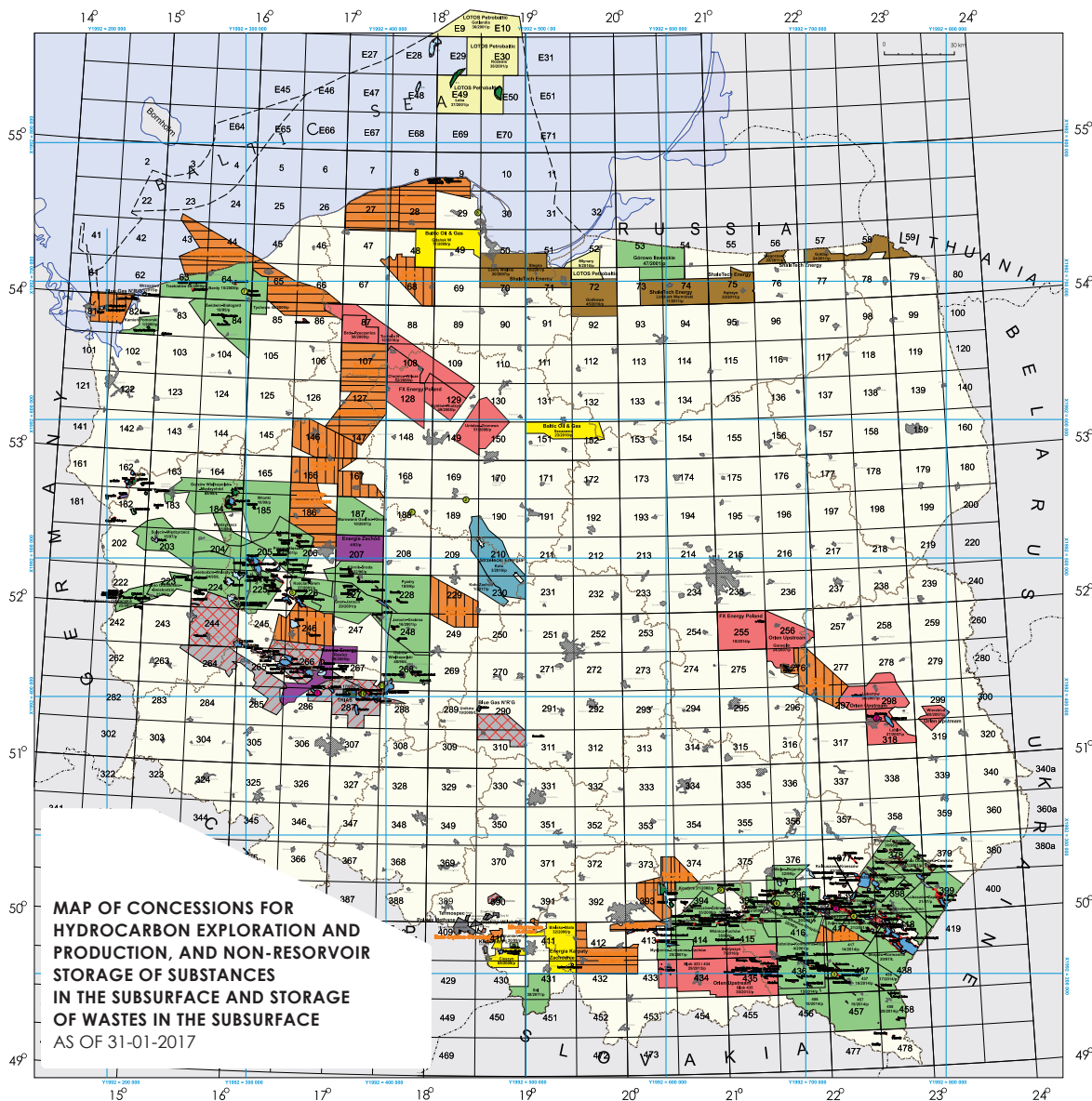
THE 17 MOST PROSPECTIVE BLOCKS  
FOR HYDROCARBON EXPLORATION HAVE BEEN SELECTED:

## ROUND 1

No.	Block name	Licensing rounds time frame	Exploration target
1	Błażowa	Completed and closed. To be offered during a planned next bidding round	Conventional, Cenozoic, Mesozoic, Paleozoic
2	Bytów	Completed and closed. To be offered during a planned next bidding round	Unconventional – shale gas, Paleozoic Conventional, Cambrian
3	Chodzież	Completed and closed. To be offered during a planned next bidding round	Conventional, Permian Unconventional – Basin Centered Gas System
4	Leszno	<b>OPEN UNTIL JUNE 1st, 2017</b>	Conventional, Carboniferous and Permian
5	Piła	<b>OPEN UNTIL JUNE 1st, 2017</b>	Conventional, Permian Unconventional – Basin Centered Gas System
6	Proszowice	Completed and closed. To be offered during a planned next bidding round	Conventional, Jurassic and Cretaceous
7	Ryki	Completed and closed. To be offered during a planned next bidding round	Conventional, Carboniferous Unconventional, Devonian

## ROUND 2

No.	Block name	Licensing round time frame	Exploration target
8	Bochnia	<b>in preparation</b>	Conventional, Cenozoic, Mesozoic, Paleozoic
9	Bzie-Dębina-Strumień	<b>in preparation</b>	Unconventional – CBM, Carboniferous
10	Damnica	<b>in preparation</b>	Unconventional – shale gas, Paleozoic Conventional, Cambrian
11	Debrzno-Człuchów	<b>in preparation</b>	Conventional, Devonian, Carboniferous, Permian Unconventional, Silurian, Ordovician
12	Koszalin-Polanów	<b>in preparation</b>	Conventional, Devonian, Permian
13	Sucha Beskidzka-Wiśniowa	<b>in preparation</b>	Conventional, Paleogene, Miocene, Paleozoic, Mesozoic
14	Szamotuły-Poznań Północ	<b>in preparation</b>	Conventional, Permian, Upper Paleozoic Unconventional – Basin Centered Gas System
15	Ustronie N (offshore)	<b>in preparation</b>	Conventional, Permian, Paleozoic
16	Złotów-Zabartowo	<b>in preparation</b>	Conventional, Permian
17	Żarnowiec	<b>in preparation</b>	Unconventional – shale gas, Paleozoic Conventional, Cambrian



**MAP OF CONCESSIONS FOR HYDROCARBON EXPLORATION AND PRODUCTION, AND NON-RESERVOIR STORAGE OF SUBSTANCES IN THE SUBSURFACE AND STORAGE OF WASTES IN THE SUBSURFACE AS OF 31-01-2017**

Elaboration : R. Bońda D. Siekiera M. Szuflicki © Copyright by PGI (2017)  
 WARSZAWA - as of 31-01-2017

**Prospecting and exploration and production concessions:**

- |                             |   |  |
|-----------------------------|---|--|
| PGNIG S.A.                  | Hutton Energy PLC                                       | Concessions of prospecting and production of coal bed methane                                      |
| Grupa LOTOS Petrobalic S.A. | PKN Orlen S.A.  | Pending applications   |
| TRIAS Sp. z o.o.            | Stena Investment S.A.R.L.                               | Pending applications submitted according to the article 46 of the Act on Geological and Mining Law |
| Blue Gas N'R'G Sp. z o.o.   | Palomar Capital Advisors Limited - San Leon Energy B.V. | Pending applications submitted according to the article 47 of the Act on Geological and Mining Law |
| San Leon Energy Plc         |   |  |

- Areas typified to the tender — Round 1
  - Areas typified to the tender — Round 2
- Tender areas: Wolin, Malanów (offer evaluation in progress), Międzyrzecze (granted)



# PREFACE

On 26<sup>th</sup> of June 2015 and 30<sup>th</sup> of June 2016, the Polish Ministry of the Environment announced two rounds (respectively round 1 and round 2) of planned concessions bidding for offered areas dedicated to prospection, exploration and exploitation of hydrocarbons. All areas have been selected and based on their promising perspectives for oil and gas field discoveries, both conventional and unconventional.

In order to assist stakeholders and members of the public with information, the Ministry presents this folder describing the short overview of all areas offered for bidding, hoping that it will help to learn geological and geographical conditions of assumed hydrocarbon deposits occurrence. Each tender area has its dedicated section with detailed

description accompanied by the map of a respective area borders, its geographical coordinates, seismic cross sections and deep boreholes locations. The maps have been edited by the Polish Geological Institute – National Research Institute (PGI-NRI).

We believe that this publication will contribute to better understanding of the offered tender areas and encourage investments in the Polish oil and gas sector.



KLASA 1  
V=5000 m  
ROPA NAFTY



**ROUND 1**  
**7 (1 – 7) TENDER**  
**BLOCKS**

# NO.1 TENDER BLOCK

# BLAŻOWA

# ROUND 1

Licensing rounds:  
information and opportunities  
2017

The hydrocarbon prospects in the "Błażowa" tender area are related to three working conventional petroleum systems developed in: (I) Cretaceous – Paleogene flysch deposits of the Outer Carpathians, (II) Miocene molasses of the Carpathian Foredeep and (III) deep Palaeozoic – Mesozoic basement. The first system is expected as the oil-producing from the organic-rich flysch deposits. The second system is developed beneath the Carpathian overthrust at depths below 1500 m and contains numerous horizons of biogenic gases accumulated in stratigraphic

and anticlinal traps. The oil- and gas-accumulations in the third system are expected below 2,000 m in the Middle and Upper Devonian, Mississippian and Jurassic carbonates, while the Ordovician and Silurian shales are supposed to be the source rocks.

Numerous hydrocarbon deposits have been documented within these three petroleum systems in the neighborhood of the "Błażowa" tender area. Several traps are still waiting for drilling.



**Area name:** Błażowa

**Location:** onshore; part of Ministry of the Environment concession blocks: 416 and 417; in areas of the following counties and communes: **Podkarpackie province:** Strzyżów county, commune: Niebylec (participation in the concession area 13.32%), Rzeszów county, communes: Lubenia (14.89%), Tyczyn (0.28%), urban Błażowa (0.8%), Błażowa (30.06%), Hyżne (13.13%), urban Dynów (0.37%), Dynów (18.68%), Brzozów county, communes: Domaradz (0.06%), Nozdrzec (0.07%), Przemysł county, commune: Dubiecko (6.151%), Przeworsk county, commune: Jawornik (2.18%)

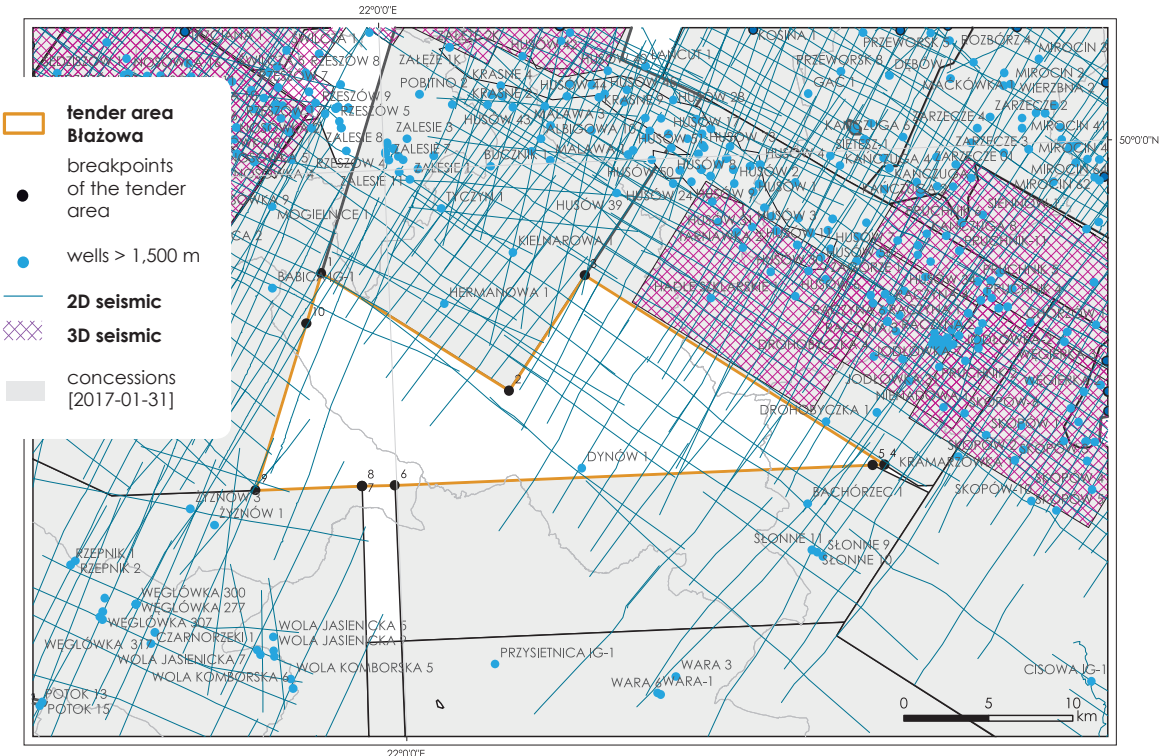
**Concession type:** prospecting and exploration of hydrocarbon deposits and extracting hydrocarbons from deposits

**Duration:** concession for 10 years, therein: prospecting and exploration phase (5 years) extracting phase – after the investment decision

**Type of deposit:** Conventional for oil and gas

**Acreege:** 270.05 km<sup>2</sup>  
66,731 acres

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# INFORMATION SHEET FOR TENDER BLOCK

Licensing rounds:  
information and opportunities  
2017

## BŁAŻOWA ◀ ROUND 1

### Participation:

winner of the tender  
(an entity or a consortium) **100%**

### Petroleum play:

I – flysch of the Skole Nappe  
II – Carpathian Foredeep below Skole Nappe  
III – Paleozoic-Mesozoic in the Carpathian basement

### Reservoir rock:

I – Kuźmińskie Sandstones, Inoceramian Beds, Kliwa Sandstones  
II – sand and sandstones of the Upper Badenian and Lower Sarmatian  
III – Precambrian sandstones, carbonate rocks of the Middle Devonian, Upper Devonian, Lower Carboniferous and Upper Jurassic

### Thickness of overburden:

I – 0-2,500 m  
II – 2,000-3,800 m  
III – 2,000-4,500 m

### Completed seismic surveys (owner):

1977-1986 Błażowa-Bircza 2D (State Treasury)  
1982 Rzeszów-Zalesie 2D (State Treasury)  
1990 Błażowa-Leszczyny 2D (PGNiG S.A.)  
1991 Dębica-Sędziszów-Rzeszów 2D (PGNiG S.A.)  
1991-1995 Zalesie-Jodłówka-Skopów 2D + 1997 reprocessing (PGNiG S.A.)  
2004 Babica-Niebylec 2D (PGNiG S.A.)  
2012 Błażowa-Dynów 2D (PGNiG S.A.)

### Structural level:

flysch  
Paleogene-Miocene; Paleozoic-Mesozoic  
Precambrian

### Source rock:

I – Spas Beds, Inoceramian Beds, Menilite Beds  
II – clastic rocks of Upper Badenian and Lower Sarmatian  
III – clastic rocks of Ordovician, Silurian, Lower Devonian and Middle Jurassic, clastic-carbonate rocks of the Middle and Upper Devonian and Lower Carboniferous

### Seal rock:

I – flysch: Spas Beds, Inoceramian Beds, Hieroglyphic Beds, Variegated Shales, Menilite Beds, Krosno Beds  
II – claystone layers in autochthonous Miocene, rocks of the Stebnik Unit or flysch of the Skole Nappe above autochthonous Miocene interval  
III – Ordovician and Silurian for Precambrian deposits; rocks of the culm facies, Triassic, Jurassic, autochthonous Miocene and Skole Nappe for Devonian and Carboniferous deposits; autochthonous Miocene rocks and Skole Nappe for Jurassic deposits

### Trap type:

I – structural or structural-lithological  
II – structural and stratigraphic  
III – structural and stratigraphic

### Key and offset wells (TVD):

**Key wells:** Szklary IG-1 (1,152 m), Dynów 1 (4,281 m), Żyznów 4 (1,400 m), Żyznów 5 (1,405 m),  
**Offset wells:** Bachórzec 1 (4,093 m), Babica IG-1 (3,426.1 m), Drohobyczka 1 (4,104.5 m), Drohobyczka 3 (3,900 m), Hadle Szklarskie 1 (3,277 m), Hermanowa 1 (5,092 m), Kielnarowa 1 (3,611.5 m)

INFORMATION CONTINUED ON  
THE NEXT PAGE

# INFORMATION SHEET FOR TENDER BLOCK

Licensing rounds:  
information and opportunities  
2017

## BŁAŻOWA ◀ ROUND 1

### The proposed minimum work program of prospecting and exploration phase

Stage I (12 months) – interpretation and analysis of archival geological data

Stage II (12 months) – execution of 2D seismic survey (100km) or drilling of one well to the depth of 5000 m (TVD) with obligatory coring of perspective intervals

Stage III (24 months) – drilling of one well to the depth of 5000 m (TVD) with obligatory coring of perspective intervals

Stage IV (12 months) – performance analysis of the data obtained

### The deposits identified in the vicinity

#### [GZ – gas; RN – oil]

**Zalesie (GZ)** – discovered in 1982, cumulative production 1,054.61 million m<sup>3</sup>; 2014 production: 158.41 million m<sup>3</sup>, reserves: recoverable 2,239.38 million m<sup>3</sup> (economic reserves in place 333.64 million m<sup>3</sup>)

**Nosówka (RN)** – discovered in 1989, cumulative production 269.76 ktonnes; 2014 production: 6.03 ktonnes, reserves: recoverable 55.68 ktonnes (economic reserves in place: non)

**Nosówka (GZ)** – discovered in 1999, cumulative production 38.61 million m<sup>3</sup>; 2014 production: 3.96 million m<sup>3</sup>, reserves: recoverable 396.49 million m<sup>3</sup> (economic reserves in place 168.4 million m<sup>3</sup>)

**Jodłówka (GZ)** – discovered in 1980, cumulative production 2,058.04 million m<sup>3</sup>; 2014 production: 7.43 million m<sup>3</sup>, reserves: recoverable 989.37 million m<sup>3</sup> (economic reserves in place 78.58 million m<sup>3</sup>)

**Rączyna (GZ)** – discovered in 1983, cumulative production 231.52 million m<sup>3</sup>; 2014 production: 0.17 million m<sup>3</sup>, reserves: recoverable 228.62 million m<sup>3</sup> (economic reserves in place 120.55 million m<sup>3</sup>)

**Husów-Albigowa-Krasne (GZ)** – discovered in 1961, cumulative production 4,409.72 million m<sup>3</sup>; 2014 production: 19.95 million m<sup>3</sup>, reserves: recoverable 613.92 million m<sup>3</sup> (economic reserves in place 78.36 million m<sup>3</sup>)

**Kielanówka-Rzeszów (GZ)** – discovered in 1978, cumulative production 2,431.25 million m<sup>3</sup>; 2014 production: 61.22 million m<sup>3</sup>, reserves: recoverable 2,301.74 million m<sup>3</sup> (economic reserves in place 111.46 million m<sup>3</sup>)

**Kańczuga (GZ)** – discovered in 1959, cumulative production 675.03 million m<sup>3</sup>; 2014 production: 5.31 million m<sup>3</sup>, reserves: recoverable 54.35 million m<sup>3</sup> economic reserves in place 8.53 million m<sup>3</sup>)

**Wola Jasienicka (RN)** – discovered in 1962 cumulative production 71.72 ktonnes and 33.67 million m<sup>3</sup> associated gas; in 2014 production: 0.12 ktonnes, reserves: recoverable non (economic reserves in place 0.18 ktonnes)

# THE TENDER PROCEDURE

Licensing rounds:  
information and opportunities  
2017

The granting of a concession for the prospecting and exploration of a hydrocarbon deposit and the production of hydrocarbons from a deposit, or a concession for the production of hydrocarbons from a deposit requires a tender procedure.

The tender procedure provides non-discriminatory access to the execution of activities related to the prospecting, exploration or production of hydrocarbons and is consistent with the Hydrocarbons Directive.

## 2016-2017 LICENSING ROUND TIMETABLE

June 26 <sup>th</sup> , 2015 June 30 <sup>th</sup> , 2016	announcement Licensing of the tender blocks of respectively round 1 and round 2
2016 2017 PLANNED - DATE NOT YET DEFINED	a call for tender blocks for round 1 a call for tender blocks for round 2 a call for tender blocks for round 3
fill 7 days after a call for tender	deadline to submit an application for clarifications regarding the tender conditions
min. 90 days after a call for tender	timeframe for offer submission for entities with positive result of the qualification procedure

Priority in the tender will be given to the best systems of hydrocarbon deposits exploration and extraction or hydrocarbon production. The offers evaluation tender will be based on the following criteria:

- experience in performing activities of prospecting and exploration of hydrocarbon deposits or production of hydrocarbons from deposits,
- technical ability to perform abovementioned activities,
- financial capabilities of the bidder,
- technology of conducting geological work,
- the scope and timing of the proposed geological work,
- the scope and timing of mandatory geological sampling.

