# OIL AND GAS IN POLAND

## 17 TENDER BLOCKS

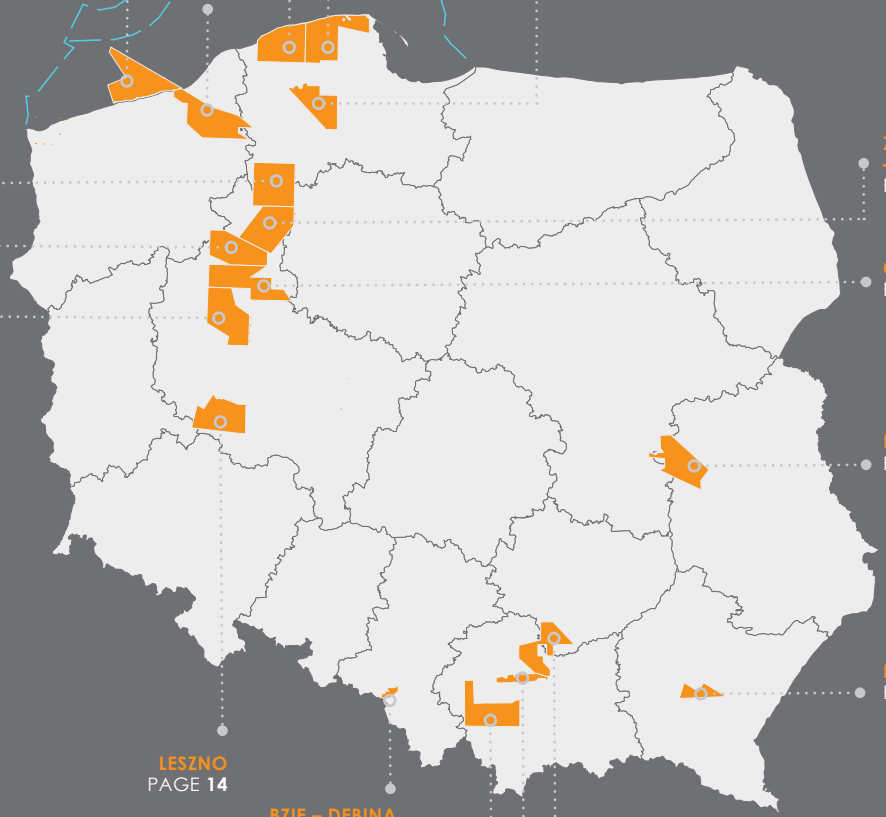
LICENSING ROUNDS: INFORMATION AND OPPORTUNITIES
2017

MINISTRY OF THE ENVIRONMENT

Polish Geological Institute
National Research Institute

POLAND

# 17 TENDER BLOCKS



# 17 TENDER BLOCKS

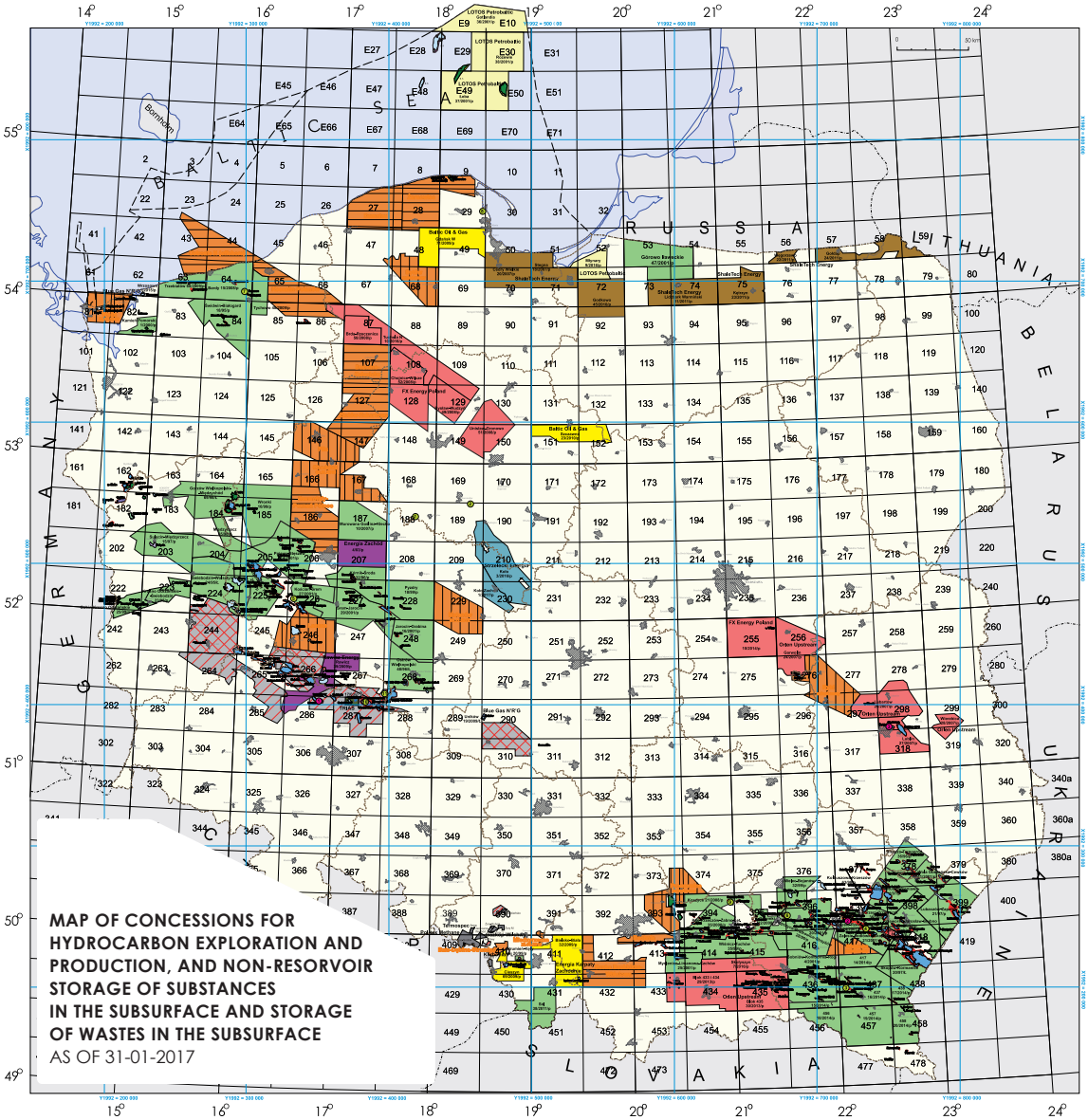
**THE 17 MOST PROSPECTIVE BLOCKS FOR HYDROCARBON EXPLORATION HAVE BEEN SELECTED:**