# NO.2 TENDER BLOCK BYTÓW

Licensing rounds:  
information and opportunities  
2017

## ROUND 1

"Bytów" tender area is dedicated to the exploration of unconventional and conventional prospects in the onshore part of the Baltic Basin. Shale gas accumulations occur within the Ordovician (Caradocian) and Silurian (Llandovery) strata. Conventional oil accumulations occur in the Middle Cambrian sandstone interval. Lower Paleozoic shales constitute both source and reservoir rocks sealed by the overlying shales and Permian evaporites, while Middle Cambrian

sandstone is a reservoir rock documented by four historical conventional oil field discoveries (Żarnowiec, Żarnowiec W, Dębki, Białogóra E) in the onshore part of the Baltic Basin. Shale gas production rate reported at Gapowo site (2014) is a good prognostic and probably indicates one of the best areas for future continuation of shale gas prospecting in Poland.



**Acreage:** 779.97 km<sup>2</sup>  
192,734 acres

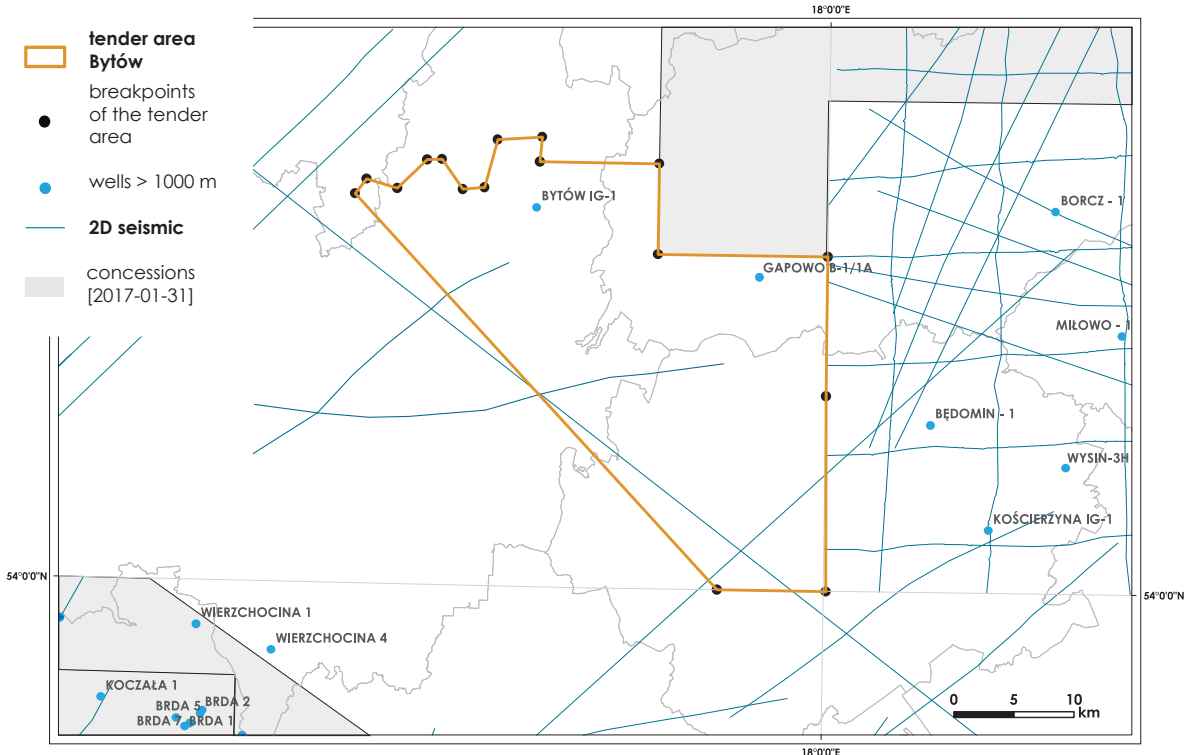
**Area name:** Bytów

**Location:** onshore; part of Ministry of the Environment concession blocks: 47, 48, 67 and 68; in areas of the following counties and communes: **Pomorskie province:** Słupsk county, commune: Dębica Kaszubska (participation in the concession area 0.46%), Bytów county, communes: Czarna Dąbrówka (13.34%), Bytów (5.61%), Parchowo (16.81%), Studzienice (2.75%), Kościerzyna county, communes: Dziemiany (3.44%), Lipusz (10.37%), Kościerzyna (24.33%), urban Kościerzyna (1.54%), Stara Kiszewa (0.03%), Kartuzy county, communes: Stężycza (7.73%), Sulęczyño (1.21%), Sierakowice (1.37%), Chmielno (0.01%)

**Concession type:** prospecting and exploration of hydrocarbon deposits and extracting hydrocarbons from deposits

**Duration:** concession for 10 years, therein: prospecting and exploration phase (5 years) extracting phase – after the investment decision

**Type of deposit:** Conventional and unconventional for gas



# INFORMATION SHEET FOR TENDER BLOCK

Licensing rounds:  
information and opportunities  
2017

## BYTÓW ◀ ROUND 1

### Participation:

winner of the tender  
(an entity or a consortium) **100%**

### Petroleum play:

I – unconventional  
II – conventional

### Reservoir rock:

I – fine-grained clastic rocks of Ordovician, Silurian  
II – Lower and Middle Cambrian sandstone

### Thickness of overburden:

I – from about 3,700 m (Bytów IG-1 area) to about 4,000 m  
(Kościerzyna IG-1, Gapowo B-1 area)  
II – about 4,250 m (Gapowo B-1 area)

### Completed seismic surveys (owner):

2012 - 7 lines of the 2D survey  
(Indiana Investments Sp. z o. o.)

### The proposed minimum work program of prospecting and exploration phase

Stage I (12 months) – interpretation and analysis of archival geological data

Stage II (12 months) – execution of 2D seismic survey (100 km) or drilling of one well to the depth of 5,000 m (TVD) with obligatory coring of perspective intervals

Stage III (24 months) – drilling of one well to the depth of 5000 m (TVD) with obligatory coring of perspective intervals

Stage IV (12 months) – performance analysis of the data obtained

### Structural level:

Cenozoic; Permian-Mesozoic  
Lower Paleozoic; Precambrian

### Source rock:

I – fine-grained clastic rocks of Ordovician, Silurian  
II – fine-grained clastic inserts in Cambrian interval and fine-grained clastic rocks of Ordovician, Silurian

### Seal rock:

I – Upper Silurian (Ludlow and Pridoli) and Zechstein evaporites  
II – fine-grained clastic rocks of Ordovician, Silurian and Zechstein evaporites

### Trap type:

I – unconventional  
II – structural and stratigraphic

### Key and offset wells (TVD):

**Key wells:** Bytów IG-1 (2,569.70 m), Gapowo B-1/1A (4,299.79m)

**Offset wells:** Kościerzyna IG-1 (5,202.0 m), Lębork IG-1 (3,310.0 m)

### The deposits identified in the vicinity

#### [GZ – gas; RN – oil]

I – no shale gas type deposits

II – no gas deposits, but in this interval recognized:

**Żarnowiec W (RN)** – discovered in 1990, cumulative production 4.16 ktonnes; 2014 production: 0.05 ktonnes, reserves: recoverable 17.84 ktonnes (economic reserves in place 3.88 ktonnes)

**Dębki-Żarnowiec (RN)** – discovered in 1977, cumulative production 39.12 ktonnes; 2014 production: 0.81 ktonnes, reserves: recoverable 51.68 ktonnes (economic reserves in place 7.59 ktonnes)

**Białogóra E (RN)** – discovered in 1995, cumulative production from 11 years 1.41 ktonnes; 2014 production: non, reserves: recoverable non (economic reserves in place 0.38 ktonnes)

# NO.3 TENDER BLOCK

# CHODZIEŻ

Licensing rounds:  
information and opportunities  
2017

# ◀ ROUND 1

Hydrocarbon exploration prospects for “Chodzież” tender area are associated with deeply buried Rotliegend sandstones, mostly aeolian in origin. Deep burial of reservoirs rocks, exceeding up to 5000 m, results in conventional and unconventional (tight) gas traps suite, characterized by moderate porosity and low permeability predictions. Source rocks include Lower (Upper?) Carboniferous organic-rich mudstones and sandstones. Extraction of good quality dry

gas is expected. Primary seal for hydrocarbon deposits should be formed by playa-lake claystones interbedded with aeolian sandstones. Secondary seal is formed by Zechstein evaporites (anhydrite and salt). “Chodzież” tender area is an exciting hydrocarbon prospect as it is very poorly explored (lack of deep boreholes) and may be an element of the Basin Centered Gas System, yet untested in the Polish Rotliegend Basin.



**Acreage:**  
1,119.08 km<sup>2</sup>  
276,530 acres

**Area name:** Chodzież

**Location:** onshore, part of Ministry of the Environment concession blocks: 166 and 167; in areas of the following counties and communes: **Wielkopolskie province:** Czarnków - Trzcianka county, communes: Potajewo (participation in the concession area 0.69%), Lubasz (3.63%), Czarnków city (0.90%), Czarnków (19.97%), Trzcianka (0.62%), Piła county, commune Ujście (2.43%), Chodzież county, communes: Chodzież city (0.93%), Chodzież (10.51%), Margonin (5.36%), Budzyń (17.79%), Szamocin (0.03%), Oborniki county, communes: Ryczywół (3.,24%), Rogoźno (2.52%), Wągrowiec county, communes: Mieścisko (2.76%), Wągrowiec city (1.59%), Wągrowiec (24.40%), Damasławek (1.10%), Gołańcz (0.12%)

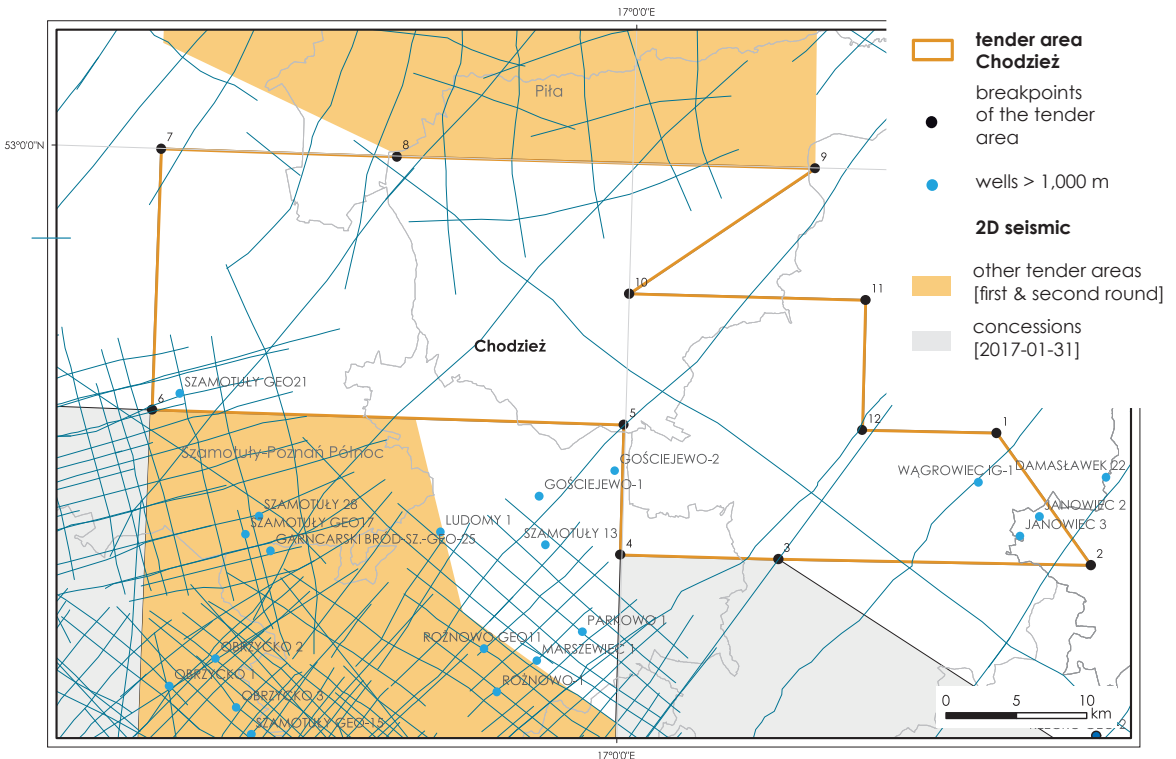
**Kujawsko-Pomorskie province:** Żnin county, commune Janowiec Wielkopolski (1.41%)

**Concession type:** prospecting and exploration of hydrocarbon deposits and extracting hydrocarbons from deposits

**Duration:** concession for 10 years, therein: prospecting and exploration phase (5 years) extracting phase – after the investment decision

**Types of deposit:** Conventional and unconventional for natural gas

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# INFORMATION SHEET FOR TENDER BLOCK

Licensing rounds:  
information and opportunities  
2017

## CHODZIEŹ ◀ ROUND 1

### Participation:

winner of the tender  
(an entity or a consortium) **100%**

### Petroleum play:

I – Conventional  
II – Unconventional

### Reservoir rock:

I, II – Rotliegend sandstones

### Thickness of overburden:

I – 4,700-5,000 m  
II – 5,000-5,400 m

### Completed seismic surveys (owner):

1976-1977 Czarnków-Poznań-Strzelno 2D (State Treasury)  
1979 Piła-Bydgoszcz 2D (State Treasury)  
1980-1981 Radęcin-Wieleń-Murowana Goślina 2D  
(State Treasury)  
1982-1984 Wałcz-Gołańcz 2D (State Treasury)  
1985-1986 Elektrownia Jądrowa Warta 2D (State Treasury)  
2011 Poland SPAN Obrzycko-Zabartowo line  
2014 Poland SPAN Gołęczewo-Szubin line

### The proposed minimum work program of prospecting and exploration phase

Stage I (12 months) – interpretation and analysis  
of archival geological data

Stage II (12 months) – execution of 2D seismic survey  
(100 km)

Stage III (24 months) – drilling of one well to the depth  
of 5,500 m (TVD) with obligatory coring of perspective  
intervals

Stage IV (12 months) – performance analysis  
of the data obtained

### Structural level:

Permian + Mesozoic  
Carboniferous + Rotliegend

### Source rock:

I, II – mudstone-clay series of Carboniferous

### Seal rock:

I, II – Zechstein evaporites

### Trap type:

I – structural, stratigraphic  
II – unconventional

### Key wells (MD):

Piła IG-1 (5,482 m)  
Objezierze IG-1 (5,094.50 m)

### The deposits identified in the vicinity

#### [GZ – gas; RN – oil]

I – deposits in the shallower part of the basin  
(2,500-3,500 m)

**Grodzisk Wielkopolski (GZ)** – discovered in 1976,  
exploited 1978-2004; cumulative production (27 years)  
1,966.65 million m<sup>3</sup>

**Radlin (GZ)** – discovered in 1986, cumulative production  
(24 years) 7,843.55 million m<sup>3</sup>; 2015 production:  
178.94 million m<sup>3</sup>, reserves: recoverable 3,226.45 million m<sup>3</sup>  
(economic reserves in place: 1,442.23 million m<sup>3</sup>)

**Paproć (GZ)** – discovered in 1985, cumulative production  
(28 years) 4,230.4 million m<sup>3</sup>; 2015 production:  
182.45 million m<sup>3</sup>, reserves: recoverable 3,438.80 million m<sup>3</sup>  
(economic reserves in place: 3,228.63 million m<sup>3</sup>)

**Młodasko (GZ)** – discovered in 1985, cumulative produc-  
tion (24 years) 451.9 million m<sup>3</sup>; 2015 production:  
27.28 million m<sup>3</sup>, reserves: recoverable 44.10 million m<sup>3</sup>  
(economic reserves in place: 43.86 million m<sup>3</sup>)

II – no tight gas discovered in the Rotliegend

# NO.4 TENDER BLOCK

# LESZNO ◀ ROUND 1

Licensing rounds:  
information and opportunities  
2017

Hydrocarbon exploration prospects for "Leszno" tender area are associated with relative shallowly buried Rotliegend sandstones, mostly aeolian in origin. Hydrocarbon prospect is also related to Zechstein Limestone, Zechstein Main Dolomite and top most units of the Lower Carboniferous rocks, as stated in the vicinity of "Leszno" tender area. Stratigraphic, tectonic and geomorphic gas traps are expected to be encountered. Source rocks include Lower Carboniferous organic-rich mudstones, claystones and sandstones.

Extraction of moderate quality methane gas (over 70% of methane content) is expected (excluding small hydrocarbon traps in the Main Dolomite interval). Primary seal for hydrocarbon deposits is formed by Zechstein evaporites (anhydrite and salt). "Leszno" Tender area was previously examined by POGC and FX Energy. The newly carried 3D seismic survey and geological research open new possibilities for exploration, particularly in the so-called subtle traps or multi-level traps.



**Area name:** Leszno








**Location:** onshore, part of Ministry of the Environment concession blocks: 226, 245 and 246; in areas of the following counties and communes: **Wielkopolskie province:** Wolsztyn county, commune Przemęt (participation in the concession area <0.00%), Kościan county, communes: Śmigiel (9.10%), Kościan (2.57%), Krzywiń (11.56%), Leszno county, communes: Włoszakowice (4.04%), Lipno (10.73%), Świeciechowa (10.78%), Osieczna (13.30%), Rydzyna (6.45%), Krzemieniewo (11.70%), Leszno county, commune Leszno (3.29%), Gostyń county, communes: Gostyń (7.94%), Poniec (6.16%), Krobia (1.58%), **Lubuskie province:** Wschowa county, commune Wschowa (0.78%)

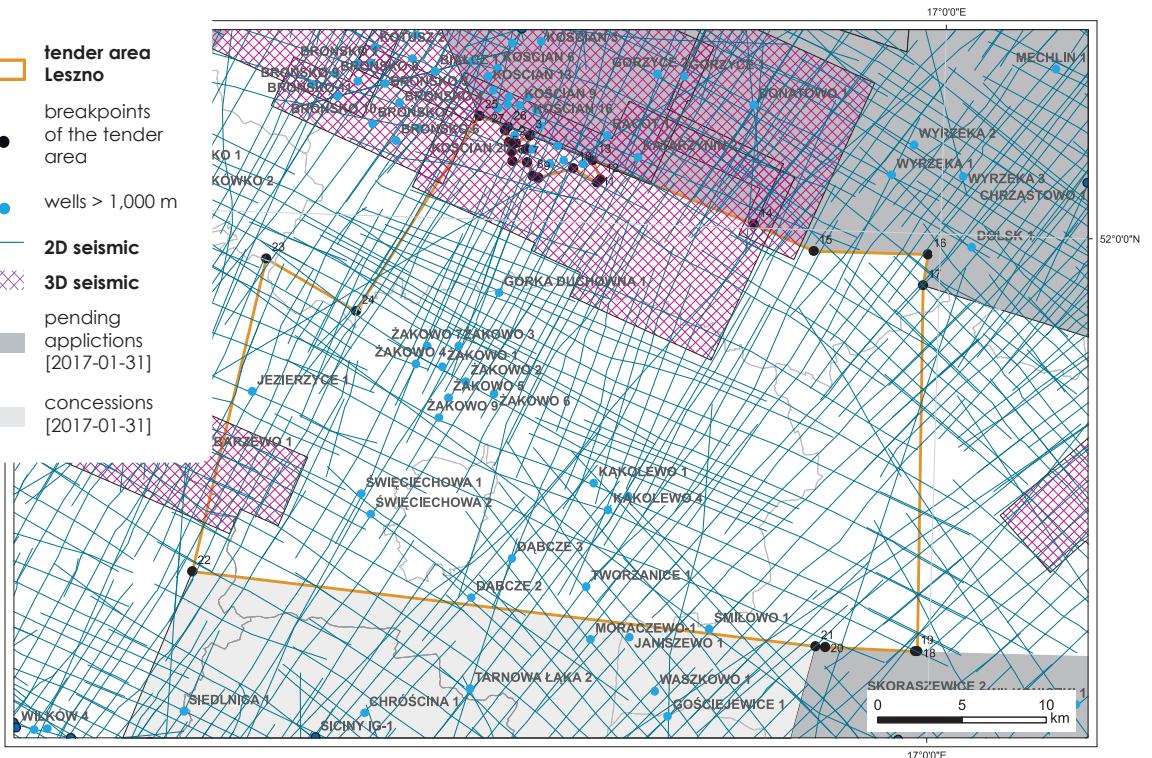
**Acreage:**  
966.43 km<sup>2</sup>  
238,810 acres

**Concession type:** prospecting and exploration of hydrocarbon deposits and extracting hydrocarbons from deposits

**Duration:** concession for 10 years, therein: prospecting and exploration phase (5 years) extracting phase – after the investment decision

**Types of deposit:** Conventional for oil and natural gas

-  tender area Leszno
-  breakpoints of the tender area
-  wells > 1,000 m
-  2D seismic
-  3D seismic
-  pending applications [2017-01-31]
-  concessions [2017-01-31]





# INFORMATION SHEET FOR TENDER BLOCK

Licensing rounds:  
information and opportunities  
2017

## LESZNO ◀ ROUND 1

### Participation:

winner of the tender  
(an entity or a consortium) **100%**

### Petroleum play:

I – Upper Paleozoic Carboniferous and Rothliegend  
II – Main Dolomite

### Reservoir rock:

I – fissured rocks of Carboniferous, Rothliegend  
sandstones, and Zechstein Limestone  
II – Zechstein dolomites and limestones

### Thickness of overburden:

1,500-1,800 m for Main Dolomite  
1,800-2,400 m for Rothliegend and Zechstein  
Limestone

### Completed seismic surveys (owner):

1975-1977 Kościan-Gostyń 2D (State Treasury)  
1975-1976 Kościan-Śrem 2D (State Treasury)  
1975 Profile regionalne 2D (State Treasury)  
1975 Wschowa-Gostyń-Milicz 2D (State Treasury)  
1976 Monoklina przedsudecka 2D (State Treasury)  
1976-1979 Nowa Sól-Góra-Milicz 2D (State Treasury)  
1980 Góra-Rawicz 2D (State Treasury)  
1986-1988 Leszno-Rawicz 2D (State Treasury)  
1988 Pogorzela-Krotoszyn 2D (State Treasury)  
1988 Śrem-Gostyń 2D (State Treasury)  
1989 Leszno-Rawicz 2D (PGNiG)  
1989-1990 Nowy Tomyśl-Wolsztyn-Leszno 2D (PGNiG)  
1989 Śrem-Gostyń 2D (PGNiG)  
1990-1992 Stawa-Leszno 2D (PGNiG)  
1992 Kościan-Śrem 2D (PGNiG)  
1996 Zbarzewo 3D (PGNiG)  
1997-1999 Kościan-Krobia 2D (PGNiG)  
1998 Kościan-Krzywin 3D (PGNiG)  
1998-1999 Jaraczewo-Pogorzela 2D (PGNiG)  
2013 Tworzanice 3D (FX Energy)  
2012 Kościan-Żakowo-Frankowo 2D/3D (FX Energy)

### The proposed minimum work program of prospecting and exploration phase:

Stage I (12 months) – interpretation and analysis  
of archival geological data  
Stage II (12 months) – execution of 3D seismic survey  
Stage III (24 months) – drilling of one well to the  
depth to 3,000 m (TVD) with obligatory coring of  
perspective intervals  
Stage IV (12 months) – performance analysis  
of the data obtained

### Structural level:

Zechstein + Mesozoic  
Carboniferous + Rothliegend

### Source rock:

I – Mudstone-claystone series of Carboniferous,  
II – Main Dolomite organic-rich interbeds

### Seal rock:

I, II – Zechstein evaporites

### Trap type:

structural

### Key wells (MD):

Jezierzycze 1 (2,668 m), Święciechowa 1 (2,776.8 m), Święciechowa  
2 (2,200 m), Żakowo 6 (2,216 m), Górka Duchowna 1  
(2,443 m, FX Energy) **Offset:** Dąbcze2 (2,203.7 m), Śmitowo 1  
(2,130 m), Siciny 2 (3,520 m), Siciny IG-1 (3,000 m), Gościejewice 1  
(2,048 m), Wycistowo IG-1 (3,160 m), wells on Brońsko deposit:  
1, 2, 4, 5, 6, 7, 8, 9 i 11 (2,206-2,609 m)

### The deposits identified in the vicinity

#### [GZ – gas; RN – oil]

**Brońsko (GZ)** – discovered in 2001, cumulative production  
(14 years) 7,920.35 million m<sup>3</sup>; 2015 production: 781.0 million m<sup>3</sup>,  
reserves: recoverable 15,797.79 million m<sup>3</sup> (economic reserves  
in place 15,178.85 million m<sup>3</sup>)

**Kościan S (GZ)** – discovered in 1995, cumulative production  
(14 years) 6,577.74 million m<sup>3</sup>; 2015 production: 370.87 million m<sup>3</sup>,  
reserves: recoverable 3,781.94 million m<sup>3</sup> (economic reserves in  
place 2,204.94 million m<sup>3</sup>)

**Ruchocice (GZ)** – discovered in 2003; cumulative production  
(6 years) 348.28 million m<sup>3</sup>; 2015 production: 40.99 million m<sup>3</sup>,  
reserves: recoverable 484.72 million m<sup>3</sup> (economic reserves  
in place 453.02 million m<sup>3</sup>)

**Wielichowo (GZ)** – discovered in 2002; cumulative production  
(6 years) 536.38 million m<sup>3</sup>; 2015 production: 91.64 million m<sup>3</sup>,  
reserves: recoverable 863.62 million m<sup>3</sup> (economic reserves in  
place 852.86 million m<sup>3</sup>)

**Tarchaly (GZ)** – discovered in 1970; cumulative production  
(42 years) 1,855.06 million m<sup>3</sup>; 2015 production: 17.18 million m<sup>3</sup>,  
reserves: recoverable 1,537.75 million m<sup>3</sup> (economic reserves in  
place 429.94 million m<sup>3</sup>)

**Ujazd (GZ)** – discovered in 1978; cumulative production (38 years)  
1,316.36 million m<sup>3</sup>; 2015 production: 0.51 million m<sup>3</sup>, reserves:  
recoverable 103.64 million m<sup>3</sup> (economic reserves  
in place 5.96 million m<sup>3</sup>)

**Grodzisk Wielkopolski (GZ)** – discovered in 1976, exploited  
1978-2004; cumulative production (27 years) 1,966.65 million m<sup>3</sup>

**Żakowo (GZ)** – discovered in 1965, not exploited, reserves:  
recoverable 2,150 million m<sup>3</sup>

**Kąkolewo (GZ)** – discovered in 1970, not exploited, reserves:  
recoverable 240 million m<sup>3</sup> (economic reserves in place: non)

# NO.5 TENDER BLOCK

Licensing rounds:  
information and opportunities  
2017

## PIŁA ◀ ROUND 1

Hydrocarbon exploration prospects for “Piła” tender area are associated with deep buried Rotliegend sandstones, mostly aeolian in origin. Deep burial of reservoir rocks, exceeding from 4,500 up to 5,000 m, results in conventional and unconventional (tight) gas traps suite, characterized by moderate porosity and low permeability predictions. Source rocks include Lower (Upper?) Carboniferous organic-rich mudstones and sandstones.

Extraction of good quality dry gas is expected. Primary seal for hydrocarbon deposits is formed by playa-lake claystones interbedded with aeolian sandstones. Secondary seal is formed by Zechstein evaporites (anhydrite and salt). “Piła” tender area is an exciting hydrocarbon prospect because it is very poorly explored (only one deep bore hole) and may be an element of the Basin Centered Gas System, yet untested in the Polish Rotliegend Basin.



**Area name:** Piła

**Location:** onshore, part of Ministry of Environment concession blocks: 146 and 147; in areas of the following counties and communes: **Zachodniopomorskie province:** Wałcz county, commune Wałcz (participation in the concession area 3.92%); **Wielkopolskie Province:** Złotów county, commune Krajenka (2.00%), Piła county, communes: Szydłowo (18.55%), Piła (10.89%), Kaczory (13.90%), Wysoka (0.40%), Miasteczko Krajeńskie (7.38%), Białośliwie (3.50%), Ujście (9.32%), Czarnków - Trzcianka county, communes: Trzcianka (9.50%), Czarnków (0.14%), Chodzież county, communes: Chodzież city (0.25%), Chodzież (10.09%), Margonin (1.37%), Szamocin (8.69%), Wągrowiec county, commune Gołańcz (0.09%)

**Acreage:**

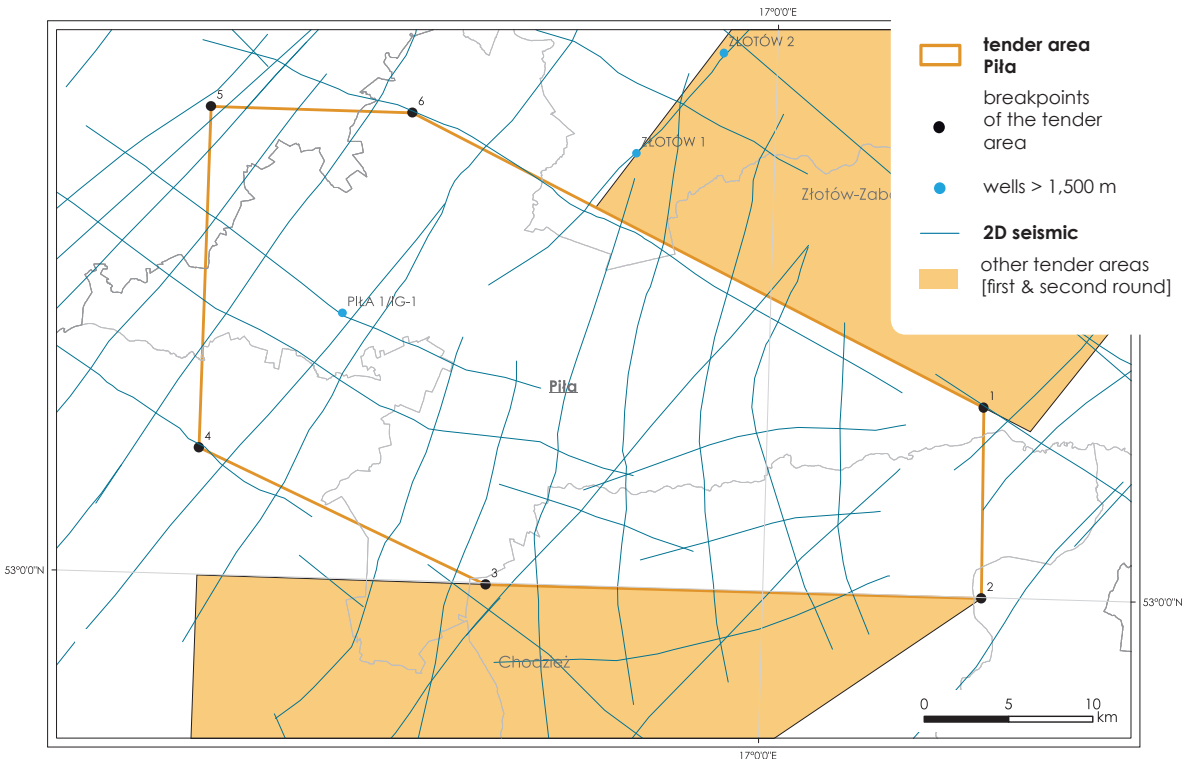
942.19 km<sup>2</sup>

232,820 acres

**Concession type:** prospecting and exploration of hydrocarbon deposits and extracting hydrocarbons from deposits

**Duration:** concession for 10 years, therein: prospecting and exploration phase (5 years) extracting phase – after the investment decision

**Types of deposit:** Conventional and unconventional for natural gas



# INFORMATION SHEET FOR TENDER BLOCK

Licensing rounds:  
information and opportunities  
2017

## PIŁA ◀ ROUND 1

### Participation:

winner of the tender  
(an entity or a consortium) **100%**

### Petroleum play:

I – Conventional  
II – Unconventional

### Reservoir rock:

I, II – Rotliegend sandstones

### Thickness of overburden:

I, II – 4,500-5,100 m

### Completed seismic surveys (owner):

1977 Czarnków-Poznań-Strzelno 2D (State Treasury)  
1979 Piła-Bydgoszcz 2D (State Treasury)  
1982 Bydgoszcz 2D (State Treasury)  
1982-1984 Wałcz-Gołańcz 2D (State Treasury)

### The proposed minimum work program of prospecting and exploration phase:

Stage I (12 months) – interpretation and analysis of archival geological data

Stage II (12 months) – execution of 2D seismic survey (100 km)

Stage III (24 months) – drilling of one well to the depth of 5,500 m (TVD) with obligatory coring of perspective intervals

Stage IV (12 months) – performance analysis of the data obtained

### Structural level:

Permian + Mesozoic  
Carboniferous + Rotliegend

### Source rock:

I, II – Mudstone-claystones series of Carboniferous

### Seal rock:

I, II – Zechstein evaporates, clastic rocks

### Trap type:

I – structural, stratigraphic, unconventional

### Key wells (MD):

Piła IG-1 (5,482 m), Złotów 2 (4,845 m)

### The deposits identified in the vicinity

#### [GZ – gas; RN – oil]

**Grodzisk Wielkopolski (GZ)** – discovered in 1976, exploited 1978-2004; cumulative production (27 years) 1,966.65 million m<sup>3</sup>

**Radlin (GZ)** – discovered in 1986, cumulative production (24 years) 7,843.55 million m<sup>3</sup>; 2015 production: 178.94 million m<sup>3</sup>, reserves: recoverable 3,226.45 million m<sup>3</sup> (economic reserves in place: 1,442.23 million m<sup>3</sup>)

**Paproc (GZ)** – discovered in 1985, cumulative production (28 years) 4,230.4 million m<sup>3</sup>; 2015 production: 182.45 million m<sup>3</sup>, reserves: recoverable 3,438.80 million m<sup>3</sup> (economic reserves in place: 3,228.63 million m<sup>3</sup>)

**Młodasko (GZ)** – discovered in 1985, cumulative production (24 years) 451.9 million m<sup>3</sup>; 2015 production: 27.28 million m<sup>3</sup>, reserves: recoverable 44.10 million m<sup>3</sup> (economic reserves in place: 43.86 million m<sup>3</sup>)

II – no tight gas discovered in the Rotliegend

# NO.6 TENDER BLOCK PROSZOWICE ◀ ROUND 1

Licensing rounds:  
information and opportunities  
2017

Hydrocarbon exploration prospects for "Proszowice" tender area are associated with the shallowly buried Oxfordian (Upper Jurassic) organofretic limestones and Cenomanian (Upper Cretaceous) fine- and medium-grained glauconitic sandstones, marine in origin, characterized by middle to high porosity. Primary seal for hydrocarbon deposits is formed by Senonian marls which directly overlie sandstones or limestones.

Main source rocks are Silurian mudstones and Devonian dolomites, while Carboniferous and Middle Jurassic rocks are expected to be secondary source rocks. Several oil and gas fields are connected with this conventional petroleum system in adjacent areas. "Proszowice" Tender area was previously examined by POGC and Vabush Energy. Deeper Devonian, Carboniferous and Middle Jurassic reservoirs are still waiting to be explored.



**Acreage:**  
818.29 km<sup>2</sup>  
202,203 acres

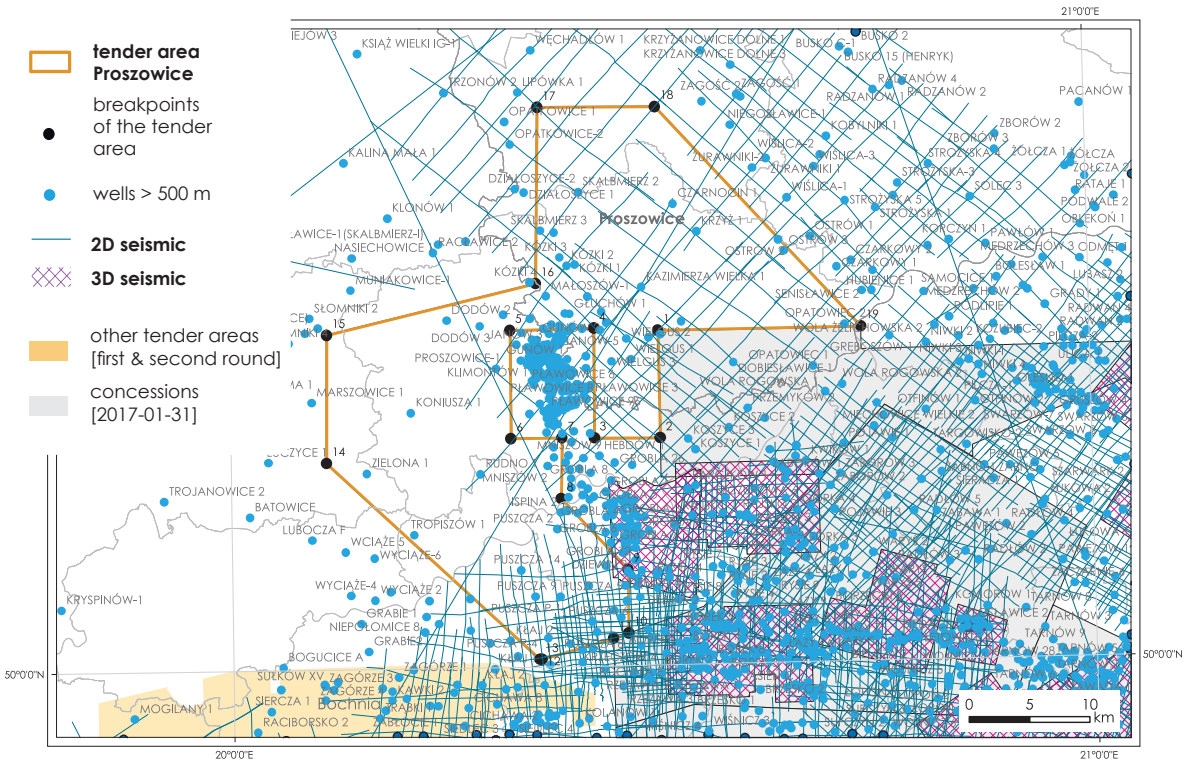
**Type of deposit:**  
Conventional for oil  
and natural gas

**Area name:** Proszowice

**Location:** onshore, part of Ministry of the Environment concession blocks: 373, 374 and 393; in areas of the following counties and communes: **Małopolskie province:** Kraków county, communes: Słomniki (participation in the concession area 2.04%), Kocmyrzów-Luborzyca (3.97%), Igołomia-Wawrzeńczyce (6.30%), Kraków county, urban commune Kraków (0.29%), Proszowice county, communes: Radziemice (3.57%), Patecznica (2.74%), Koniusza (10.81%), Proszowice (7.17%), Nowe Brzesko (2.94%), Koszyce (0.18%), Wieliczka county, communes: Niepołomice (3.86%), Kłaj (2.29%), Bochnia county, communes: Drwinia (7.05%), Bochnia (0.98%), Dąbrowa Tarnowska county, commune Gręboszów (0.01%); **Świętokrzyskie province:** Pińczów county, communes: Michałów (0.04%), Pińczów (1.47%), Działoszyce (5.47%), Złota (3.43%), Kazimierza Wielka county, communes: Skalbierz (8.81%), Czarnocin (8.43%), Kazimierza Wielka (12.44%), Bejsce (1.80%), Opatowiec (3.91%), Busko Zdrój county, commune Wiślica (< 0.1%)

**Concession type:** prospecting and exploration of hydrocarbon deposits and extracting hydrocarbons from deposits

**Duration:** concession for 10 years, therein: prospecting and exploration phase (5 years) extracting phase – after the investment decision



# INFORMATION SHEET FOR TENDER BLOCK PROSZOWICE

Licensing rounds:  
information and opportunities  
2017

## ◀ ROUND 1

### Participation:

winner of the tender  
(an entity or a consortium) **100%**

### Petroleum play:

Paleozoic-Mesozoic

### Reservoir rock:

Cenomanian glauconitic sandstone  
and Oxfordian detrital limestone

### Thickness of overburden:

350-750 m

### Completed seismic surveys (owner):

1975 Kazimierza Wielka-Dąbrowa Tarnowska 2D  
(State Treasury)  
1977-1978 Bochnia-Czchów-Pilzno 2D  
(State Treasury)  
1987-1988 Kazimierza Wielka-Pińczów-Nowy Korczyn  
2D (State Treasury)  
1987-1988 Niepołomice-Gdów-Myślenice 2D (State  
Treasury)  
1989-1990 Kazimierza Wielka-Pińczów-Nowy Korczyn  
2D (PGNiG)  
1991-1993 Słomniki-Pińczów 2D (PGNiG)  
1993 Liplas-Grobla-Żukowice 2D (PGNiG)  
2003 Puszca-Krzeczów-Borek 2D  
(State Treasury)

### The proposed minimum work program of prospecting and exploration phase:

Stage I (12 months) – interpretation and analysis of  
archival geological data

Stage II (12 months) – execution of 2D seismic survey  
(100 km) or drilling of one well to the depth  
of 2,000 m (TVD) with obligatory coring of perspec-  
tive intervals

Stage III (24 months) – drilling of one well to the  
depth of 2,000 m (TVD) with obligatory coring of  
perspective intervals

Stage IV (12 months) – performance analysis  
of the data obtained

### Structural level:

Cenozoic; Mesozoic  
Paleozoic

### Source rock:

Ordovician, Silurian, Devonian, Carboniferous  
and Middle Jurassic

### Seal rock:

Upper Cretaceous marls and Miocene Krakowieckie Bed  
(Carpathian Foredeep)

### Trap type:

structural

### Key wells (MD):

Puszca-14 (1,642 m), Dodów 2 (1,267 m), Kózki 1 (800 m)

### The deposits identified in the vicinity [GZ – gas; RN – oil]

**Pławowice (RN)** – discovered in 1964, cumulative production (50 years) 610.71 ktonnes; 2014 production: 4.58 ktonnes, reserves: recoverable 92.49 ktonnes (economic reserves in place 20.13 ktonnes); **Grobla (RN)** – discovered in 1962, cumulative production (52 years) 2,822.59 ktonnes and 145.02 million m<sup>3</sup> associated gas; 2014 production: 4.43 ktonnes, reserves: recoverable 48.30 ktonnes (economic reserves in place 21.05 ktonnes); **Mniszów (RN)** – discovered in 1966, not operated; **Dąbrowka (GZ)** – discovered in 1976, cumulative production (38 years) 425.35 million m<sup>3</sup>; 2014 production: 1.23 million m<sup>3</sup>, reserves: recoverable 30.85 million m<sup>3</sup> (economic reserves in place: 8.02 million m<sup>3</sup>); **Grądy Bocheńskie (GZ)** – discovered in 1985, cumulative production (18 years) 166.9 million m<sup>3</sup>; 2014 production: non, reserves: recoverable 39.17 million m<sup>3</sup> (economic reserves in place: 14.05 million m<sup>3</sup>); **Rajsko (GZ)** – discovered in 1997, cumulative production (3 years) 20.63 million m<sup>3</sup>; 2014 production: 6.73 million m<sup>3</sup>, reserves: recoverable 142.37 million m<sup>3</sup> (economic reserves in place: 54.37 million m<sup>3</sup>); **Rylowa (GZ)** – discovered in 1988, cumulative production (4 years) 66.46 million m<sup>3</sup>; 2014 production: 27.11 million m<sup>3</sup>, reserves: recoverable 478.54 million m<sup>3</sup> (economic reserves in place: 175.16 million m<sup>3</sup>); **Rysie (GZ)** – discovered in 1985, cumulative production (25 years) 75.81 million m<sup>3</sup>; 2014 production: 0.74 million m<sup>3</sup>, reserves: recoverable 15.96 million m<sup>3</sup> (economic reserves in place: 1.47 million m<sup>3</sup>); **Szczepanów (GZ)** – discovered in 1990, cumulative production (16 years) 707.24 million m<sup>3</sup>; 2014 production: 9.87 million m<sup>3</sup>, reserves: recoverable 206.96 million m<sup>3</sup> (economic reserves in place: 116.62 million m<sup>3</sup>); **Łazy (GZ)** – discovered in 1995, cumulative production (7 years) 12.48 million m<sup>3</sup>; 2014 production: non, reserves: recoverable 13.40 million m<sup>3</sup> (economic reserves in place: non); **Łętowice-Bogumiłowice (GZ)** – discovered in 1993, cumulative production (18 years) 137.58 million m<sup>3</sup>; 2014 production: 0.40 million m<sup>3</sup>, reserves: recoverable 110.87 million m<sup>3</sup> (economic reserves in place: 21.15 million m<sup>3</sup>)

# NO.7 TENDER BLOCK

Licensing rounds:  
information and opportunities  
2017

## RYKI ◀ ROUND 1

The petroleum system in the “Ryki” tender area is developed in the Devonian, Mississippian and Pennsylvanian intervals of the Lublin Basin. Three oil-fields (Świdnik, Glinik, and Stężycza) and five gas-fields (Minkowice, Ciecierzyn, Mełgiew B, Mełgiew A, and Stężycza) have been discovered in the neighborhood of the area, so far. The Pennsylvanian Stężycza field is conventional accumulation of oil and gas trapped in Maciejowice – Dęblin – Abramów anticline, in which hydrocarbons are accumulated in porous alluvial sandstones, sealed by fine-grained alluvial-plain facies.