**ROUND1**

| 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 | **OPEN UNTIL JUNE 1st, 2017** | Conventional, Carboniferous and Permian |
| 5 | Piła | **OPEN UNTIL JUNE 1st, 2017** | 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 | **in preparation** | Conventional, Cenozoic, Mesozoic, Paleozoic |
| 9 | Bzie-Dębina-Strumień | **in preparation** | Unconventional – CBM, Carboniferous |
| 10 | Damnica | **in preparation** | Unconventional – shale gas, Paleozoic Conventional, Cambrian |
| 11 | Debrzno-Człuchów | **in preparation** | Conventional, Devonian, Carboniferous, Permian |
| 12 | Koszalin-Polanów | **in preparation** | Conventional, Devonian, Carbon-iferous, Permian |
| 13 | Sucha Beskidzka-Wiśniowa | **in preparation** | Conventional, Paleogene, Miocene, Paleozoic, Mesozoic |
| 14 | Szamotuły-Poznań Północ | **in preparation** | Conventional, Permian, Upper Paleozoic Unconventional – Basin Centered Gas System |
| 15 | Ustronie N (offshore) | **in preparation** | Conventional, Permian, Paleozoic |
| 16 | Złotów-Zabartowo | **in preparation** | Conventional, Permian |
| 17 | Żarnowiec | **in preparation** | Unconventional – shale gas, Paleozoic Conventional, Cambrian |




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.**
- **Grupa LOTOS Petrobaltic S.A.**
- **TRIAS Sp. z o.o.**
- **Blue Gas N'R'G Sp. z o.o.**
- **San Leon Energy Plc**
- **Hutton Energy PLC**
- **PKN Orlen S.A.**
- **Stena Investment S.A.R.L.**
- **Palomar Capitol Advisords Limited - San Leon Energy B.V.**
- Concessions of prospecting and production of coal bed methane
- Pending applications
- Pending applications subitted according to the article 46 of the Act on Geological and Mining Law
- Pending applications subitted according to the article 47 of the Act on Geological and Mining Law
- **Blocks typified to the tender — Round 1**
- **Blocks typified to the tender — Round 2**