In the Devonian, the oil-field accumulation occurs in the Glinnik field in thin-layered sandstones and siltstones of the Famennian age. They are sealed by the Visean fine-grained clastics. The saturated horizon reaches 4.3 m in thickness, and the trap area is about 0.6 km<sup>2</sup>. Numerous hydrocarbon shows, as well as the presence of the intergranular- and fracture-type porosities in the Upper Devonian carbonates (Mełgiew fields) indicate also the possibility of the tight-gas accumulations in the tender area.



**Area name:** Ryki

**Location:** onshore, part of Ministry of the Environment concession blocks: 276, 277, 296 and 297; in areas of the following counties and communes: **Mazowieckie province:** Kozienice county, communes: Gniewoszków (participation in the concession area 2.53%), Sieciechów (0.19%), Kozienice (0.07%), Garwolin county, commune Trojanów (6.82%); **Lubelskie province:** Ryki county, communes: Kłoczew (4.10%), Ryki (16.01%), Stężycza (6.77%), Dęblin (3.91%), Nowodwór (1.39%), Ułęż (5.24%), Lubartów county, communes: Michów (0.82%), Abramów (4.94%), Puławy county, communes: Baranów (7.85%), Żyrzyn (13.34%), Puławy (8.56%), urban Puławy (2.79%), Końskowola (5.94%), Kurów (8.15%), Natęczów (0.18%), Markuszów (0.41%)

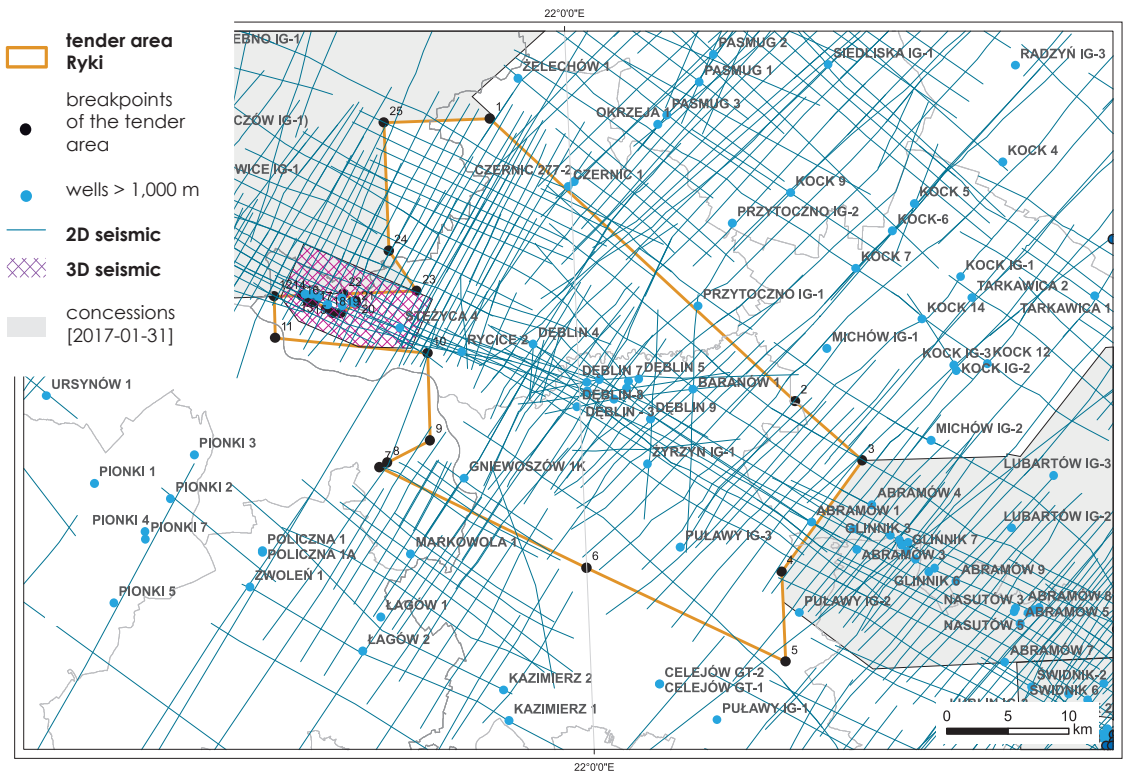
**Concession type:** prospecting and exploration of hydrocarbon deposits and extracting hydrocarbons from deposits

**Duration:** concession for 10 years, therein: prospecting and exploration phase (5 years) extracting phase – after the investment decision

**Type of deposit:** I - conventional for oil and gas II - unconventional for gas

**Acreage:**  
968.69 km<sup>2</sup>  
239,368 acres

20



# INFORMATION SHEET FOR TENDER BLOCK

Licensing rounds:  
information and opportunities  
2017

## RYKI ◀ ROUND 1

### Participation:

winner of the tender  
(an entity or a consortium) **100%**

### Petroleum play:

I – Upper Paleozoic (Devonian + Carboniferous)  
II – Paleozoic (Frasnian)

### Reservoir rock:

I – Upper Carboniferous clastic rocks  
and Famennian sandstones  
II – Frasnian limestones

### Thickness of overburden:

from 1,150 m in SE part to 1,500 m in NW part

### Completed seismic surveys (owner):

1974 Rów Lubelski 2D (State Treasury)  
1979-1981, 1983-1986, 1988-1989 Tłuszcz-Dęblin-Lublin 2D  
(State Treasury)  
1985 Wilga-Abramów 2D (State Treasury)  
1989, 1991, 1993-1994 Tłuszcz-Dęblin-Lublin 2D (PGNiG)  
1989-1992 Wilga-Abramów 2D (PGNiG)  
1992, 1994, 1996 Żelechów-Radzyn Podlaski-Kock 2D (PGNiG)  
1993 Żelechów-Radzyn Podlaski 2D (PGNiG)  
1995-1997 Ryki-Żyrzyn 2D (PGNiG)  
1998 Radość-Zamość 2D (Apache)  
1999 Rycice 2D (Apache)  
2003-2004 Pionki-Kazimierz 2D (State Treasury)  
2003 Strych-Stężycza 2D (State Treasury)  
2004 Pionki-Kazimierz 3D (State Treasury)  
2005 Kock-Tarkawica 2D (State Treasury)  
2011 Czernic-Ryki 2D (PGNiG)

### The proposed minimum work program of prospecting and exploration phase:

Stage I (12 months) – interpretation and analysis of archival  
geological data  
Stage II (12 months) – execution of 2D seismic survey (100 km)  
or drilling of one well to the depth of 5,000 m (TVD) with  
obligatory coring of perspective intervals  
Stage III (24 months) – drilling of one well to the depth of  
5,000 m (TVD) with obligatory coring of perspective intervals;  
Stage IV (12 months) – performance analysis of the data  
obtained

### Structural level:

Cenozoic; Mezozoic  
Paleozoic

### Source rock:

I – Devonian (Frasnian and Famennian) and Carbonif-  
erous fine-grained clastic rocks  
II – Frasnian limestones

### Seal rock:

I – Devonian and Carboniferous fine-grained clastic  
rocks  
II – Frasnian limestones

### Trap type:

Structural, stratigraphic, structural-stratigraphic

### Key and offset wells (MD):

**Key wells:** Abramów 1 (4,825.8 m), Dęblin 8 (2,928.1 m)  
**Offset wells:** Stężycza 1 (3,724 m)

### The deposits identified in the vicinity [

**GZ – gas; RN – oil]**

**Glinnik (RN)** – discovered in 1991, cumulative produc-  
tion 6.17 ktonnes; 2014 production: 0.34 ktonnes,  
reserves: recoverable 8.0 ktonnes (economic reserves  
in place: 5.39 ktonnes), associated gas - cumulative  
production 0.6 million m<sup>3</sup>; 2014 production:  
0.04 million m<sup>3</sup>, reserves: recoverable 0.68 million m<sup>3</sup>  
(economic reserves in place: 0.52 million m<sup>3</sup>)

**Stężycza (GZ)** – discovered in 2002, cumulative produc-  
tion 404.33 million m<sup>3</sup>; 2014 production: 0.69 million m<sup>3</sup>,  
reserves: recoverable 402.88 million m<sup>3</sup> (economic  
reserves in place: 106.42 million m<sup>3</sup>)

**Świdnik (RN)** – discovered in 1982, operated in years  
1998-2003; cumulative production 9.52 ktonnes and  
0.71 million m<sup>3</sup> associated gas

**Ciecierzyn (GZ)** – discovered in 1988, cumulative pro-  
duction 171.59 million m<sup>3</sup> (from 2000); 2014 production:  
15.24 million m<sup>3</sup>, reserves: recoverable 472.32 million m<sup>3</sup>  
(economic reserves in place: 259.88 million m<sup>3</sup>)

Mełgiew A and B (GZ) – discovered in 1997, cumula-  
tive production 451.57 million m<sup>3</sup> (from 2003); 2014  
production: 23.13 million m<sup>3</sup>, reserves: recoverable  
800.43 million m<sup>3</sup> (economic reserves in place:  
172.59 million m<sup>3</sup>)







**ROUND 2**  
**10 (8-17) TENDER**  
**BLOCKS**

480  
T-010

# NO.8 TENDER BLOCK BOCHNIA ◀ ROUND 2

Licensing rounds:  
information and opportunities  
2017

The hydrocarbon potential of the "Bochnia" tender area is confirmed by numerous hydrocarbon deposits discovered in the Miocene molasses of the Carpathian Foredeep and in the Jurassic and Cretaceous basement in the neighborhood areas. At least two conventional working petroleum systems occur at the area. The first one is related to the biogenic gases generated and accumulated continuously during the sedimentation of fine- and coarsegrained clastic deposits in the Carpathian Foredeep, favoring the formation of multi-horizontal stratigraphic traps.

The second petroleum system occurs below, at depths between 500 and 4,500 m. Apart from the Jurassic and Cretaceous strata, high porosity was observed also in the Cambrian and Lower Devonian sandstones and in the Middle and Upper Devonian carbonates, while only the Middle Jurassic claystones are supposed to be the effective source rocks in the local geologic profile. The migration of gases from the neighboring areas should also be considered in this case.



**Area name:** Bochnia

**Location:** onshore, part of Ministry of the Environment concession blocks: 393, 412, 413; in area of the following counties and communes: **Malopolskie province:** Kraków county, communes: Skawina (participation in the concession area 1.7%), Mogilany (11.50%), Świątynki Górne (4.85%), Kraków city county: commune: Kraków (6,13%); Wieliczka county, communes: Wieliczka (23.53%), Niepołomice (5.57%), Kłaj (13.88%), Biskupice (15.53%), Gdów (9.36%); Bochnia county: commune: Bochnia (5.53%), Bochnia (city) (2.41%)

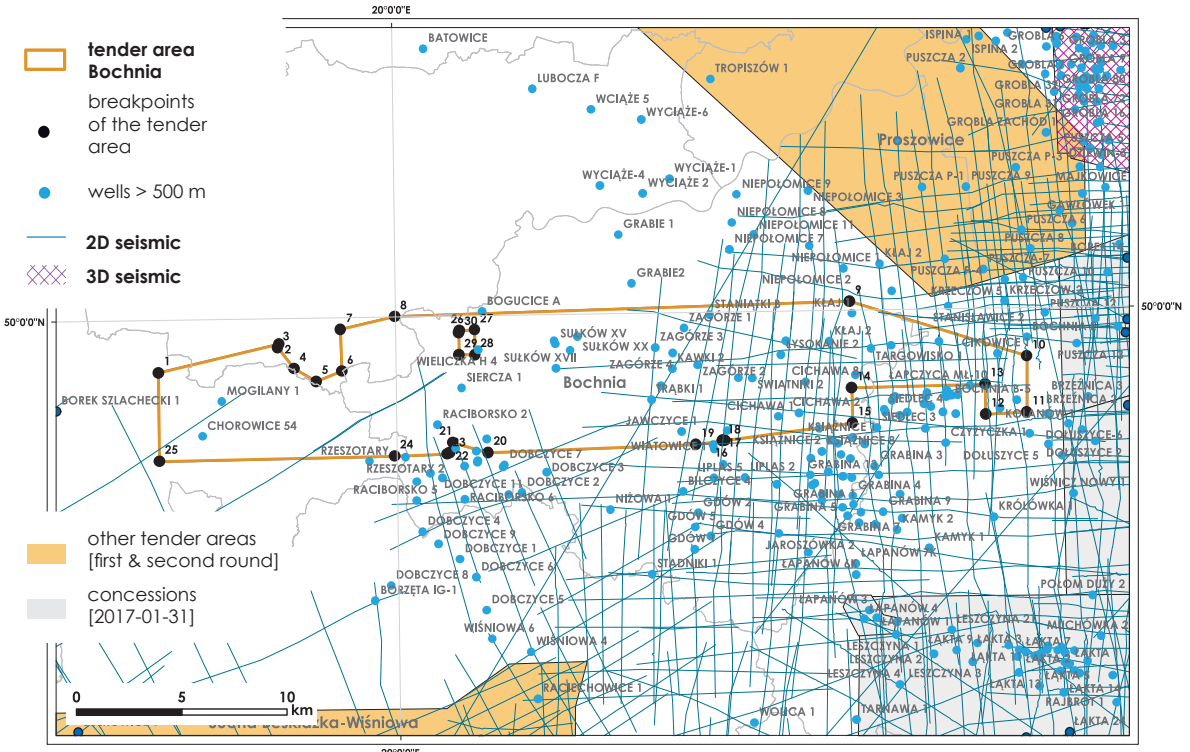
**Commune type:** prospecting and exploration of hydrocarbons deposits and extracting hydrocarbons from deposit

**Duration:** concession for 10 years, therein: Prospecting and exploration phase (5 years)  
Extracting phase – after the investment decision

**Type of deposit:** Conventional for natural gas

24

**Acreage:**  
218.9 km<sup>2</sup>  
54.092 acres



# INFORMATION SHEET FOR TENDER BLOCK

Licensing rounds:  
information and opportunities  
2017

## BOCHNIA ◀ ROUND 2

### Participation:

winner of the tender  
(an entity or a consortium) **100%**

### Petroleum play:

I – Petroleum system of the Paleozoic and Mesozoic basement  
II – Petroleum system of the Carpathian Nappes  
III – Petroleum system of the autochthonous Miocene in Carpathian Foredeep

### Reservoir rock:

I – Cambrian sandstones, Lower Devonian limestones and dolomites; Upper Devonian limestones and dolomites  
Permo - Triassic sandstones; Upper Jurassic limestones, Cenomanian Sandstones  
II – Silesian Unit flysch; Grodzisk beds, Wierzowice beds, Lgota beds, sandstones of Ciężkowice, Menilite and Krosno beds  
III – clastic rocks of the autochthonous Miocene, Badenian and Sarmathian

### Thickness of overburden:

I – Petroleum system of the Paleozoic and Mesozoic basement: claystones of the autochthonous Miocene, Badenian evaporates and locally flysch of the Silesian and Subsilesian Units 500 – 1,000 m  
II – Petroleum system of the Carpathian Nappes: impermeable fine-grained flysch rocks 0 – 100 m  
III – Petroleum system of the autochthonous Miocene in Carpathian Foredeep locally flysch of the Silesian and Subsilesian Units, claystones of the autochthonous Miocene, locally Badenian evaporates, generally 100 - 500 m

### Completed seismic surveys (owner):

1976 Brzesko-Pilzno-Olszyny, Geofizyka Kraków Sp. z o.o., Kraków (State Treasury)  
1977 Bochnia-Czchów-Tarnów, Geofizyka Kraków Sp. z o.o., Kraków, (State Treasury)  
1978 Górnośląskie Zagłębie Węglowe, Przeds. Bad.Geofiz., Warszawa, (State Treasury)  
1978 Żywiec-Wadowice-Gdów, Geofizyka Kraków Sp. z o.o., Kraków, (State Treasury)  
1992 Dobczyce-Gdów-Wolica, Geofizyka Kraków Sp. z o.o., Kraków, (PGNiG, Warszawa)  
1993 Liplas-Grobla-Żukowice, [Liplas-Grobla], Geofizyka Kraków Sp. z o.o., Kraków, (PGNiG, Warszawa)  
1993 Liplas-Puszcza, (Liplas-Grobla-Żukowice), Geofizyka Kraków Sp. z o.o., Kraków, (PGNiG, Warszawa)  
1994 Lachowice-Myślenice, Geofizyka Kraków Sp. z o.o., Kraków, (PGNiG, Warszawa)  
2003 Puszcza-Krzeczów-Borek, Geofizyka Kraków Sp. z o.o., Kraków, (PGNiG, Warszawa)  
2004 Kamyk-Niepołomice, Geofizyka Kraków Sp. z o.o., Kraków, (PGNiG, Warszawa)  
1987-1989 Niepołomice-Gdów-Myślenice, Geofizyka Kraków Sp. z o.o., Kraków, (State Treasury)

### Structural level:

Carpathian Orogenic Belt, West European Platform

### Source rock:

I – Petroleum system of the Paleozoic and Mesozoic basement: Middle Jurassic mudstones and claystones, possible migration from southern areas  
II – Petroleum system of the Carpathian nappes: Lower Cretaceous Cieszyn shales, Wierzowice shales, Grodzisk shales, Lgota shales, Oligocene minilite shales of all units  
III – Petroleum system of the autochthonous Miocene in Carpathian Foredeep: Shale horizons within the Miocene basin infill

### Seal rock:

I, III – Fine-grained rocks of the autochthonous Miocene of the Carpathian Foredeep, Badenian evaporates, fine-grained flysch rocks which isolates hydrocarbons within rocks of the Miocene of the Carpathian  
II – Foredeep and coarse-grained clastic rocks within flysch succession

### Trap type:

I – Petroleum system of the Paleozoic and Mesozoic basement: structural, stratigraphical  
II – Petroleum system of the Carpathian Nappes: structural, structural-lithological, lithological  
III – Petroleum system of the autochthonous Miocene in Carpathian Foredeep: structural, compaction anticlines

### Key and offset wells (MD):

Cichawa 8 1 (1,029 m); Cikowice 1 (1,465.5 m)  
Trąbki 1 (862 m); Mogilany 1 (2,500 m)

25

# INFORMATION SHEET FOR TENDER BLOCK

Licensing rounds:  
information and opportunities  
2017

## BOCHNIA ◀ ROUND 2

### The proposed minimum work program of prospecting and exploration phase:

Stage I (12 months) – reprocessing and reinterpretation of archival seismic 2D data

Stage II (12 months) – acquisition 50 km<sup>2</sup> of new 3D seismic survey or 50 km of 2D survey

Stage III (24 months) – drilling of one exploration well to depth of 1,100 m (TVD) with with obligatory coring of perspective intervals and performing the wireline logging program, allowing to interpret the lithology, saturation and petrophysical parameters of hydrocarbon bearing zones, and also to perform the drilling process safe

Perform the exploration tests in previously found zones and estimate the production parameters in case of discovery

Stage IV (12 months) – analysis of obtained data

### The deposits identified in the vicinity

#### [GZ-gas; RN-oil]

**Grabina – Nieznanowice (GZ)** – discovered in 1972, cumulative production (37 years) 161.25 million m<sup>3</sup>; anticipated economic resources: 328 million m<sup>3</sup>, production in 2015: 1.96 million m<sup>3</sup>, economic resources in place 12.96 million m<sup>3</sup>, sub-economic (marginal) resources: 431.77 million m<sup>3</sup>

**Grabina – Nieznanowice S (GZ)** – discovered in 1987, cumulative production (22 years) 17.25 million m<sup>3</sup>; anticipated economic resources: 205.74 million m<sup>3</sup>, production in 2015: 1.96 million m<sup>3</sup>, economic resources in place 110.54 million m<sup>3</sup>, sub-economic (marginal) resources: 95.2 million m<sup>3</sup>

**Łapanów (GZ)** – discovered in 2008, cumulative production (2 years) 18.04 million m<sup>3</sup>, in 2015 production 17.92 million m<sup>3</sup>, exploitable resources (economic resources in place: 307.28 million m<sup>3</sup>)

**Łąka (GZ, RN)** – discovered in 1971, cumulative production of natural gas from gas-bearing horizons (40) 96.15 million m<sup>3</sup>, natural gas from condensate-bearing horizons (28 years) 721.38 million m<sup>3</sup>, condensate (30 years) 50.54 tonnes, in 2015 production of natural gas 3.02 million m<sup>3</sup>, crude oil - none, exploitable resources of natural gas 211.72 million m<sup>3</sup>, condensate 4.58 tonnes

**Raciborsko (GZ)** – discovered in 1978, cumulative production (37 years) 25.75 million m<sup>3</sup>, production in 2015: 0.22 million m<sup>3</sup>, anticipated economic resources: 431.65 million m<sup>3</sup>, economic resources in place 16.31 million m<sup>3</sup>

# THE GRANTING OF A CONCESSION

## One concession instead of three

As a rule, a concession is granted for a period of 10 to 30 years and is divided into 2 phases:

1. prospecting and exploration phase (which lasts 5 years and can be extended for another 2 years)
2. production phase.

The period for which a concession is granted depends on the size of a block and the assessment of the prospects of a given deposit

In the case where a deposit is partly documented, it is also provided that the hydrocarbon production from the deposit can be started even as the prospecting and exploration phase is still underway (the so-called phased in deposit documentation). The condition for the start of production is the award of an investment decision.

## Joint application for a concession

In the case where entities jointly obtain a concession, they implement it in accordance with the terms and conditions set out in the cooperation agreement signed among them.

At the stage of the submission of a joint offer in the tender procedure, the entities must define a percentage share of each of them in the costs in case they win the tender and indicate one operator. The operator's percentage share in the costs of geological works, including geological operations, or mining operations, should be more than 50%.

The operator is an entrepreneur obliged to implement its rights and obligations under the concession granted with respect to the public administration authorities and liable with respect to these authorities and third parties, as well as authorised to represent the other entrepreneurs to which the concession has been granted, under the principles laid down in the Act.



# INFORMATION SHEET FOR TENDER BLOCK

## BZIE-DĘBINA – STRUMIEŃ

Licensing rounds:  
information and opportunities  
2017

## ◀ ROUND 2

### Participation:

winner of the tender  
(an entity or a consortium) **100%**

### Petroleum play:

Unconventional

### Reservoir rock:

Upper Mississippian to Lower Pennsylvanian

### Thickness of overburden:

1,000 – 1,500 m

### Completed seismic surveys (owner):

1977-1979, Zebrzydowice-Bzie-Dębina 2D  
(State Treasury)

### The proposed minimum work program of prospecting and exploration phase:

Stage I (12 months) – interpretation and analysis of archival geological data

Stage II (12 months) – drilling of two wells to the minimum depth of 1,600 m with obligatory coring of perspective intervals

Stage III (24 months) – drilling of three wells to the minimum depth of 1,600 m with obligatory coring of perspective intervals

Stage IV (12 months) – performance analysis of the obtained data

### Structural level:

Paleozoic (Carboniferous)

### Source rock:

Upper Mississippian to Lower Pennsylvanian

### Seal rock:

Miocene (Skawina Formation)

### Trap type:

lithological

### Key and offset wells (MD):

**Key wells:** Bzie-Dębina 2/91,-3/91 (1,552.3-1,610.0 m), Bzie-Dębina 3,-4,-7,-8,-13,-16,-17,-18,-19,-20,-21,-24,-25,-26,-27,-28,-31,-33,-42,-45,-46,-47,-48,-49,-50,-51,-52,-54,-55,-60,-61 (1,345.0-1,856.0 m), Pawłowice 18,-19 (1,484.0-1,545.0 m), Zebrzydowice-7,-8,-9,-10 (1,492.0-1,930.2 m)

**Offset wells:** Bzie-Dębina 14,-15,-22,-23 (1,500.0-1,716.4 m), Bzie-Dębina TEXACO A (970.0 m), Golasowice I (1,260.0 m), Jarząbkowice 1 (4,028.0 m), Pielgrzymowice IG-55 (1,250.0 m), Pruchna IG-56 (1,250.5 m), Zebrzydowice 1,-2, -4, -5, -6, -R1, IG-53 (905.0-1,622.3 m)

### The deposits identified in the vicinity [VCBM - CBM as the main mineral commodity, CMM - CBM as the accompanying mineral commodity]

**Bzie-Dębina 1 – Zachód (CMM)** – reserves: recoverable 1,314.1 million m<sup>3</sup>

**Bzie-Dębina 1 (CMM)** – reserves: recoverable 398.38 million m<sup>3</sup>

**Bzie-Dębina (CMM)** – reserves: recoverable 5,371.3 million m<sup>3</sup>

**Pawłowice – rej. (CMM)** – reserves: recoverable 1,708.60 million m<sup>3</sup>

**Zebrzydowice (VCBM)** – reserves: recoverable 1,424.75 million m<sup>3</sup>

**Bzie-Dębina 2 Zachód (CMM)** – 2015 production: none, emissions: 2.42 million m<sup>3</sup>, reserves: recoverable 276.8 million m<sup>3</sup> (economic reserves in place 26.82 million m<sup>3</sup>)

**Zofiówka (CMM)** – 2015 production: 17.04 million m<sup>3</sup>, emissions: 27.02 million m<sup>3</sup>, reserves: recoverable 736.96 million m<sup>3</sup> (economic reserves in place 347.01 million m<sup>3</sup>)

**Pniówek (CMM)** – 2015 production: none, emissions: 2.63 million m<sup>3</sup>, reserves: recoverable 3,108.42 million m<sup>3</sup> (economic reserves in place 659.23 million m<sup>3</sup>)

**Pawłowice 1 (CMM)** – 2015 production: 42.8 million m<sup>3</sup>, emissions: 77.09 million m<sup>3</sup>, reserves: recoverable 1,627.34 million m<sup>3</sup> (economic reserves in place 228.23 million m<sup>3</sup>)

# NO.10 TENDER BLOCK DAMNICA

Licensing rounds:  
information and opportunities  
2017

## ROUND 2

"Damnica" tender area is dedicated to the exploration of unconventional prospects within the onshore part of the Baltic Basin. Shale oil and shale gas prospective intervals include the Upper Cambrian (Furongian), Ordovician (Caradocian) and Silurian (Llandovery) strata. Tight oil opportunities are also considered in the Middle Cambrian sandstone. Lower Paleozoic shales constitute both source and reservoir rocks sealed by the overlying shales and Permian evaporates, while Middle Cambrian sandstone is another reservoir

rock documented by four historical conventional oil field discoveries (Żarnowiec, Żarnowiec W, Dębki, Białogóra E) in the vicinity of the tender area. Shale gas production rates reported at Warblino site (2011) on "Damnica" tender area and exploration sites on the neighboring "Żarnowiec" tender area are believed to be a good prognostics for future continuation of shale gas prospecting on the „Damnica" tender area.



**Area name:** Damnica

**Location:** onshore, part of Ministry of the Environment concession blocks: 7, 8, 27, 28, 47, 48; in area of the following counties and communes: **Pomorskie province:** Słupsk county, communes: Ustka (participation in the concession area 7.40%), Smołdzino (25.01%), Słupsk (9.48%), Główny (30.57%), Damnica (10.15%), Potęgowo (7.17%), Słupsk city county: commune Słupsk (0.50%); Łębork county: communes Nowa Wieś Łęborska (2.19%), Wicko (6.51%), Łeba (1.02%)

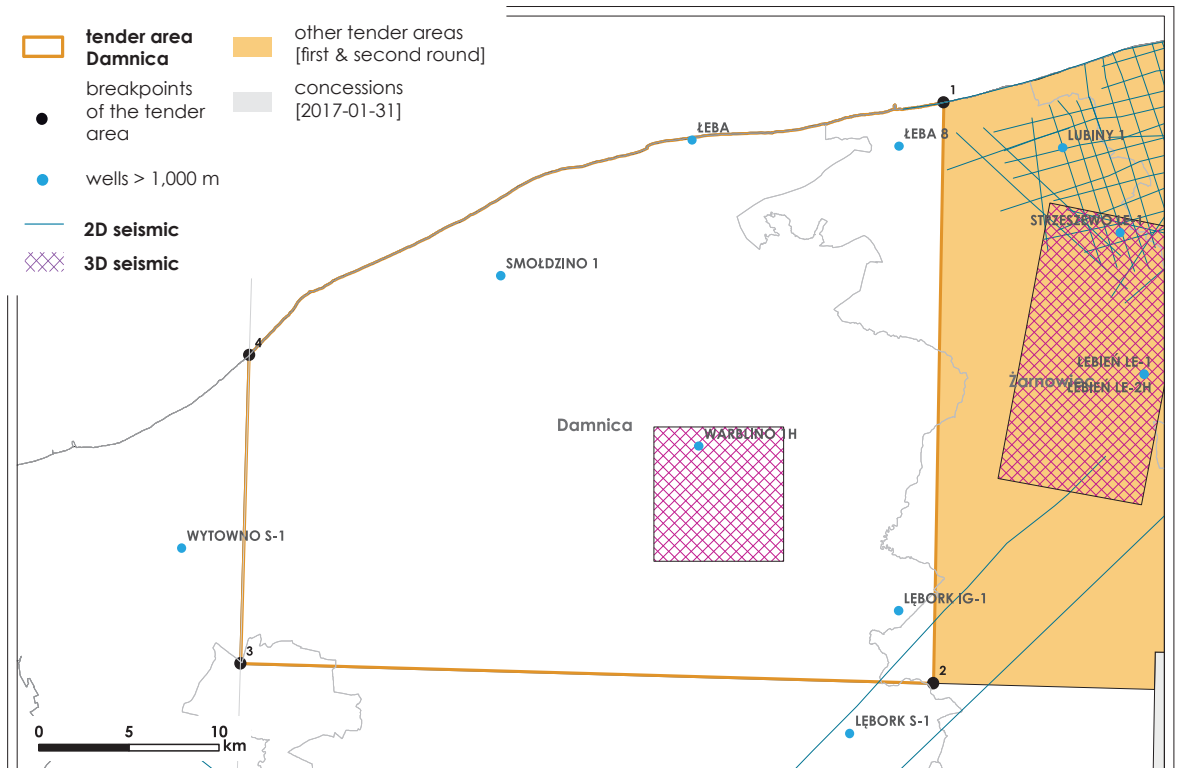
**Concession type:** prospecting and exploration of hydrocarbon deposits and extracting hydrocarbons from deposits

**Duration:** concession for 10 years, therein: Prospecting and exploration phase (5 years)  
Extracting phase – after the investment decision

**Type of deposit:** Unconventional for natural gas and oil, conventional for natural gas and oil

**Acreage:**  
1,039.29 km<sup>2</sup>  
256,814 acres

30





# INFORMATION SHEET FOR TENDER BLOCK

## DAMNICA ◀ ROUND 2

Licensing rounds:  
information and opportunities  
2017

### Participation:

winner of the tender  
(an entity or a consortium) **100%**

### Petroleum play:

I – Unconventional petroleum system of the Lower Paleozoic rocks  
(Upper and Middle Cambrian, Ordovician, Silurian)  
II – Conventional petroleum system of the Middle Cambrian  
sandstones

### Reservoir rock:

I – Upper Cambrian, Ordovician and Silurian claystones and mud-  
stones  
II – Middle and Lower Cambrian sandstones

### Thickness of overburden:

Average 2,990 m (value for well Łębork IG 1)

### Key and offset wells (MD):

Łębork IG 1 (3,310.0 m); Łeba 8 (3,340.0 m)

### Completed seismic surveys (owner):

1959 Ustka – Kołobrzeg (State Treasury)  
1960 Ustka – Łeba (State Treasury)  
1968 Darłowo-Stupsk-Łeba (State Treasury)  
1971 Darłowo – Wejherowo (State Treasury)  
1972 Ustka - Łeba, Żarnowiec – Władysławowo (State Treasury)  
1987 Kostrzyn – Łębork (State Treasury)  
2011 Damnica 3D (State Treasury)  
2011 PL1-5,600 accomplished within the project Poland SPAN

### The proposed minimum work program of prospecting and exploration phase:

Stage I (12 months) – reprocessing and reinterpretation of archival  
seismic 2D data and geological data

Stage II (36 months) – drilling of one exploration well to 3,000 m  
(TVD) with mandatory coring of prospective intervals and with  
performing the wireline logging program, allowing to interpret the  
lithology, saturation and petrophysical parameters of hydrocarbon  
bearing zones, and also to perform the drilling process safe

Perform the exploration tests in previously found zones and estima-  
te the production parameters in case of discovery

Drilling second exploration well to 3,000 m (TVD) with mandato-  
ry coring of prospective intervals and with performing the wireline  
logging program, allowing to interpret the lithology, saturation and  
petrophysical parameters of hydrocarbon bearing zones, and also  
to perform the drilling process safe

Perform the exploration tests in previously found zones and estima-  
te the production parameters in case of discovery

Stage III (12 months) – analysis of obtained data

### Structural level:

Lower Paleozoic; Upper Paleozoic  
Permo-Mesozoic

### Source rock:

I, II – Upper Cambrian, Ordovician and Silurian  
claystones and mudstones

### Seal rock:

I, II – Zechstein evaporate sedimentary rocks;  
Upper  
Cambrian, Ludlow and Pridol (Silurian) claystones  
and mudstones (secondary seal complex)

### Trap type:

I – Unconventional traps  
II – Conventional structural and stratigraphic traps

### The deposits identified in the vicinity

#### [GZ – gas; RN – oil]:

„Żarnowiec” (RN) – discovered in 1972, cumulative  
production (44 years) 9.721 thousand tonnes (kton-  
nes) of condensate, natural gas associated:  
26.93 million m<sup>3</sup>; in 2015 production 0.11 ktonnes of  
condensate, natural gas associated: 0.07 million  
m<sup>3</sup>; exploitable resources 42.33 ktonnes, (economic  
resources in place 1.68 ktonnes); 6.96 million m<sup>3</sup>,  
(economic resources in place 1.39 million m<sup>3</sup>)

„Żarnowiec W” (RN) – discovered in 1990, cumula-  
tive production (21 years) 4.2 ktonnes of conden-  
sate, natural gas associated: 25.65 million m<sup>3</sup>; in  
2015 production 0.11 ktonnes of condensate, natu-  
ral gas associated: 0.07 million m<sup>3</sup>; exploitable reso-  
urces 17.81 ktonnes, (economic resources in place  
3.85 ktonnes); 2.35 million m<sup>3</sup>, (economic resources  
in place 1.50 million m<sup>3</sup>)

„Dębki” (RN) – discovered in 1978, cumulative pro-  
duction (44 years) 36.169 ktonnes of crude oil,  
natural gas associated: 10.201 million m<sup>3</sup>; in 2015  
production 0.61 ktonnes of crude oil, natural gas  
associated 0.22 million m<sup>3</sup>; exploitable resources  
8.62 ktonnes, (economic resources in place  
5.19 ktonnes); 3.0 million m<sup>3</sup> (economic resources  
in place 4.23 million m<sup>3</sup>)

„Białogóra-E” (RN) – discovered in 1991, cumula-  
tive production (16 years) 2.917 ktonnes of crude oil,  
natural gas associated: 2.4185 million m<sup>3</sup>; in 2015  
production - none; anticipated sub-economic  
resources 1.43 ktonnes, (economic resources in  
place 0.38 ktonnes); anticipated sub-economic  
resources 0.86 million m<sup>3</sup>, (economic resources in  
place 1.02 million m<sup>3</sup>)

# NO.11 TENDER BLOCK DEBRZNO – CZŁUCHÓW ◀ ROUND 2

Licensing rounds:  
information and opportunities  
2017

The “Debrzno-Człuchów” tender area is located on the edge of East European Craton and Paleozoic-Mesozoic platform margin zone, which is widely considered as prospection target. The hydrocarbon prospects of the “Debrzno-Człuchów” tender area are associated with complex and multistage petroleum system. The main hydrocarbon source rocks comprise of the organic-rich fine-grained Ordovician and Silurian formations. In addition, the Upper Devonian and Carboniferous marls, claystones and mudstones, as well as the Zechstein dolomites are consid-

ered secondary source rocks. Lithological, structural, tectonic and stratigraphic traps are expected in the area. Oil and gas are believed to be accumulated in the Devonian and Carboniferous clastic and carbonate rocks, Permian Rotliegend and Zechstein Main Dolomite. A primary seal is formed by the Zechstein anhydrites and salts; moreover the fine-grained Devonian and Carboniferous rocks form intraformation seals. Hydrocarbon deposits have been documented in its wide neighborhood, confirming the potential for oil and gas-exploration.



**Area name:** Debrzno - Człuchów

**Location:** onshore, part of Ministry of the Environment concession blocks: 107, 127; in area of the following counties and communes: **Pomorskie province:** Człuchów county, commune: Czame (participation in the concession area 9.73%), Człuchów urban (1.10%), Człuchów (28.04%), Debrzno (19.29%), Przechlewo (1.94%), Rzeczenica (1.94%), Chojnice county, commune, Chojnice (1.36%); **Wielkopolskie province:** Złotów county, communes: Złotów (1.87%), Lipka (16%), Okonek (0.19%), Zakrzewo (3.44%); **Kujawsko – Pomorskie province:** Sępólno Krajeńskie county, communes: Kamień Krajeński (5.85%), Sępólno Krajeńskie (4.78%)

**Concession type:** prospecting and exploration of hydrocarbon deposits and extracting hydrocarbons from deposit

**Duration:** concession for 10 years, therein: Prospecting and exploration phase (5 years) Extracting phase – after the investment decision

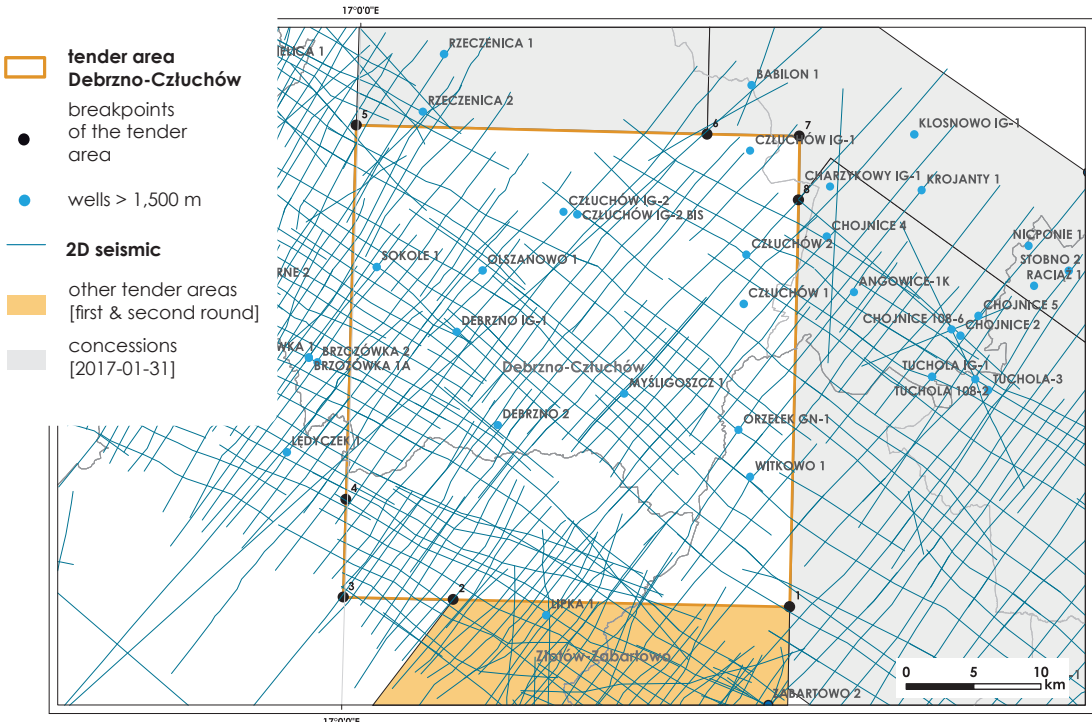
**Type of deposit:** Conventional for natural gas and oil, unconventional for natural gas

32

**Acreage:**

1,158.97 km<sup>2</sup>

286,388 acres



# INFORMATION SHEET FOR TENDER BLOCK DEBRZNO – CZŁUCHÓW ◀ ROUND 2

Licensing rounds:  
information and opportunities  
2017

## Participation:

winner of the tender  
(an entity or a consortium) **100%**

## Petroleum play:

I – Lower Paleozoic (Ordovician), Upper Paleozoic (Devonian, Carboniferous) and Permian (Rotliegend)  
II – Zechstein – Main Dolomite

## Reservoir rock:

I – Devonian sandstones and carbonate rocks, Carboniferous sandstones and minor limestones, Rotliegend sandstones  
II – Zechstein dolomites and limestones

## Thickness of overburden:

>2,000 m

## Key and offset wells (MD):

Człuchów-1 (1,953 m); Debrzno IG-1 (5,010 m)

## Structural level:

Lower Paleozoic; Upper Paleozoic  
Permo-Mesozoic

## Source rock:

I – Ordovician claystones and mudstones, Upper Devonian marls, Lower Carboniferous claystones and mudstones  
II – Main Dolomite beds

## Seal rock:

I, II – Zechstein evaporate sedimentary rocks;  
II – claystones and siltstones complexes intercalated Devonian and Carboniferous reservoirs  
I, II – Lower Paleozoic claystones and mudstones in fault zones

## Trap type:

I – Devonian and Carboniferous – stratigraphic and structural, Rotliegend – structural, tectonic, lithological  
II – Main Dolomite – lithological-facial, structural

## Completed seismic surveys (owner):

1986 Szczecinek – Złotów [Bielica], (State Treasury); 1985 Szczecinek – Chojnice [Szczecinek], (State Treasury)  
1986-1987 Szczecinek – Chojnice [Człuchów – Debrzno], (State Treasury); 1988-1989 Białogard - Czarne – Wilcze [Okonek-Łędyczek], (PGNiG S.A.); 1993 Szczecinek-Złotów [Rzeczynica-Biały Bór], (PGNiG S.A.); 1991 Białogard - Czarne - Wilcze in 1989 year [Chojnice-Kamień Krajeński], (PGNiG S.A.); 1986-1987 Szczecinek – Chojnice [Człuchów – Debrzno], (State Treasury); 1987-1989 Szczecinek - Złotów [Szczecinek - Czarne – Debrzno], (State Treasury); 1989 Białogard - Czarne - Wilcze [Chojnice-Kamień Krajeński], (State Treasury); 1992 Białogard – Czarne - Wilcze, [Tuchola-Wilcze, Sępólno Krajeńskie-Wilcze], (PGNiG S.A.); 1994 Białogard – Czarne - Wilcze [Człuchów-Debrzno-Zabartowo], (PGNiG S.A.), 1994 Opracowanie badań sejsmicznych wykonanych w rejonie Czarne-Łędyczek i Czarne-Zabartowo w latach 1976-1992, interpretacja i reinterpretacja (PGNiG S.A.)