**Tender blocks: Wolin, Malanów (offer evaluation in progress), Międzyrzecze (granted)**

MINISTRY OF THE ENVIRONMENT

Financed by National Fund for Environmental Protection and Water Management

# PREFACE

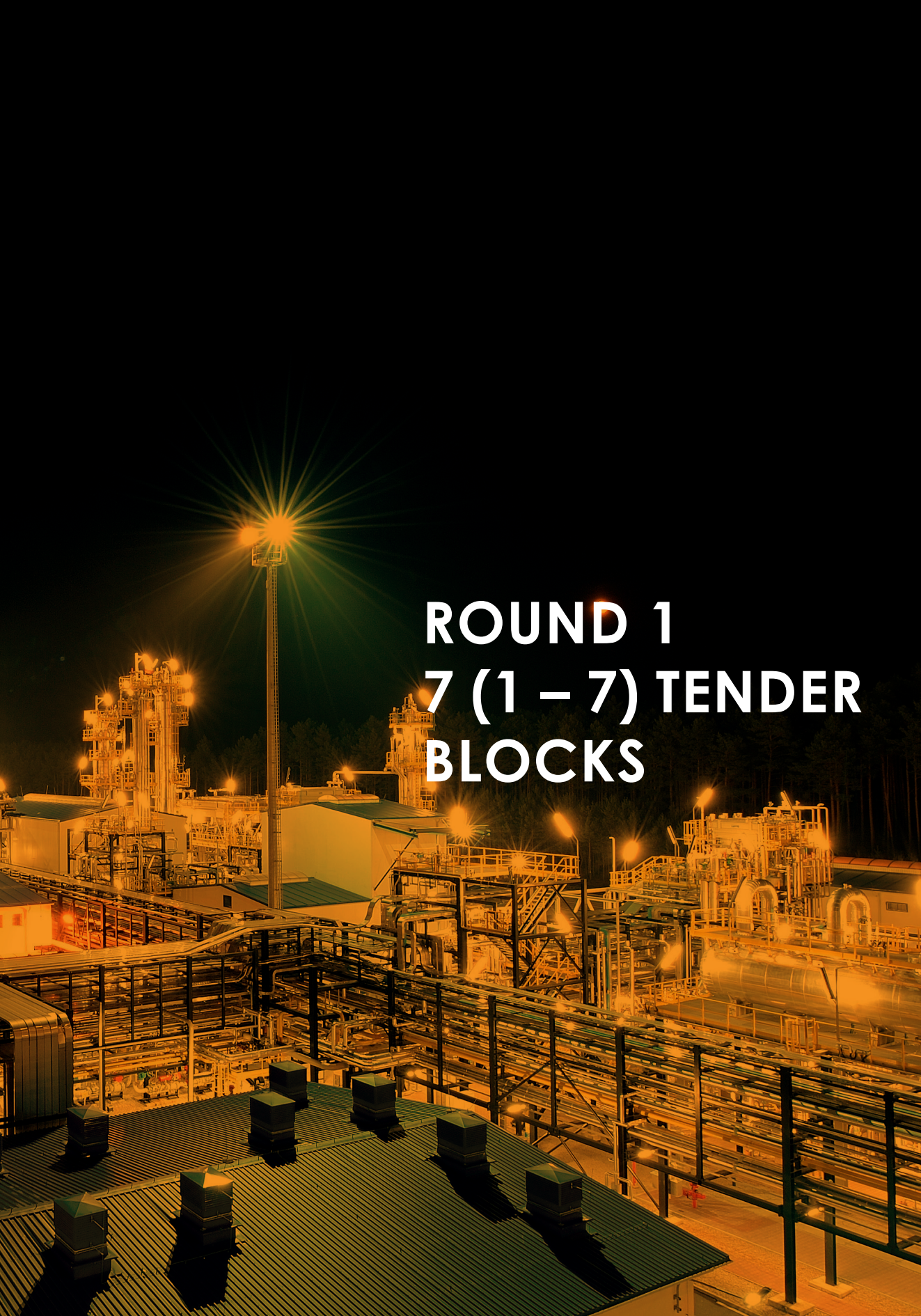
On 26th of June 2015 and 30th of June 2016, the Polish Ministry of the Environment announced two rounds (respectively round 1 and round 2) of planned concessions bidding for offered blocks dedicated to prospection, exploration and exploitation of hydrocarbons. All blocks have been selected and based 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 blocks offered for bidding, hoping that it will help to learn geological and geographical conditions of assumed hydrocarbon deposits occurrence.

Each tender block has its dedicated section with detailed description accompanied by the map of a respective block 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 blocks and encourage investments in the Polish oil and gas sector.

PGNiG S.A.



# ROUND 1
# 7 (1 – 7) TENDER BLOCKS

# NO.1 TENDER BLOCK BŁAŻOWA



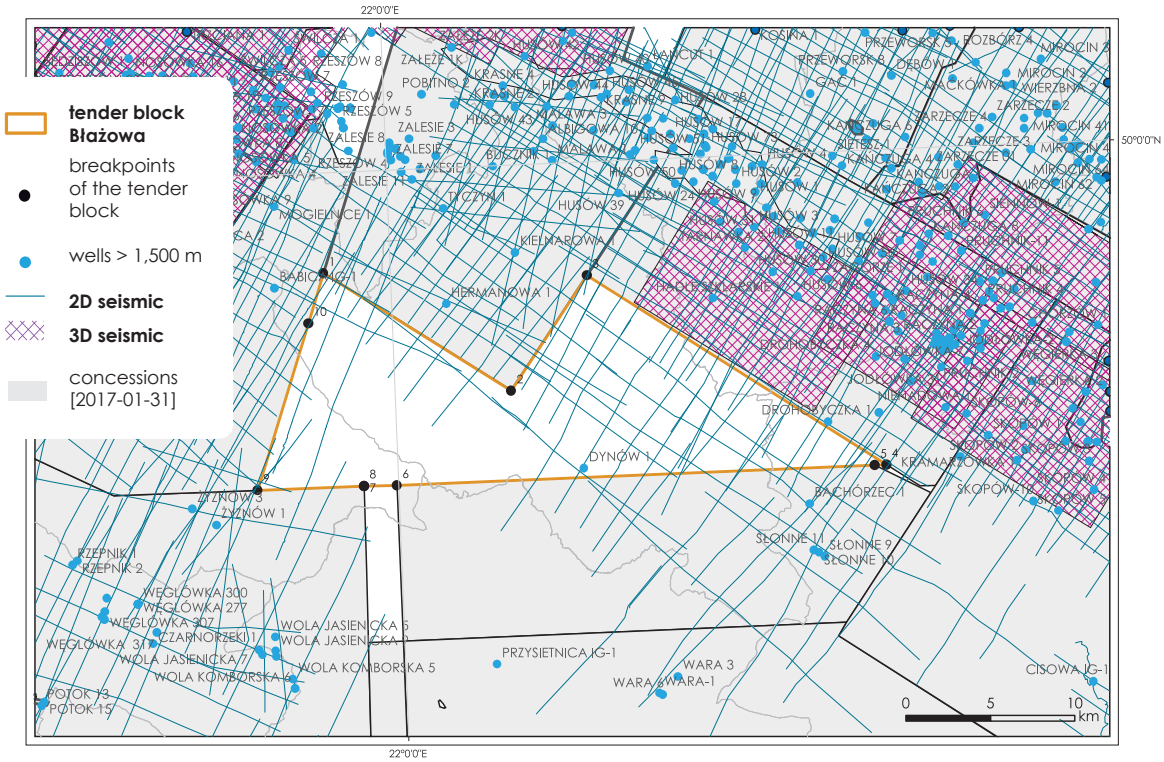
The hydrocarbon prospects in the **"Błażowa"** tender block are related to three working conventional petroleum systems developed in: (I) Cretaceous – Paleogene flysch deposits of the Outer Carpathians, (II) Miocene molasses of the Carpathian Foredeep and (III) deep Palaeozoic – Mesozoic basement. The 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 biogenic gas horizons 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 block. Several traps are still waiting for drilling.

**Acreage:** 270.05 km$^2$
66,731 acres

**Block name:** Błażowa
**Location:** onshore; part of Ministry of the Environment concession blocks: 416 and 417; in blocks of the following counties and communes: **Podkarpackie province:** Strzyżów county, commune: Niebylec (participation in the concession block 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%), Przemyśl 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**





# INFORMATION SHEET FOR TENDER BLOCK BŁAŻOWA

Licensing rounds:
information and opportunities
2017

◄ 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 stage:**
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 (1405m),
**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 BŁAŻOWA

Licensing rounds: information and opportunities 2017

◄ 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 1,054.61million m$^3$; 2014 production: 158.41million m$^3$, reserves: recoverable 2,239.38 million m$^3$ (economic reserves in place 333.64 million m$^3$)

**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$^3$; 2014 production: 3.96 million m$^3$, reserves: recoverable 396.49 million m$^3$ (economic reserves in place 168.4 million m$^3$)

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

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

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

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

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

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

# THE TENDER PROCEDURE

**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 26th, 2015<br>June 30th, 2016 | announcement Licensing of the tender blocks of respectively round 1 and round 2 |
| 2016<br>2017 PLANNED - DATE NOT YET DEFINED | a call for tender blocks for round 1<br>a call for tender blocks for round 2<br>a call for tender blocks for round 3 |
| till 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 will be given to the best systems of hydrocarbon deposits exploration and extraction or hydrocarbon production. The offers evaluation 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.**

**CONTINUATION OF THE TENDER PROCEDURE OVERVIEW ON THE PAGE 27**

# NO.2 TENDER BLOCK BYTÓW

## ◂ ROUND 1

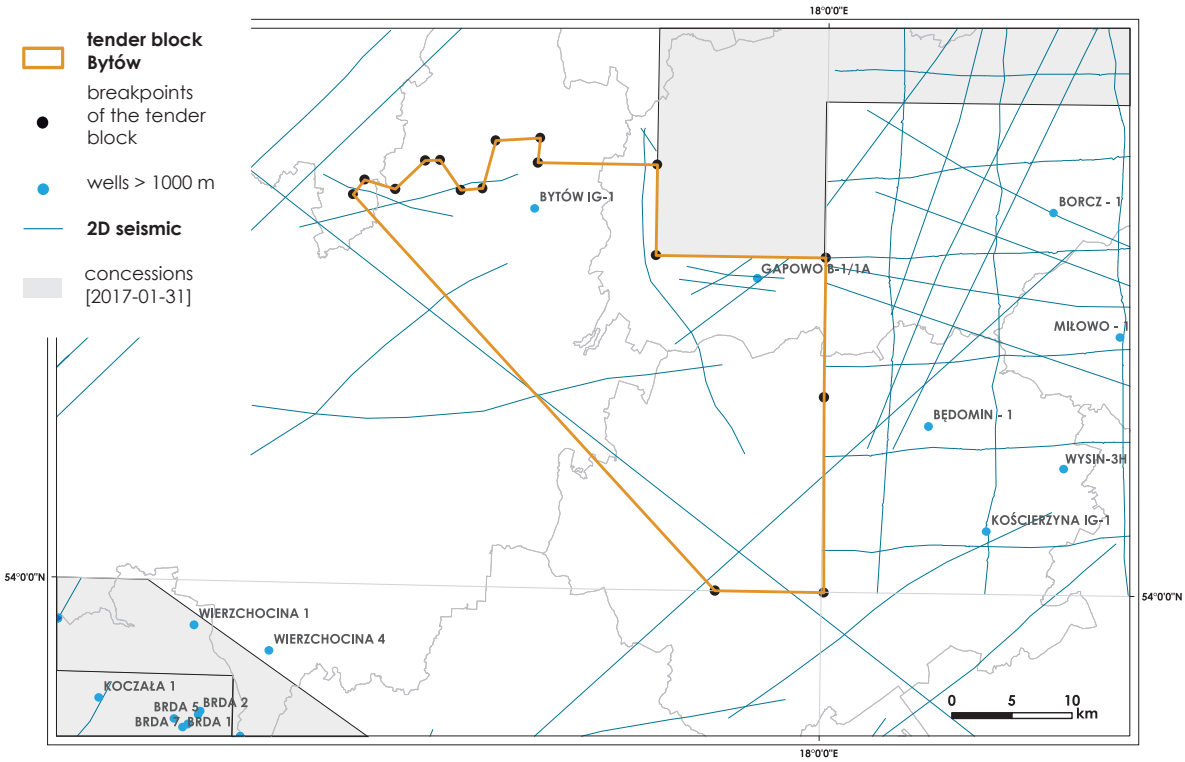
**"Bytów"** tender block is dedicated to the exploration of unconventional and conventional prospects in the onshore part of the Baltic Basin. Shale gas accumulations occur within the Ordovician (Caradocian) and Silurian (Llandovery) strata. Conventional oil accumulations occur in the Middle Cambrian 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 blocks for future continuation of shale gas exploration in Poland.