## The proposed minimum work program of prospecting and exploration phase:

Stage I (12 months) – reprocessing and reinterpretation of archival seismic 2D data

Stage II (12 months) – acquisition 100 km<sup>2</sup> of new 3D seismic survey or 80 km of 2D survey

Stage III (24 months) – drilling of one exploration well to 5,200 m (TVD) with mandatory coring of prospective intervals and with performing the wireline logging program, allowing to interpret the lithology, saturation and petrophysical parameters of hydrocarbon bearing zones, and also to perform the drilling process safe

Perform the exploration tests in previously found zones and estimate the production parameters in case of discovery

Stage IV – (12 months) – analysis of obtained data

## The deposits identified in the vicinity

[GZ – gas; RN – oil]:

**Białogard (GZ)** – discovered in 1982, cumulative production – natural gas 595.66 million m<sup>3</sup> (32 years), in 2015 production – natural gas 14.13 million m<sup>3</sup>, exploitable resources of natural gas 59.43 million m<sup>3</sup> (pending evaluation of resources)

**Wierzchowo (GZ)** – discovered in 1971, cumulative production 514.02 million m<sup>3</sup> (42 years), in 2015 production – none, exploitable resources: natural gas 10.78 million m<sup>3</sup>, economic resources in place 10.69 million m<sup>3</sup>

# NO.12 TENDER BLOCK KOSZALIN – POLANÓW ◀ ROUND 2

Licensing rounds:  
information and opportunities  
2017

The hydrocarbon prospects of the “Koszalin-Polanów” tender area are associated with complex petroleum system. The main hydrocarbon source rocks comprise of the organic-rich fine-grained Ordovician formations. In addition, the Upper Devonian and Mississippian marls, claystones and mudstones, as well as the Zechstein dolomites are considered secondary source rocks. Lithological, structural, tectonic and stratigraphic traps are expected in the area. Oil and gas are believed to be accumulated in the Devonian and Mississippian clastic and carbonate rocks, Permian

Rotliegend and Zechstein Main Dolomite. A primary seal is formed by the Zechstein anhydrites and salts, moreover the fine-grained Devonian and Carboniferous rocks form intra-formation seals, whereas the Ordovician shales are considered as additional seal in the fault zones. The “Koszalin-Polanów” tender area is located in the classical platform margin zone, which is considered as prospection target worldwide. Six hydrocarbon deposits have been documented in its wide neighborhood, confirming the potential for oil and gas-exploration.



**Area name:** Koszalin - Polanów

**Location:** onshore, Part of Ministry of the Environment concession blocks: 44, 45, 64, 65, 66, 85, 86; in areas of the following administrative districts: **Pomorskie province:** Słupsk county, commune Kępcice (participation in the concession area <0.01%), Bytów county, commune Miastko (4.92%); **Zachodniopomorskie province:** Białogard county, communes: Białogard (0.16%), Tychowo (9.10%), Koszalin city county, commune urban Koszalin (6.65%); Koszalin county: communes Bobolice (27.64%), Biesiekierz (1.33%), Będzino (3.64%), Świeszyno (6.77%), Mielno (1.47%), Manowo (15.70%), Sianów (1.57%), Polanów (16.15%), Szczacinek county, communes: Grzmiąca (< 0.01%), Biały Bór (4.89%) Spytkowice (2.42%), Tomice (2.09%)

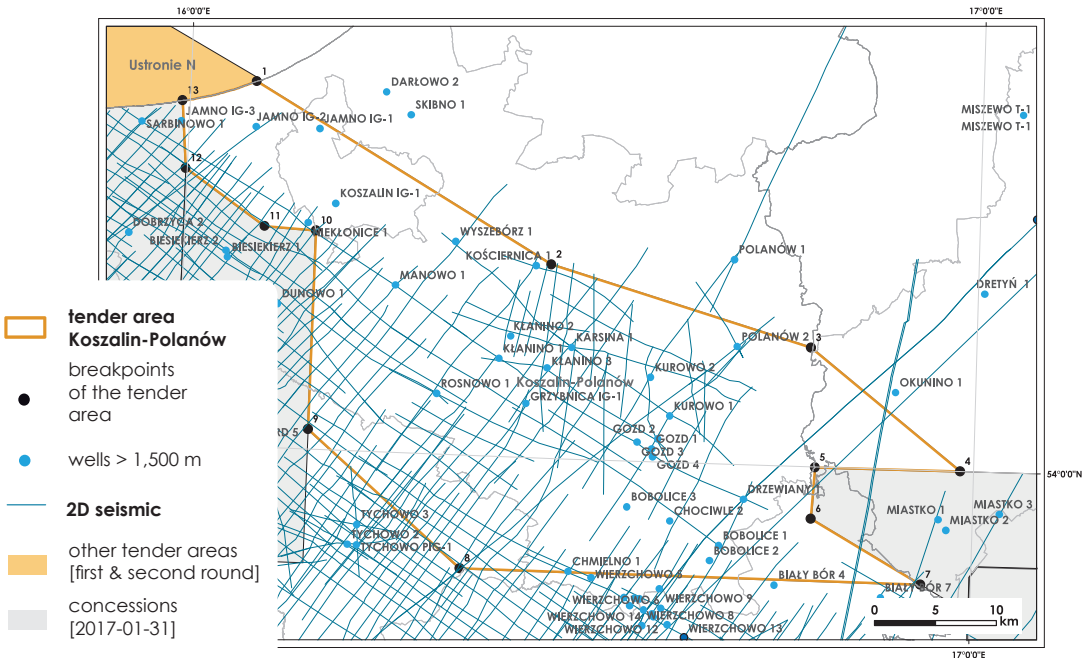
**Concession type:** prospecting and exploration of hydrocarbons deposits and extracting hydrocarbons from deposit

**Duration:** concession for 10 years, therein: Prospecting and exploration phase (5 years)  
Extracting phase – after the investment decision

**Type of deposit:** Conventional for gas and oil

34

**Acreage:**  
1,198.69 km<sup>2</sup>  
296,200 acres



# INFORMATION SHEET FOR TENDER BLOCK KOSZALIN – POLANÓW

Licensing rounds:  
information and opportunities  
2017

## ◀ ROUND 2

### Participation:

winner of the tender  
(an entity or a consortium) **100%**

### Petroleum play:

I – Lower Paleozoic (Ordovician), Upper Paleozoic (Devonian, Carboniferous) and Permian (Rotliegend, Zechstein)  
II – Main Dolomite

### Reservoir rock:

I – Devonian sandstones and carbonate rocks, Carboniferous sandstones and limestones, Permian sandstones  
II – Permian dolomites

### Thickness of overburden:

1,600-3,300 m

### Key and offset wells (MD):

Jamno IG 1 (2,801.5 m); Kłanino 1 (3,306.0 m);  
Kurowo 1 (3,089.7 m)

### Structural level:

Lower Paleozoic; Upper Paleozoic;  
Permo-Mesozoic

### Source rock:

I – Ordovician claystones and mudstones, Upper Devonian marls, Lower Carboniferous claystones and mudstones  
II – Main Dolomite fine grained-organic-rich interbeds

### Seal rock:

I, II – Zechstein evaporates; claystones and mudstones intercalated the Devonian and Carboniferous reservoirs;  
Lower Paleozoic claystones and mudstones in fault zones

### Trap type:

I – Devonian and Carboniferous – stratigraphic and tectonic traps  
Rotliegend – structural, tectonic and stratigraphic traps  
II – Main Dolomite – lithological-facial and structural traps

### Completed seismic surveys (owner):

1973 Koszalin-Bydgoszcz (State Treasury)  
1974 Profile Regionalne [Polanów] (State Treasury)  
1974 Profile Regionalne [Wierzchowo-Gózd] (State Treasury)  
1975 Resko-Czaplinek (State Treasury)  
1975-1977 Białogard-Człuchów [Wierzchowo] (State Treasury)  
1976-1978 Szczecinek-Chojnice [Szczecinek-Człuchów] (State Treasury)  
1977-1979 Wysoka Kamieńska-Białogard [Karlino] (State Treasury)  
1983-1986 Wysoka Kamieńska-Białogard [Ustronie-Biesiekierz-Rosnowo] (State Treasury)  
1984 Wysoka Kamieńska-Białogard [Dygowo-Białogard-Tychowo] (State Treasury)  
1985-1986 Koszalin-Polanów-Miastko [Grzybnica] (State Treasury)  
1987 Koszalin-Polanów-Miastko [Gozd] (State Treasury)  
1988-1989 Głębokie Badania Sejsmiczne [Drawsko] (State Treasury)  
1989 Głębokie Badania Sejsmiczne [Szczecinek-Miastko] (State Treasury)  
1990 Tychowo-Czechy [Tychowo-Czechy] (PGNiG S.A.)  
1991-1992 Kłanino-Karsina-Żydowo (PGNiG S.A.)  
1992 Tychowo-Czechy [Tychowo] (PGNiG S.A.)  
1992 Program Głębokich Sondowań Sejsmicznych PAN (State Treasury)  
1993 Świdwin-Białogard [Rąbino-Daszewo] (PGNiG S.A.)  
1994 Dobrzyca-Parnowo [Dobrzyca] (PGNiG S.A.)  
1995 Drzonowo-Wierzchowo (PGNiG S.A.)  
1998 Rosnowo-Białogard, (reprocessing) (PGNiG S.A.)  
2000 Pomerania [Biały Bór] (Apache Poland Sp. z o.o.)  
2011 Dargin 2D (State Treasury)

INFORMATION CONTINUED ON  
THE NEXT PAGE

# INFORMATION SHEET FOR TENDER BLOCK KOSZALIN – POLANÓW

Licensing rounds:  
information and opportunities  
2017

## ◀ ROUND 2

### The proposed minimum work program of prospecting and exploration phase:

Stage I (12 months) – reprocessing and reinterpretation of archival seismic 2D data

Stage II (12 months) – acquisition 100 km<sup>2</sup> of new 3D seismic survey or 80 km of 2D survey

Stage III (24 months) – drilling of one exploration well to depth of 3,500 m (TVD) with mandatory coring of prospective intervals and with performing the wireline logging program, allowing to interpret the lithology, saturation and petrophysical parameters of hydrocarbon bearing zones, and also to perform the drilling process safe

Perform the exploration tests in previously found zones and estimate the production parameters in case of discovery

Stage IV (12 months) – analysis of obtained data

### The deposits identified in the vicinity

[GZ – gas; RN – oil]:

**Daszewo N gas (GZ)**, discovered in 1984, cumulative production – 415.99 million m<sup>3</sup> of natural gas (26 years), in 2015 production – 25.25 million m<sup>3</sup>, exploitable resources 999.47 million m<sup>3</sup>; Economic resources in place 225.74 million m<sup>3</sup>

**Daszewo N crude oil (RN)**, discovered in 1988, cumulative production – 57.893 ktonnes of crude oil, natural gas associated 10.33 million m<sup>3</sup> (17 years), in 2015 production – none, exploitable resources 60 ktonnes of crude oil, natural gas associated 15 million m<sup>3</sup>

**Daszewo (RN)**, discovered in 1980, cumulative production – 180.61 ktonnes of crude oil (21 years), 97.75 million m<sup>3</sup> of natural gas (24 years), in 2015 (PMG Daszewo): production – 0.27 ktonnes of crude oil, natural gas – none, exploitable resources 5.02 ktonnes of crude oil, 27.72 million m<sup>3</sup> of natural gas (buffer gas)

**Białogard (GZ)**, discovered in 1982, cumulative production – 595.66 million m<sup>3</sup> of natural gas (32 years), in 2015 production – 14.13 million m<sup>3</sup> of natural gas, exploitable resources 59.43 million m<sup>3</sup> of natural gas (pending evaluation of resources)

**Tychowo (RN)**, discovered in 1988, cumulative production – 20.742 ktonnes of crude oil, 5.972 million m<sup>3</sup> of natural gas (8 years), in 2015 production – none, exploitable resources: 19 ktonnes of crude oil, 5.86 million m<sup>3</sup> of natural gas, loss of self-production. The well was plugged and abandoned after unsuccessful attempt of absorbency test made before lowering down the pumps

**Wierzchowo (GZ)**, discovered in 1971, cumulative production 514.02 million m<sup>3</sup> (42 years), in 2015 production – none, exploitable resources: 10.78 million m<sup>3</sup> of natural gas, economic resources in place 10.69 million m<sup>3</sup>

# THE QUALIFICATION PROCEDURE

Every entity interested in obtaining a concession for the prospecting and exploration of a hydrocarbon deposit and the production of hydrocarbons from a deposit, or a concession for the production of hydrocarbons from a deposit needs to undergo the qualification procedure.

During the procedure an entity is assessed in terms of the state security and experience in hydrocarbon exploration and production.

The procedure will end with the issuing of a decision awarding a positive result of the qualification procedure or a refusal to award such a result. A decision awarding a positive result of the qualification procedure will remain valid for 5 years.

Two types of qualification are distinguished:

for an operator

the requirements include positive opinions of the General Inspector of Financial Information, the Financial Supervision Authority, the Head of the Internal Security Agency and the Head of the Foreign Intelligence Agency and documentation on experience in the prospecting or exploration of hydrocarbon deposits or production of hydrocarbons from deposits

for a consortium member

the requirements only include positive opinions of the abovementioned authorities and there is no need to provide documentation on experience in the prospecting or exploration of hydrocarbon deposits or production of hydrocarbons from deposits

**A threat for the state security constitutes grounds for annulling the decision and deleting the entity from the list of qualified entities.**

# NO.13 TENDER BLOCK SUCHA BESKIDZKA – WIŚNIOWA

Licensing rounds:  
information and opportunities  
2017

## ◀ ROUND 2

The hydrocarbon prospects in the “Sucha Beskidzka – Wiśniowa” tender area are related to three working petroleum systems developed in the Cretaceous – Paleogene flysch deposits of the Outer Carpathians, Miocene molasses of the Carpathian Foredeep, and Palaeozoic – Mesozoic basement. The flysch oil-factory is working as the multi-story system of nappes, in which source and reservoir rocks are folded in imbricated anticlines. These flysch deposits are overthrust over the autochthonous Miocene of the Car-

pathian Foredeep, in which biogenic gas accumulations are expected at depths between 2,000 and 3,800 m. Below, the gas shows occur up to 4,500 m deep in the Cambrian sandstones, Devonian and Mississippian carbonates, Pennsylvanian sandstones and Upper Jurassic limestones. Five hydrocarbon deposits have been discovered in the neighborhood of the “Sucha Beskidzka – Wiśniowa” tender area. At least 7 traps documented on the seismic profiles are still waiting for exploration.



**Area name:** Sucha Beskidzka-Wiśniowa

**Location:** onshore, part of Ministry of the Environment concession blocks: 412, 413, 432, 433; in area of following counties and communes: **Malopolskie province:** Kraków county, commune: Czernichów (participation in the concession area 0.16%), Limanowa county, communes: Mszana Dolna (3.89%), urban Mszana Dolna (2.41%), Myślenice county, communes: Pcim (9.05%), Lubień (6.05%), Dobczyce (1.04%), Myślenice (6.30%), Raciechowice (0.39%), Tokarnia (6.98%), Sułkowice (2.37%), Wiśniowa (4.91%), Nowy Targ county, commune Rabka-Zdrój (<1%), Sucha Beskidzka county, communes Sucha Beskidzka (2.81%), Jordanów (0.58%), Bystra-Sidzina (0.10%), Budzów (7.48%), Jordanów (5.17%), Zawoja (2.47%), Maków Podhalański (10.32%), Stryszawa (3.92%), Zembrzyce (3.52%), Wadowice county, communes: Wadowice (5.12%), Kalwaria Zebrzydowska (0.69%), Brzeźnica (2.60%), Stryszów (3.35%), Mucharz (2.76%), Lanckorona (1.06%), Spytkowo (2.42%), Tomice (2.09%)

**Concession type:** prospecting and exploration of hydrocarbons deposits and extracting hydrocarbons from deposit

**Duration:** concession for 10 years, therein: Prospecting and exploration phase (5 years)  
Extracting phase – after the investment decision

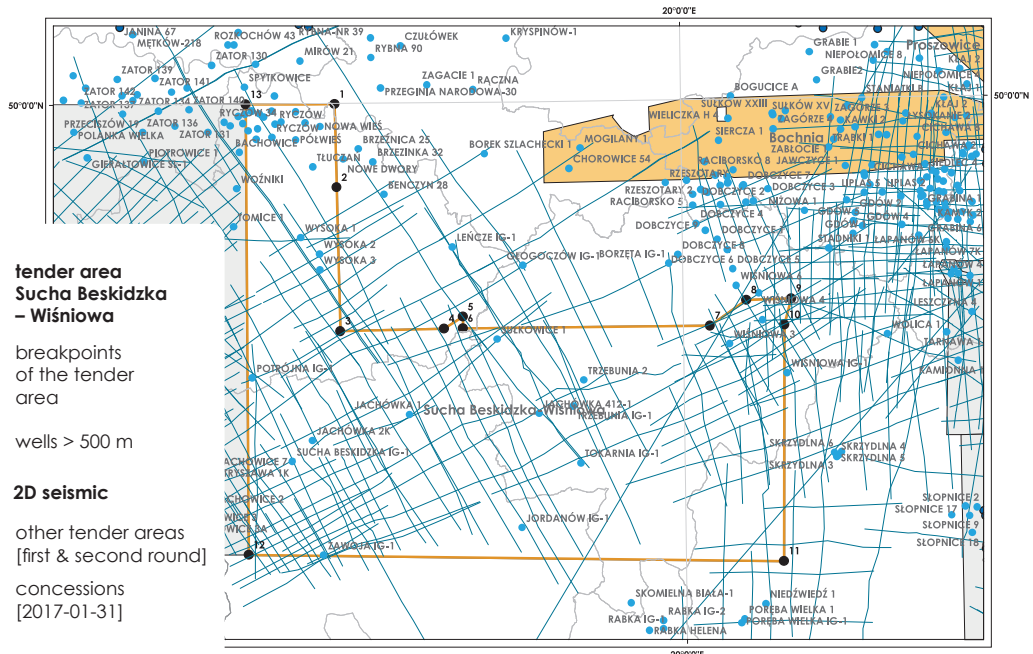
38

**Acreage:**

981.67km<sup>2</sup>  
242,576 acres

**Type of deposit:**

conventional for  
natural gas and oil





# INFORMATION SHEET FOR TENDER BLOCK SUCHA BESKIDZKA – WIŚNIOWA

Licensing rounds:  
information and opportunities  
2017

## ◀ ROUND 2

### Participation:

winner of the tender  
(an entity or a consortium) **100%**

### Petroleum systems:

- I – Paleozoic and Mesozoic basement
- II – Carpathian Nappes
- III – Autochthonous Miocene in Carpathian Foredeep

### Reservoir rock:

- I – Cambrian sandstones; Lower and Upper Devonian, Lower Carboniferous limestones and dolomites; clastic rocks of the Productive Carboniferous; Upper Jurassic limestones
- II – flysch of Magura Nappe, Dukla/Grybów Nappe, Subsilesian Nappe, Silesian Nappe
- III – Miocene sandstones and mudstones

### Thickness of overburden:

- I – 2,000 – 4,500 m
- II – 500 – 1,000 m
- III – 2,000 – 3,800 m

### Key and offset wells (MD):

Potrójna IG 1 (3,701 m), Tokarnia IG 1 (3,936.5 m), Trzebunia IG 1 (3,053 m), Jordanów IG 1 (3,877.0 m)

### Completed seismic surveys (owner):

- 1972 Andrychów-Jordanów Myślenice-Wiśniowa Geofizyka Kraków Sp.z o.o., Kraków (State Treasury)
- 1973 Andrychów-Myślenice Geofizyka Kraków Sp. z o.o., Kraków (State Treasury)
- 1973 Andrychów-Myślenice-Rabka Geofizyka Kraków Sp. z o.o., Kraków (State Treasury)
- 1976 Sucha-Rabka Geofizyka Kraków Sp. z o.o., Kraków (State Treasury)
- 1978 Żywiec-Wadowice-Gdów Geofizyka Kraków Sp. z o.o., Kraków (State Treasury)
- 1978 -1984 Górnośląskie Zagłębie Węglowe Przeds. Bad. Geofiz., Warszawa (State Treasury)
- 1988 Niepołomice-Gdów-Myślenice Geofizyka Kraków Sp. z o.o., Kraków (State Treasury)
- 1986 -1989 Skoczów-Wadowice-Sucha [Wysoka] Geofizyka Kraków Sp. z o.o., Kraków (State Treasury)
- 1986-1989 Skoczów-Wadowice-Sucha [Lachowice-Zawoja] Geofizyka Kraków Sp. z o.o., Kraków (State Treasury)
- 1989-1991 Dobczyce-Gdów-Wolica Geofizyka Kraków Sp. z o.o., Kraków (PGNiG S.A.)
- 1989-1991 Skoczów-Wadowice-Sucha [Lachowice] Geofizyka Kraków Sp. z o.o., Kraków (PGNiG S.A.)
- 1992 Myślenice-Limanowa-Czchów Geofizyka Kraków Sp. z o.o., Kraków (PGNiG S.A.)
- 1993-1995 Lachowice-Myślenice Geofizyka Kraków Sp. z o.o., Kraków (PGNiG S.A.)
- 1993 Lachowice-Myślenice [Zagorzyce] Geofizyka Kraków Sp. z o.o., Kraków (PGNiG S.A.)
- 1994-1995 Myślenice-Limanowa-Czchów Wiśniowa Geofizyka Kraków Sp. z o.o., Kraków (PGNiG S.A.)
- 1995 Żywiec-Wadowice Geofizyka Kraków Sp. z o.o., Kraków (PGNiG S.A.)
- 1997-1998 Zawoja-Sucha Beskidzka Geofizyka Kraków Sp. z o.o., Kraków (PGNiG S.A.)
- 2001-2002 Raciechowice-Stadniki Geofizyka Kraków Sp. z o.o., Kraków (PGNiG S.A.)
- 2012 Karpaty West, Budzow Project Geofizyka Kraków Sp. z o.o., Kraków (Energia Karpaty Zachodnie)

### Structural level:

Carpathian Belt, West European Platform

### Source rock:

- I – Lower Carboniferous clastic rocks, Upper Carboniferous clastic rocks (Productive Carboniferous paralic and limnic series), Middle Jurassic mudstones and claystones
- II – Lower Cretaceous Cieszyn shales, Wierzowice shales, Grodzisk shales, Lgota shales; Oligocene menillite shales
- III – Fine grained clastics of mollase basin infill

### Seal rock:

- I – Carboniferous fine-grained clastic rocks and fine-grained clastic rocks of the autochthonous Miocene
- II – Fine-grained flysch and fine-grained clastic rocks of the autochthonous Miocene
- III – Fine-grained flysch and fine-grained clastic rocks of the autochthonous Miocene

### Trap type:

- I – structural, stratigraphic
- II – structural, structural-lithological, lithological
- III – compaction anticlines, structural, complex

# INFORMATION SHEET FOR TENDER BLOCK SUCHA BESKIDZKA – WIŚNIOWA

Licensing rounds:  
information and opportunities  
2017

## ◀ ROUND 2

### The proposed minimum work program of prospecting and exploration phase:

Stage I (12 months) – reprocessing and reinterpretation of archival seismic 2D data

Stage II (12 months) – acquisition 50 km of 2D survey

Stage III (24 months) – drilling of one exploration well to 4,500 m (TVD) with mandatory coring of prospective intervals and with performing the wireline logging program, allowing to interpret the lithology, saturation and petrophysical parameters of hydrocarbon bearing zones, and also to perform the drilling process safely

Perform the exploration tests in previously found zones and estimate the production parameters in case of discovery

Stage IV (12 months) – analysis of obtained data

### The deposits identified in the vicinity

[GZ – gas; RN – oil]:

**Lachowice – Stryzawa (GZ, RN)** – discovered in 1995; unexploited – exploitable resources: 240 million m<sup>3</sup>

**Lapanów (GZ)** – discovered in 2008; cumulative production (2 years): 18.04 million m<sup>3</sup>; in 2015 production: 17.92 million m<sup>3</sup>; exploitable resources – economic resources in place: 307.28 million m<sup>3</sup>

**Łąkta (GZ, RN)** – discovered in 1971; cumulative production of natural gas from the gas-bearing horizons (40 years): 96.15 million m<sup>3</sup>, natural gas from the condensate horizons (28 years): 721.38 million m<sup>3</sup>, condensate (30 years): 50.54 ktonnes, in 2015 production: 3.02 million m<sup>3</sup> of natural gas, crude oil - none; exploitable resources of natural gas – 211.72 million m<sup>3</sup>, condensate – 4.58 ktonnes

**Słopnice (GZ, RN)** – discovered in 1973; cumulative production (36 years): 42.02 million m<sup>3</sup>; in 2015 production: none, exploitable resources in 2012: 80 million m<sup>3</sup> of natural gas, condensate 1.5 ktonnes; economic resources in place in 2015: none

# THE TENDER PROCEDURE SCHEME



# NO.14 TENDER BLOCK SZAMOTUŁY – POZNAŃ PÓŁNOC ◀ ROUND 2

Hydrocarbon exploration prospects for tender area "Szamotuły-Poznań Północ" are associated with Upper Paleozoic and Permian petroleum system. The most important target for natural gas exploration is Rotliegend sandstones which are the major reservoir rocks in this area. Gas exploration is also related to Zechstein Limestone, Zechstein Main dolomite (both oil and gas) and top layers of Lower Carboniferous rocks. In the deep buried Rotliegend sandstones, below the playa facies, we can expect unconventional petroleum system such as tight gas in the Basin Centered Gas System.

Potential gas deposits in Rotliegend sandstones and Zechstein Limestone and Main Dolomite (oil and gas) may be present in structural, tectonic and lithological (facial) traps. Source rocks include Lower Carboniferous interlaying mainly organic-rich mudstones and claystones. Primary seal for hydrocarbon deposits is formed by Zechstein evaporates. Prospectivity of the "Szamotuły-Poznań Północ" is supported by many gas deposits on the neighboring concession areas, especially those located to the south-west.



**Area name:** Szamotuły-Poznań Północ

**Location:** onshore, part of Ministry of the Environment concession blocks: 186, 166, 206; in area of the following counties and communes: **Wielkopolskie province:** Czarnków-Trzcianka county, communes: Czarnków (participation in the concession area <1%), Lubasz (3.62%), Połajewo (11.73%), Oborniki county, communes: Rogoźno (<1%), Oborniki (29.56%), Ryczywół (3.22%) Poznań City county, commune Poznań City (8.91%) Poznań county, communes: Dopiewo (<1%), Murwana Goślina (3.85%), Czerwonak (2.54%), Tarnowo Podgórne (1.37%), Rokietnica (5.35%), Suchy Las (10.18%), Szamotuły county, communes: Obrzycko (6.64%), Obrzycko (<1%), Szamotuły (11.54%), Ostroróg (<1%), Kaźmier (<1%)

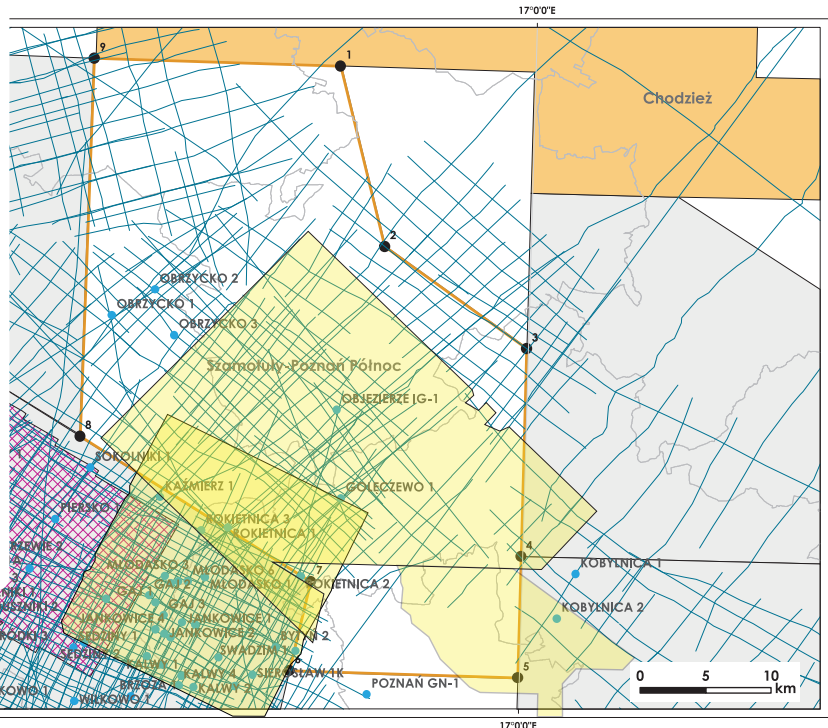
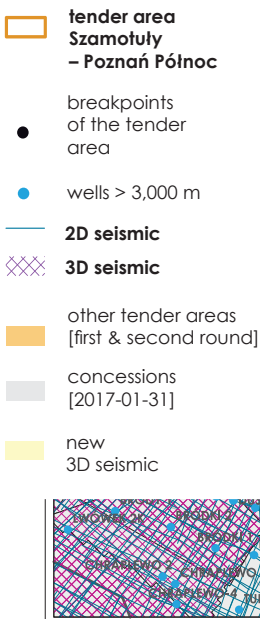
**Concession type:** prospecting and exploration of hydrocarbons deposits and extracting hydrocarbons from deposit

**Duration:** concession for 10 years, therein: Prospecting and exploration phase (5 years)  
Extracting phase – after the investment decision

**Acreage:**  
1,138.34 km<sup>2</sup>  
281,289 acres

**Type of deposit:**  
Conventional and  
unconventional for  
natural gas

42



# INFORMATION SHEET FOR TENDER BLOCK SZAMOTUŁY – POZNAŃ PÓŁNOC

Licensing rounds:  
information and opportunities  
2017

## ◀ ROUND 2

### Participation:

winner of the tender  
(an entity or a consortium) **100%**

### Petroleum play:

Conventional and/or unconventional

### Reservoir rock:

Rotliegend sandstones

### Thickness of overburden:

> 2,750 m

### Key and offset wells (MD):

Człuchów-1 (1,953 m); Debrzno IG-1 (5,010 m)

### Structural level:

Upper Paleozoic, Permo-Mesozoic

### Source rock:

Lower Carboniferous claystones and mudstones; Permian  
Main Dolomite

### Seal rock:

Zechstein evaporate sedimentary rocks, Salt or clay levels  
within the Rotliegend sandstones and playa sedimentary  
rocks in the upper part of Rotliegend sandstones

### Trap type:

Rotliegend (Zechstein Limestone): structural, tectonic,  
lithological; unconventional tight gas: Basin Centered Gas  
System

### Completed seismic surveys (owner):

1974 Program Głębokich Sondowań Sejsmicznych PAN (State Treasury)  
1976 Międzychód-Buk [Sędziny-Buk] (State Treasury); 1976 Monoklina Przedsudecka (State Treasury)  
1976-1977 Czarnków-Poznań-Strzelno (State Treasury); 1977 Czarnków-Poznań-Strzelno [Kobylnica] (State Treasury)  
1977-1978 Czarnków-Poznań-Strzelno [Chrzypsko] (State Treasury)  
1978 Czarnków-Poznań-Strzelno [Obrzycko-Kobylnica] (State Treasury)  
1977-1979 Poznań-Pniewy [Nowy Tomyśl Sędziszew] (State Treasury)  
1977-1982 Poznań-Pniewy [Obrzycko-Poznań] (State Treasury)  
1979-1980 Poznań-Pniewy [Bytyń-Borowo-Brodnica] (State Treasury)  
1980-1981 Radęcin-Wieleń-Murowana Goślina (State Treasury)  
1981-1983 Poznań-Września [Kobylnica-Września] (State Treasury)  
1982-1983 Wałcz-Gołańcz (State Treasury)  
1985-1986 Elektrownia Jądrowa Warta (State Treasury)  
1995-1998 Pniewy-Sędziszew [Pniewy-Sędziszew] (PGNiG S.A.)  
1998 Pniewy-Sędziszew [Opalenica] (PGNiG S.A.)  
1999 Pniewy-Sędziszew [Tarnowo Podgórne] (PGNiG S.A.)  
2004 Pniewy-Sędziszew [Młodasko-Witkowice-Wilczyna] (State Treasury)  
2007 Obrzycko-Szamotuły (State Treasury)

### The proposed minimum work program of prospecting and exploration phase:

Stage I (12 months) – reprocessing, integration and reinterpretation of archival seismic and well logs data

Stage II (24 months) – drilling of two exploration well to depth of 4,500 m (TVD) with mandatory coring of prospective intervals and with performing the wireline logging program, allowing to interpret the lithology, saturation and petrophysical parameters of hydrocarbon bearing zones, and also to perform the drilling process safe

Stage III (12 months) – perform the exploration tests in previously found zones and estimate the production parameters in case of discovery

Stage IV (12 months) – analysis of obtained data

### The deposits identified in the vicinity

[GZ – gas; RN – oil]:

**Młodasko (GZ)**, discovered in 1985, cumulative production – 451.9 million m<sup>3</sup> (24 years); in 2015 production – 27.28 million m<sup>3</sup>; exploitable resources – 44.1 million m<sup>3</sup>; economic resources in place – 43.86 million m<sup>3</sup>

**Ceradz Dolny (GZ)**, discovered in 1978, cumulative production in 1988-1996 (8 years) – 33.72 million m<sup>3</sup>; exploitable resources – 85.27 million m<sup>3</sup>; economic resources in place – lack

**Jankowice (GZ)**, discovered in 1985, cumulative production in 1988-2013 (25 years) – 95.51 million m<sup>3</sup>; exploitable resources – lack; geological resources – 115.48 million m<sup>3</sup>

# NO.15 TENDER BLOCK

## USTRONIE N ◀ ROUND 2

Licensing rounds:  
information and opportunities  
2017

Three different petroleum systems are developed in the "Ustronie N" tender area. They occur in the sub-Variscan Lower and Upper Palaeozoic, as well as in the Permian. High potential for oil and gas-exploration of these systems is proved by hydrocarbon accumulations discovered on the onshore neighborhood – in the Gorzysław and Trzebusz gas-fields. In both cases, the reservoir horizons are developed in the Pennsylvanian sandstones intercalated with siltstones and shales. The porosity of sandstones is ranging from 0.14 to 21.5%, while the permeability is from 0 to 433.5 mD. The gas-saturated horizons reach the maximal thickness of about 20,5 m. Apart from these fields, four another hydrocarbon deposits were discovered more southwardly. These are Wierzchowo gas-field (Mississippian), Daszewo N gas-field

(Pennsylvanian), Białogard gas-field (Pennsylvanian and Rotliegendes), and Daszewo oil-field (Hauptdolomite). The Daszewo N and Białogard are the nitrogen-type gas-fields, in which the nitrogen content is ranging from 32 to 44%, with 51.1 and 65.4% of methane, respectively.

The hydrocarbon accumulations in the southern neighborhood of the "Ustronie N" tender area occur in the stratigraphic-structural traps developed along a system of faults, which continuation is expected also on the offshore area. The Zechstein evaporites constitute the regional horizon of seal rocks with effective isolation in the southern and western part of the tender area. At least three traps – L1, L12 and L15 are still waiting for exploration.

**Area name:** Ustronie N

**Location:** offshore, part of Ministry of the Environment concession blocks: 23, 43, 44, 45, 63, 64; Polish territorial waters and exclusive economic zone (100%)

**Concession type:** prospecting and exploration of hydrocarbon deposits and extracting hydrocarbons from deposit

**Duration:** concession for 10 years, therein: Prospecting and exploration phase (5 years)  
Extracting phase – after the investment decision

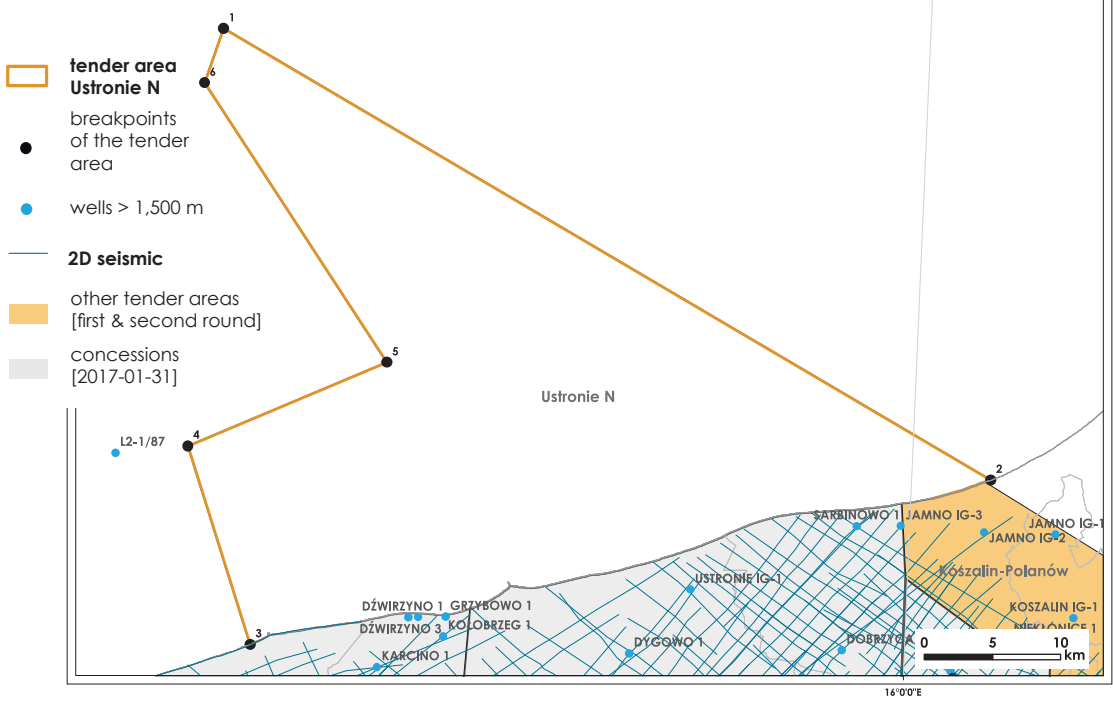
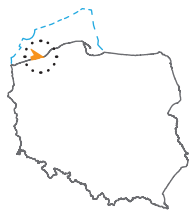
**Type of deposit:** Conventional for gas and oil

**Acreage:**

1,163.45 km<sup>2</sup>

287,495 acres

44



# INFORMATION SHEET FOR TENDER BLOCK

Licensing rounds:  
information and opportunities  
2017

## USTRONIE N ◀ ROUND 2

### Participation:

winner of the tender  
(an entity or a consortium) **100%**

### Petroleum play:

I – Ordovician, Devonian, Carboniferous and Permian (Rotliegend, Zechstein)  
II – Main Dolomite petroleum system

### Reservoir rock:

I – Devonian sandstones and carbonate rocks;  
Carboniferous sandstones and carbonate rocks, Permian sandstones  
II – Zechstein dolomites and limestones

### Thickness of overburden:

>1,500 m

### Completed seismic surveys (owner):

1975-1977 – Bałtyk (State Treasury)  
1978-1979 – Bałtyk (State Treasury)  
1981-1982 – Bałtyk, western part (State Treasury)  
1984 – Bałtyk, block Kołobrzeg (State Treasury)  
1987 – Bałtyk, objects L1 and L12  
(data - State Treasury, documentation – LOTOS Petrobaltic SA)  
1987 – Bałtyk, block L (data - State Treasury, documentation - LOTOS Petrobaltic SA)  
1996-1996 – Map of the Baltic bottom (State Treasury)

### The proposed minimum work program of prospecting and exploration phase

Stage I (12 months) – reprocessing and reinterpretation of archival seismic 2D data

Stage II (24 months) – drilling of one exploration well to TD of 3,500 m (TVD) with mandatory coring of prospective intervals and with performing the wireline logging program, allowing to interpret the lithology, saturation and petrophysical parameters of hydrocarbon bearing zones, and also to perform the drilling process safe

Stage III (12 months) – perform the exploration tests in previously found zones and estimate the production parameters in case of discovery.