**Acreage:** 779.97 km$^2$
192,734 acres

**Block name:** Bytów
**Location:** onshore; part of Ministry of the Environment concession blocks: 47, 48, 67 and 68; in blocks of the following counties and communes: **Pomorskie province:** Słupsk county, commune: Dębnica Kaszubska (participation in the concession block 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: Stężyca (7.73%), Sulęczyno (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 BYTÓW

Licensing rounds:
information and opportunities
2017

◄ 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 sandstones

**Thickness of overburden:**
I – from about 3,700 m (Bytów IG-1 block) to about 4,000 m (Kościerzyna IG-1, Gapowo B-1 block)
II – about 4,250 m (Gapowo B-1 block)

**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 stage:**
Lower Paleozoic

**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

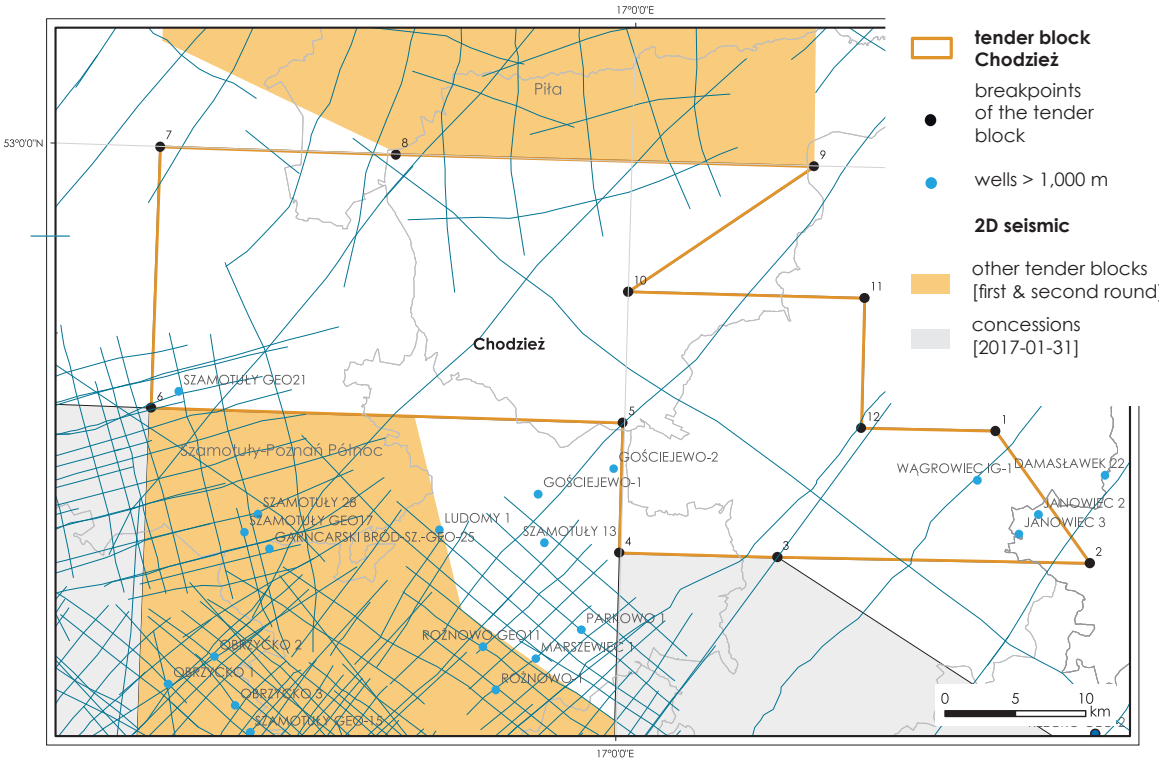
Hydrocarbon exploration prospects for **"Chodzież"** tender block are associated with deeply buried Rotliegend sandstones, mostly aeolian in origin. Deep burial of reservoirs rocks, exceeding up to 5000 m, results in conventional and unconventional (tight) gas traps suite, characterized by moderate porosity and low permeability predictions. Source rocks include Lower (Upper?) Carboniferous organic-rich mudstones and claystones. 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 block 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$^2$
276,530 acres

**Block name:** Chodzież
**Location:** onshore, part of Ministry of the Environment concession blocks: 166 and 167; in blocks of the following counties and communes: **Wielkopolskie province:** Czarnków - Trzcianka county, communes: Połajewo (participation in the concession block 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**





# INFORMATION SHEET FOR TENDER BLOCK CHODZIEŻ

Licensing rounds:
information and opportunities
2017

◄ 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 Golęczewo-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 stage:**
Permian

**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 (5,094.5 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 $m^3$
**Radlin (GZ)** – discovered in 1986, cumulative production (24 years) 7,843.55 million $m^3$; 2015 production: 178.94 million $m^3$, reserves: recoverable 3,226.45 million $m^3$ (economic reserves in place: 1,442.23 million $m^3$)
**Paproć (GZ)** – discovered in 1985, cumulative production (28 years) 4,230.4 million $m^3$; 2015 production: 182.45 million $m^3$, reserves: recoverable 3,438.80 million $m^3$ (economic reserves in place: 3,228.63 million $m^3$)
**Młodasko (GZ)** – discovered in 1985, cumulative production (24 years) 451.9 million $m^3$; 2015 production: 27.28 million $m^3$, reserves: recoverable 44.10 million $m^3$ (economic reserves in place: 43.86 million $m^3$)
II – no tight gas discovered in the Rotliegend

# NO.4 TENDER BLOCK LESZNO

## ◂ROUND 1

Hydrocarbon exploration prospects for **"Leszno"** tender block are associated with relative shallowly buried Rotliegend sandstones, mostly aeolian in origin. Hydrocarbon prospection 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 block. Stratigraphic, tectonic and geomorphic gas traps are expected to be encountered. Source rocks include Lower Carboniferous organic-rich mudstones, claystones and sandstones.

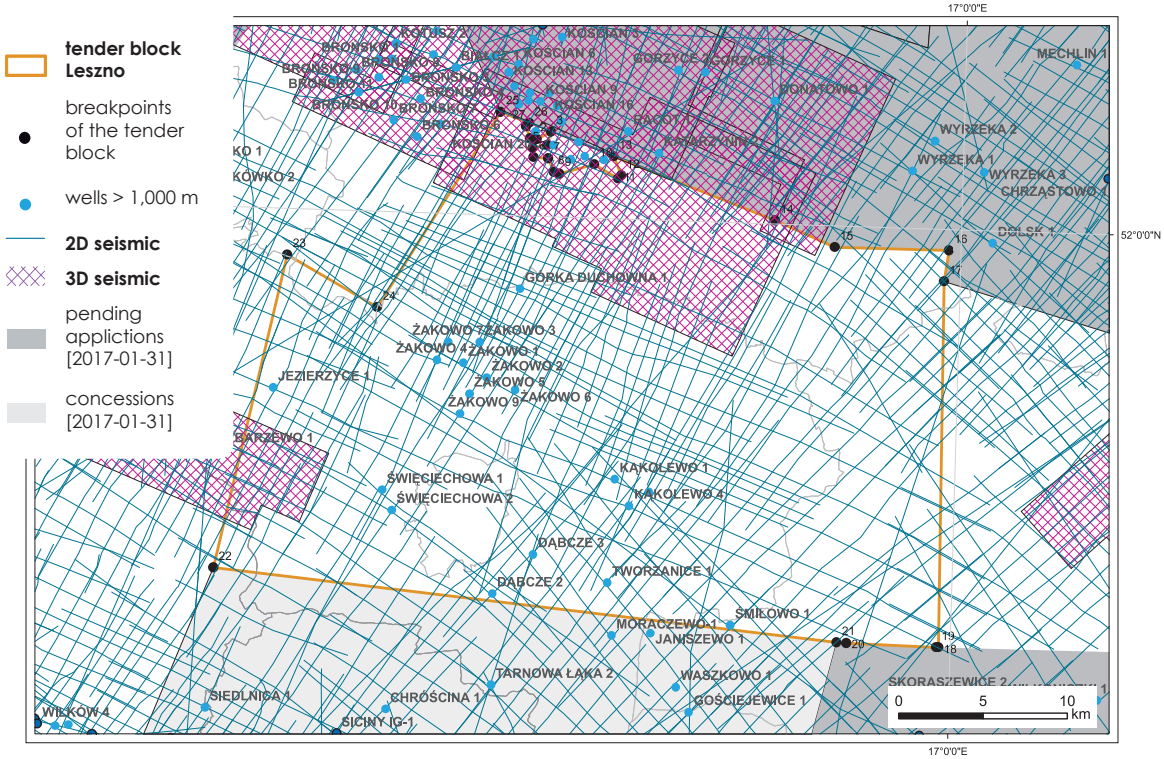
Extraction of moderate quality methane gas (over 70% of methane content) is expected (excluding small oil and gas traps in the Main Dolomite interval). Primary seal for hydrocarbon deposits is formed by Zechstein evaporites (anhydrite and salt). "Leszno" tender block was previously examined by POGC and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

**Acreage:**
966.43 km²
238,810 acres

**Block name:** Leszno
**Location:** onshore, part of Ministry of the Environment concession blocks: 226, 245 and 246; in blocks of the following counties and communes: **Wielkopolskie province:** Wolsztyn county, commune Przemęt (participation in the concession block <0.00%), Kościan county, communes: Śmigiel (9.10%), Kościan (2.57%), Krzywiń (11.56%), Leszno county, communes: Włoszakowice (4.04%), Lipno (10.73%), Święciechowa (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%)

**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**





# INFORMATION SHEET FOR TENDER BLOCK LESZNO

Licensing rounds:
information and opportunities
2017

◄ 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, Rotliegend 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 Rotliegend 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 Sława-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 stage:**
Carboniferous + Permian
**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):**
Jezierzyce 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), Śmiłowo 1 (2,130 m), Siciny 2 (3,520 m), Siciny IG-1 (3,000 m), Gościejewice 1 (2,048 m), Wycisłowo 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$^3$; 2015 production: 781.0 million m$^3$, reserves: recoverable 15,797.79 million m$^3$ (economic reserves in place 15,178.85 million m$^3$)
**Kościan S (GZ)** – discovered in 1995, cumulative production (14 years) 6,577.74 million m$^3$; 2015 production: 370.87 million m$^3$, reserves: recoverable 3,781.94 million m$^3$ (economic reserves in place 2,204.94 million m$^3$)
**Ruchocice (GZ)** – discovered in 2003; cumulative production (6 years) 348.28 million m$^3$; 2015 production: 40.99 million m$^3$, reserves: recoverable 484.72 million m$^3$ (economic reserves in place 453.02 million m$^3$)
**Wielichowo (GZ)** – discovered in 2002; cumulative production (6 years) 536.38 million m$^3$; 2015 production: 91.64 million m$^3$, reserves: recoverable 863.62 million m$^3$ (economic reserves in place 852.86 million m$^3$)
**Tarchały (GZ)** – discovered in 1970; cumulative production (42 years) 1,855.06 million m$^3$; 2015 production: 17.18 million m$^3$, reserves: recoverable 1,537.75 million m$^3$ (economic reserves in place 429.94 million m$^3$)
**Ujazd (GZ)** – discovered in 1978; cumulative production (38 years) 1,316.36 million m$^3$; 2015 production: 0.51 million m$^3$, reserves: recoverable 103.64 million m$^3$ (economic reserves in place 5.96 million m$^3$)
**Grodzisk Wielkopolski (GZ)** – discovered in 1976, exploited 1978-2004; cumulative production (27 years) 1,966.65 million m$^3$
**Żakowo (GZ)** – discovered in 1965, not exploited, reserves: recoverable 2,150 million m$^3$
**Kąkolewo (GZ)** – discovered in 1970, not exploited, reserves: recoverable 240 million m$^3$ (economic reserves in place: non)

# NO.5 TENDER BLOCK PIŁA ◂ ROUND 1

Hydrocarbon exploration prospects for **"Piła"** tender block 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 claystones.