Stage IV (12 months) – analysis of obtained data

### Structural level:

Lower Paleozoic; Upper Paleozoic  
Permo-Mesozoic

### Source rock:

I – Ordovician claystones and mudstones, Upper Devonian marls, Lower Carboniferous claystones and mudstones  
II – Main Dolomite, fine grained-organic-rich interbeds

### Seal rock:

I, II – Zechstein evaporates; claystones and siltstones complexes intercalated Devonian and Carboniferous reservoirs, claystones and mudstones in fault zones

### Trap type:

I – Devonian and Carboniferous – stratigraphic and structural  
Rotliegend – stratigraphic and structural  
II – Main Dolomite lithological

### Key and offset wells (MD):

L2-1/87 (4,040 m), Jamno IG 1 (2,801.5 m), Grzybowo 1 (3,303.20 m), Dźwirzyno 1 (2,582.30 m), Dźwirzyno 3 (3,100 m)

### The deposits identified in the vicinity [GZ-gas; RN-crude oil]:

**Daszewo N (GZ)** – discovered in 1984, cumulative production – gas 415.99 million m<sup>3</sup> (26 years), in 2015 production – 25.25 million m<sup>3</sup>, exploitable resources 999.47 million m<sup>3</sup>; Economic resources in place 225.74 million m<sup>3</sup>; **Daszewo N (RN)** – discovered in 1988, cumulative production – 57.893 ktonnes of crude oil, natural gas associated: 10.33 million m<sup>3</sup> (17 years), in 2015 production – none, exploitable resources 60 ktonnes of crude oil, natural gas associated: 15 million m<sup>3</sup>; **Daszewo (RN)** – discovered in 1980, cumulative production – crude oil: 180.61 ktonnes (21 years), natural gas: 97.75 million m<sup>3</sup> (24 years), in 2015 (PMG Daszewo): production – 0.27 ktonnes of crude oil, natural gas – none, exploitable resources 5.02 ktonnes of crude oil, gas 27.72 million m<sup>3</sup> (buffer gas); **Białogard (GZ)** – discovered in 1982, cumulative production – 595.66 mln m<sup>3</sup> of gas (32 years), in 2015 production – 14.13 million m<sup>3</sup> of gas, exploitable resources of gas 59.43 million m<sup>3</sup> (pending evaluation of resources); **Tychowo (RN)** – discovered in 1988, cumulative production – 20.742 ktonnes of crude oil, 5.972 million m<sup>3</sup> of gas (8 years), in 2015 production – none, exploitable resources: 19 ktonnes of crude oil, 5.86 million m<sup>3</sup> of natural gas, – Loss of self-production. The well was plugged and abandoned after unsuccessful attempt of absorbency test made before lowering down the pumps **Wierzchowo (GZ)** – discovered in 1971, cumulative production 514.02 million m<sup>3</sup> (42 years), in 2015 production – none, exploitable resources: 10.78 million m<sup>3</sup> of natural gas, economic resources in place 10.69 million m<sup>3</sup>; **Petrykozy (RN)** – discovered in 1994, cumulative production: 2,412 tonnes of crude oil – from July to October of 1990 in accidental condition, 4,559 tonnes of crude oil and 452,000 m<sup>3</sup> of natural gas – from 1993 to 1996 self-production, 641 tonnes of crude oil – from December 1996 to January 1998 enhanced oil recovery in 6 cycles applying oil extrusion by nitrogen using device Nitrogen TN-127

# NO.16 TENDER BLOCK ZŁOTÓW – ZABARTOWO

Licensing rounds:  
information and opportunities  
2017

## ROUND 2

Hydrocarbon exploration prospects for “Złotów-Zabartowo” tender area are mostly associated with Rotliegend fluvial and aeolian sandstones that are sealed either by Zechstein evaporites (anhydrite and halite) or intercalations of claystones within the Rotliegend strata. The source rocks are Lower Carboniferous organic-rich mudstones, claystones and sandstones.

The analysis of working petroleum system indicates a possibility of generation, migration and accumulation of hydrocarbons in the tender area, however, the expected traps would occur at the depths ranging from 4,500 to 5,500 m.



### Acreage:

1,071.01 km<sup>2</sup>  
264,652 acres

### Area name: Złotów-Zabartowo

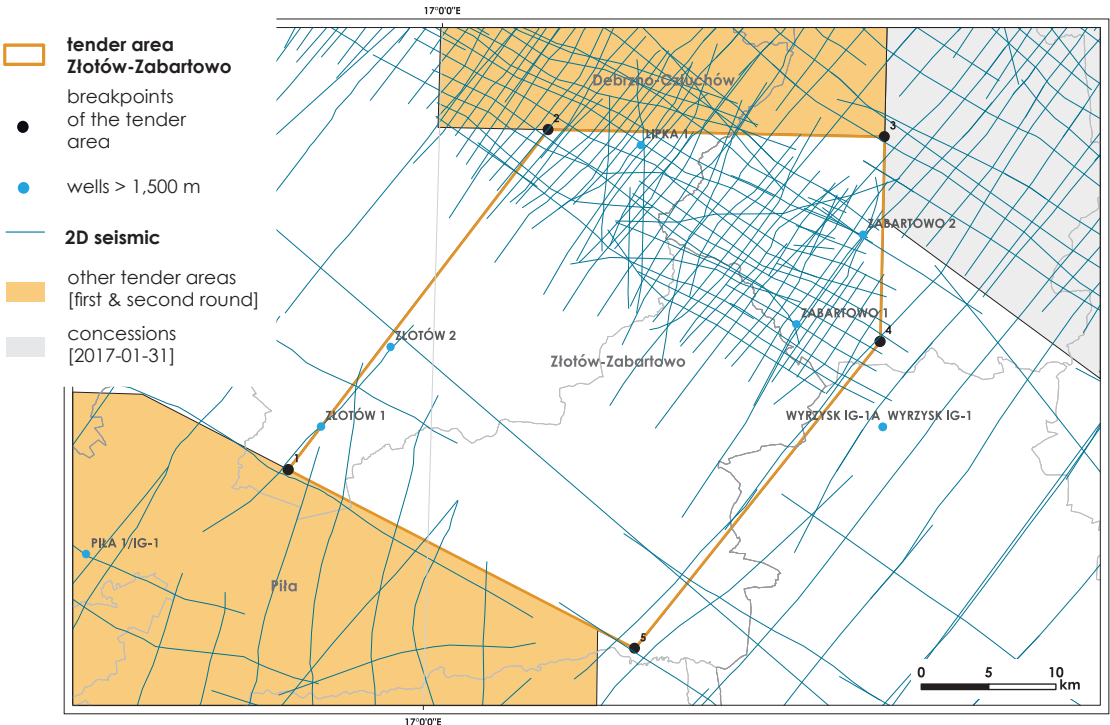
**Location:** onshore; parts of Ministry of the Environment concession blocks:126, 127, 146, 147; in areas of the following counties and communes: **Wielkopolskie province:** Piła county, communes: Kaczory (participation in the concession area 1.82%), Białośliwie (3.75%), Łobżenica (17.80%), Miasteczko Krajeńskie (0.12%), Wysoka (11.13%), Wyrzysk (9.78%), Złotów county, communes: Złotów (12.02%), urban Złotów (0.71%), Krajenka (11.04%), Lipka (0.52%), Zakrzewo (10.71%); **Kujawsko-pomorskie Province:** Nakło county, communes: Mrocza (0.53%), Sadki (1.23%) Sępólno Krajeńskie county, communes: Sępólno Krajeńskie (3.31%), Więcbork (15.53%)

**Concession type:** prospecting and exploration of hydrocarbon deposits and extracting hydrocarbons from deposits

**Duration:** concession for 10 years, therein: prospecting and exploration phase (5 years) extracting phase – after the investment decision

**Type of deposit:** Conventional for oil and gas

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# INFORMATION SHEET FOR TENDER BLOCK ZŁOTÓW – ZABARTOWO

Licensing rounds:  
information and opportunities  
2017

## ◀ ROUND 2

### Participation:

winner of the tender  
(an entity or a consortium) **100%**

### Petroleum play:

I – Carboniferous and Permian (Rotliegend)  
II – Zechstein (Main Dolomite)

### Reservoir rock:

I – Permian sandstones  
II – Main Dolomite deposits

### Thickness of overburden:

>2000 m

### Key and offset wells (MD):

Zabartowo 1 (4,823.5 m), Zabartowo 2 (4,569.6 m), Lipka 1 (4,752.0 m)

### Completed seismic surveys (owner):

1977 Więcbork–Żychlin (State Treasury)  
1980 Piła–Bydgoszcz (State Treasury)  
1981 Rejon Bydgoszczy (State Treasury)  
1985 Wałcz–Gołańcz (State Treasury)  
1987 Szczecinek–Złotów [Szczecinek–Lędyczek] (State Treasury)  
1986-1987 Szczecinek–Chojnice [Człuchów–Debrzno] (State Treasury)  
1988-1989 Białogard–Czarne–Wilcze [Okonek–Lędyczek] (PGNiG S.A.)  
1986-1989 region Okonek, reinterpretation (PGNiG S.A.)  
1989 Białogard–Czarne–Wilcze [Chojnice–Kamień Krajeński] (PGNiG S.A.)  
1989-1991 Białogard–Czarne–Wilcze [Debrzno–Złotów, Debrzno] (PGNiG S.A.)  
1993 Białogard–Czarne–Wilcze [Tuchola–Wilcze, Sępólno Krajeńskie–Wilcze] (PGNiG S.A.)  
1993 Bydgoszcz, sheet 148, reinterpretation (PGNiG S.A.)  
1994 Białogard–Czarne–Wilcze [Człuchów–Debrzno–Zabartowo] (PGNiG S.A.)  
1994 Białogard–Czarne–Wilcze [Debrzno–Złotów–Zabartowo] (PGNiG S.A.)  
1976-1992 Czarne–Lędyczek and Czarne–Zabartowo, interpretation and reinterpretation (PGNiG S.A.)  
1974–1990 region of Pomeranian Anticlinorium and Synclinorium, reinterpretation (PGNiG S.A.)  
1995 Wałcz–Gołańcz and Chociwel–Czaplinek, reinterpretation (PGNiG S.A.)  
1996 sections GB-2 and 25-III-1982, reinterpretation of reflection studies (PGNiG S.A.)  
1997 sections GB-2A, GB-2, GB-2B, 25-III-82, complex reinterpretation of reflection studies (PGNiG S.A.)  
2004 Lithosphere structure of northern Poland (Project POLONAISE) based on integrated analysis of geophysical and geological data part 1 and 2 (State Treasury)

### Structural level:

Lower Palaeozoic; Upper Palaeozoic  
Permo-Mesozoic

### Source rock:

I – Lower Carboniferous claystones and mudstones  
II – Main Dolomite deposits

### Seal rock:

I – Zechstein evaporites, claystones occurring between potential Rotliegend reservoir; II – Zechstein evaporites

### Trap type:

I – Carboniferous – stratigraphic and tectonic; Rotliegend – structural, tectonic, lithological; II – lithologic-facies, structural

### The deposits identified in the vicinity [GZ-gas]

**Wierzchowo (GZ)** – discovered in 1971, cumulative production: 514.02 million m<sup>3</sup> (during 42 years); 2015 production: lacking, reserves: recoverable 10.78 million m<sup>3</sup> (economic reserves in place: 10.69 million m<sup>3</sup>)

### The proposed minimum work program of prospecting and exploration phase

Stage I (12 months) – reprocessing and reinterpretation of archival 2D seismic data

Stage II (12 months) – execution of 3D seismic survey (100 km<sup>2</sup>) or 2D seismic survey (80 km)

Stage III (24 months) – drilling of one well to the depth of 5,000 m (TVD) with mandatory coring of prospective intervals and with full set of geophysical data necessary for interpretation of lithology, saturation and petrophysical parameters as well as ensuring the safety of drilling process. Tests in the case of discovery, determination of exploitation parameters

Stage IV (12 months) – performance analysis of the data obtained

# NO.17 TENDER BLOCK ŻARNOWIEC ◀ ROUND 2

Licensing rounds:  
information and opportunities  
2017

“Żarnowiec” tender area is dedicated to the exploration of unconventional and conventional prospects in the onshore part of the Baltic Basin. Shale oil and shale gas accumulations occur within the Upper Cambrian (Furongian), Ordovician (Caradocian) and Silurian (Llandovery) strata. Tight oil and conventional oil accumulations occur in the Middle Cambrian sandstone interval. Lower Paleozoic shales constitute both source and reservoir rocks sealed by the overlying

shales and Permian evaporates, while Middle Cambrian sandstone is a reservoir rock documented by four historical conventional oil field discoveries (Żarnowiec, Żarnowiec W, Dębki, Białogóra E) in the near vicinity of the tender area. Best shale gas production rates were reported so far on the Lebien and Lublewo sites (2010 and 2014 respectively) located on the tender area, making it probably one of the best areas for future shale gas prospecting in Poland.



**Area name:** Żarnowiec

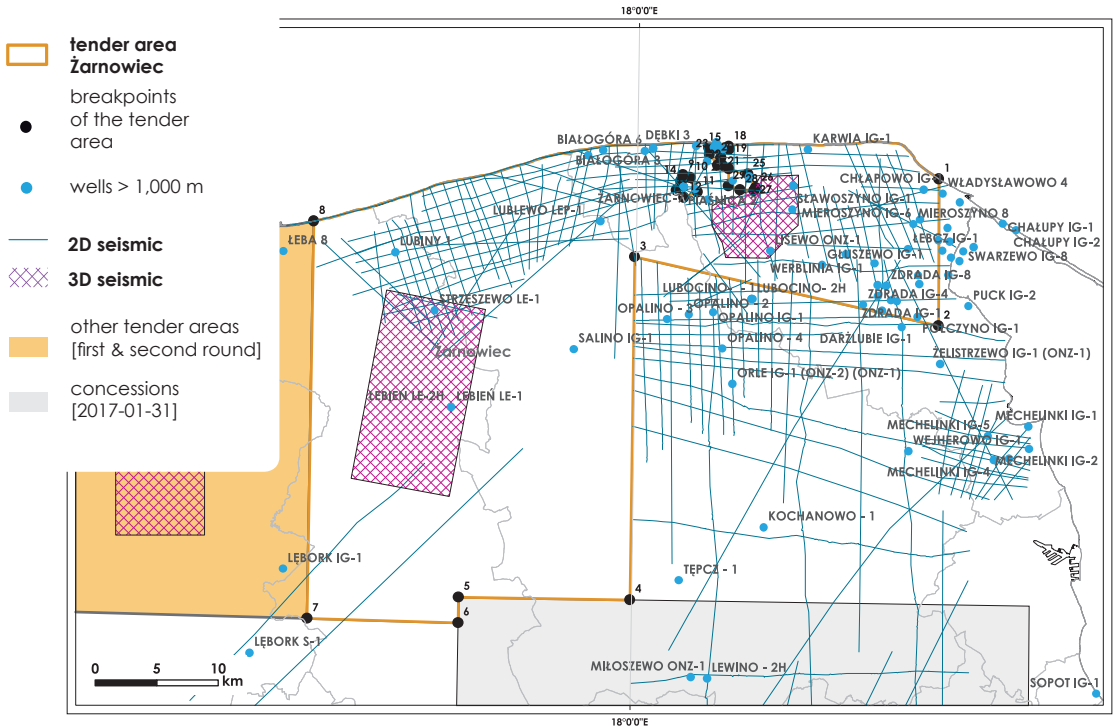
**Location:** onshore, part of Ministry of the Environment concession blocks: 8, 9, 28, 29, 48; in area of the following counties and communes: **Pomorskie province:** Łębork county, communes: Nowa Wieś Łęborska (participation in the concession area 20,22%), Łeba (0,35%), Łębork (1,49%), Cewice (1,28%), Wicko (12,29%), Puck county, communes: Puck urban. (0,01%), Puck (7,31%), Władysławowo (2,40%), Krokowa (15,38%), Słupsk country, communes: Potęgowo (0,02%), Główny (0,35%), Wejherowo country, communes: Gniewino (7,70%), Choczewo (15,30%), Łęczycze (15,91%)

**Acreage:**  
1,196.31 km<sup>2</sup>  
295,614 acres

**Concession type:** prospecting and exploration of hydrocarbon deposits and extracting hydrocarbons from deposits

**Duration:** concession for 10 years, therein: Prospecting and exploration phase (5 years)  
Extracting phase – after the investment decision

**Type of deposit:** Unconventional for natural gas and oil, conventional for oil and natural gas



# INFORMATION SHEET FOR TENDER BLOCK

## ŻARNOWIEC

Licensing rounds:  
information and opportunities  
2017

## ◀ ROUND 2

### Participation:

winner of the tender  
(an entity or a consortium) **100%**

### Petroleum play:

I – Unconventional petroleum system of the Lower Paleozoic rocks (Upper and Middle Cambrian, Ordovician, Silurian)  
II – Conventional petroleum system of the Middle Cambrian sandstones

### Reservoir rock:

I – Upper Cambrian, Ordovician and Silurian claystones and mudstones  
II – Middle Cambrian sandstones

### Thickness of overburden:

Average 2,455 m (profile Żarnowiec IG 1)

### Completed seismic surveys (owner):

1972 Żarnowiec-Władysławowo-Usika-Łeba 2D (State Treasury)  
1976 Puck Bay Area 2D (State Treasury); 1987 Deep seismic profile GBB10387 (State Treasury); 1989 Nuclear Power Plant Żarnowiec 2D (State Treasury); 1992-1994, 2002 Łeba-Żarnowiec 2D. Lubiny-Białogóra Area. (State Treasury); 2003 - 2008 Selected profiles from 2D survey Gdańsk-Kościerzyna (State Treasury); 2013 Krokowa 3D (State Treasury); 2013 - 2014 Jackowo 2D (State Treasury); 2009 - Zwartowo 3D (State Treasury); 2011 Seismic profile PL1-5600 within project PolandSPAN (State Treasury)

### The proposed minimum work program of prospecting and exploration phase

Stage I (12 months) – reprocessing and reinterpretation of archival seismic 2D data and geological data

Stage II (36 months) – drilling of one exploration well to 3,000 m (TVD) with mandatory coring of prospective intervals and with performing the wireline logging program, allowing to interpret the lithology, saturation and petrophysical parameters of hydrocarbon bearing zones, and also to perform the drilling process safe. Perform the exploration tests in previously found zones and estimate the production parameters in case of discovery

Drilling second exploration well to 3,000 m (TVD) with mandatory coring of prospective intervals and with performing the wireline logging program, allowing to interpret the lithology, saturation and petrophysical parameters of hydrocarbon bearing zones, and also to perform the drilling process safe

Perform the exploration tests in previously found zones and estimate the production parameters in case of discovery.

Stage III (12 months) – analysis of obtained data

### Structural level:

Lower Paleozoic; Upper Paleozoic  
Permo-Mesozoic

### Source rock:

I, II – Upper Cambrian, Ordovician and Silurian claystones and mudstones

### Seal rock:

I, II – Zechstein evaporates; Upper Cambrian, Ludlow, Pridol (Silurian) claystones and mudstones (secondary sealing complex)

### Trap type:

I – Unconventional traps  
II – Conventional structural and stratigraphic traps

### Key and offset wells (MD):

Żarnowiec IG 1 (3,276.0 m); Darżlubie IG 1(3,520.0 m)

### The deposits identified in the vicinity

#### [GZ-gas; RN-crude oil]:

„Żarnowiec” (RN) – discovered in 1972, cumulative production (44 years) 9.721 ktonnes of condensate, 26.93 million m<sup>3</sup> of associated natural gas; in 2015 production 0.11 ktonnes of condensate, 0.07 million m<sup>3</sup> of associated natural gas. Exploitable resources 42.33 ktonnes, (economic resources in place 1.68 ktonnes); 6.96 million m<sup>3</sup>, (economic resources in place 1.39 million m<sup>3</sup>)

„Żarnowiec W” (RN) – discovered in 1990, cumulative production (21 years) 4.2 ktonnes of condensate, 25.65 million m<sup>3</sup> of associated natural gas; in 2015 production 0.11 ktonnes of condensate, 0.07 million m<sup>3</sup> of associated natural gas; Exploitable resources 17.81 ktonnes, (economic resources in place 3.85 ktonnes); 2.35 million m<sup>3</sup>, (economic resources in place 1.50 million m<sup>3</sup>)

„Dębki” (RN) – discovered in 1978, cumulative production (44 years) 36.169 ktonnes of crude oil, 10.201 million m<sup>3</sup> of associated natural gas; in 2015 production 0.61 ktonnes of crude oil, 0.22 million m<sup>3</sup> of associated natural gas; exploitable resources 8.62 ktonnes, (economic resources in place 5.19 ktonnes); 3.0 million m<sup>3</sup>, (Economic resources in place 4.23 million m<sup>3</sup>)

„Białogóra-E” (RN) – discovered in 1991, cumulative production (16 years) 2.917 ktonnes of crude oil, 2.4185 million m<sup>3</sup> of associated natural gas; in production - none; anticipated sub-economic resources 1.43 ktonnes, (economic resources in place 0.38 ktonnes); anticipated sub-economic resources 0.86 million m<sup>3</sup>, (economic resources in place 1.02 million m<sup>3</sup>)

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