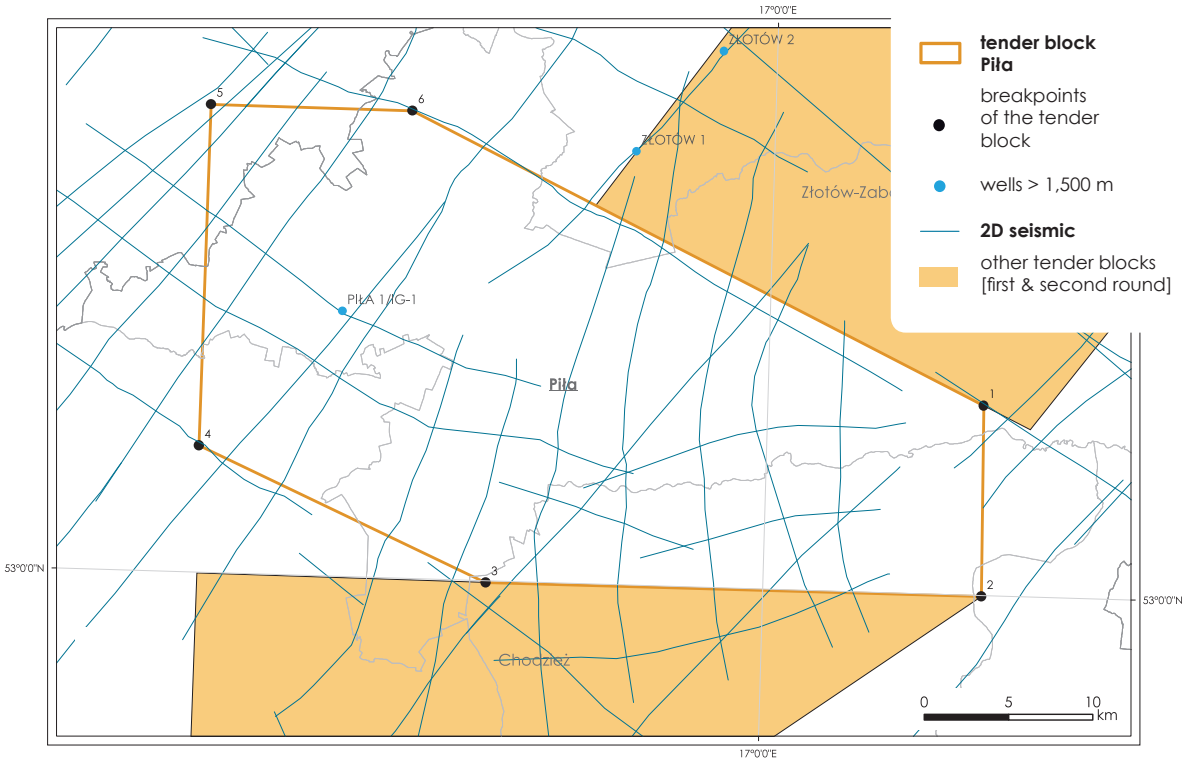
Extraction of good quality dry gas is expected. Primary seal for hydrocarbon deposits is formed by playa-lake claystones interbedded with aeolian sandstones. Secondary seal is formed by Zechstein evaporites (anhydrite and salt). "Piła" tender block is an exciting hydrocarbon prospect because it is very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

**Acreage:**
942.19 km$^2$
232,820 acres

**Block name:** Piła
**Location:** onshore, part of Ministry of Environment concession blocks: 146 and 147; in blocks of the following counties and communes: **Zachodniopomorskie province:** Wałcz county, commune Wałcz (participation in the concession block 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 - Ttrzcianka 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%)

**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 stage:**
Permian

**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 $m^3$

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

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

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

II – no tight gas doscovered in the Rotliegend

# NO.6 TENDER BLOCK PROSZOWICE

## ◂ROUND 1

Hydrocarbon exploration prospects for **"Proszowice"** tender block are associated with the shallowly buried Oxfordian (Upper Jurassic) organodetritic 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 blocks. "Proszowice" tender block was previously examined by POGC and Vabush Energy. Deeper Devonian, Carboniferous and Middle Jurassic reservoirs are still waiting to be explored.

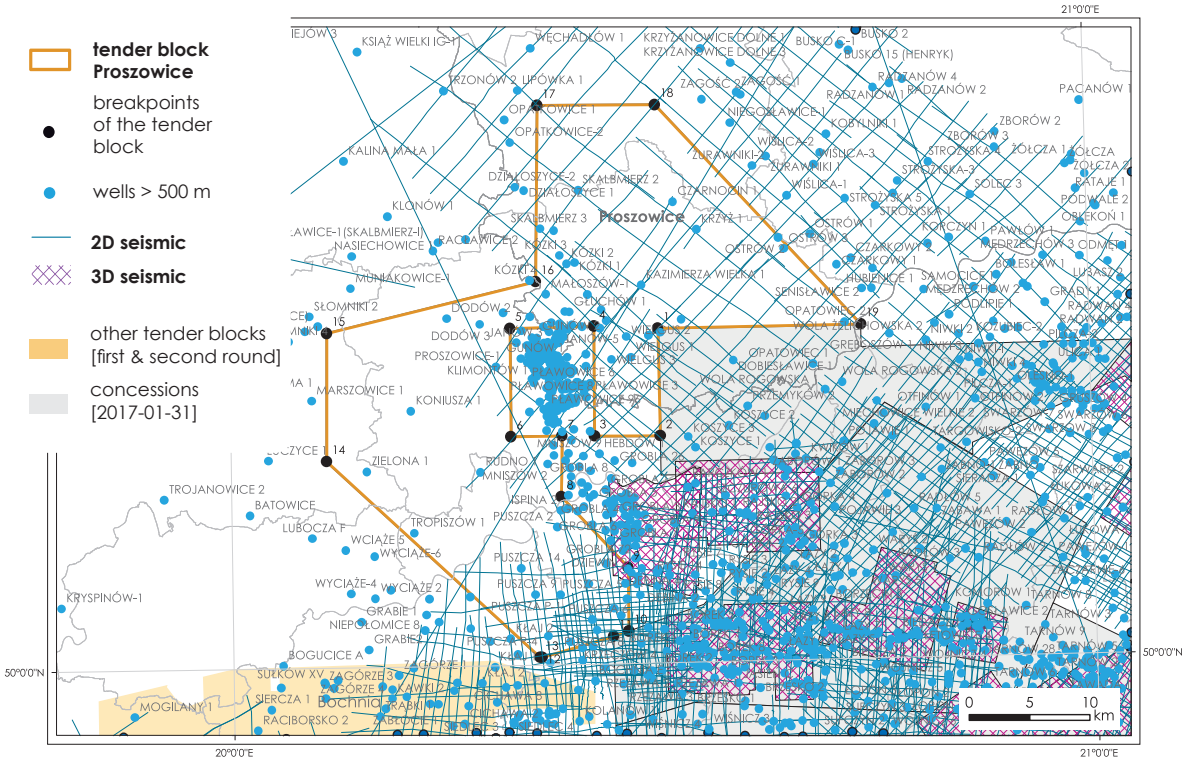
**Acreage:**
818.29 km$^2$
202,203 acres

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

**Block name:** Proszowice
**Location:** onshore, part of Ministry of the Environment concession blocks: 373, 374 and 393; in blocks of the following counties and communes: **Małopolskie province:** Kraków county, communes: Słomniki (participation in the concession block 2.04%), Kocmyrzów-Luborzyca (3.97%), Igołomnia-Wawrzeńczyce (6.30%), Kraków county, urban commune Kraków (0.29%), Proszowice county, communes: Radziemice (3.57%), Pałecznica (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: Skalbmierz (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 Puszcza-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 perspective 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 stage:**
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):**
Puszcza-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$^3$ 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; **Dąbrówka (GZ)** – discovered in 1976, cumulative production (38 years) 425.35 million m$^3$; 2014 production: 1.23 million m$^3$, reserves: recoverable 30.85 million m$^3$ (economic reserves in place: 8.02 million m$^3$); **Grądy Bocheńskie (GZ)** – discovered in 1985, cumulative production (18 years) 166.9 million m$^3$; 2014 production: non, reserves: recoverable 39.17 million m$^3$ (economic reserves in place: 14.05 million m$^3$); **Rajsko (GZ)** – discovered in 1997, cumulative production (3 years) 20.63 million m$^3$; 2014 production: 6.73 million m$^3$, reserves: recoverable 142.37 million m$^3$ (economic reserves in place: 54.37 million m$^3$);
**Rylowa (GZ)** – discovered in 1988, cumulative production (4 years) 66.46 million m$^3$; 2014 production: 27.11 million m$^3$, reserves: recoverable 478.54 million m$^3$ (economic reserves in place: 175.16 million m$^3$); **Rysie (GZ)** – discovered in 1985, cumulative production (25 years) 75.81 million m$^3$; 2014 production: 0.74 million m$^3$, reserves: recoverable 15.96 million m$^3$ (economic reserves in place: 1.47 million m$^3$); **Szczepanów (GZ)** – discovered in 1990, cumulative production (16 years) 707.24 million m$^3$; 2014 production: 9.87 million m$^3$, reserves: recoverable 206.96 million m$^3$ (economic reserves in place: 116.62 million m$^3$); **Łazy (GZ)** – discovered in 1995, cumulative production (7 years) 12.48 million m$^3$; 2014 production: non, reserves: recoverable 13.40 million m$^3$ (economic reserves in place: non);
**Łętowice-Bogumiłowice (GZ)** – discovered in 1993, cumulative production (18 years) 137.58 million m$^3$; 2014 production: 0.40 million m$^3$, reserves: recoverable 110.87 million m$^3$ (economic reserves in place: 21.15 million m$^3$)

# NO.7 TENDER BLOCK RYKI ◂ ROUND 1

The petroleum system in the **"Ryki"** tender block is developed in the Devonian, Mississippian and Pennsylvanian intervals of the Lublin Basin. Three oil-fields (Świdnik, Glinik, and Stężyca) and five gas-fields (Minkowice, Ciecierzyn, Mełgiew B, Mełgiew A, and Stężyca) have been discovered in the neighborhood of the block, so far. The Pennsylvanian Stężyca 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.

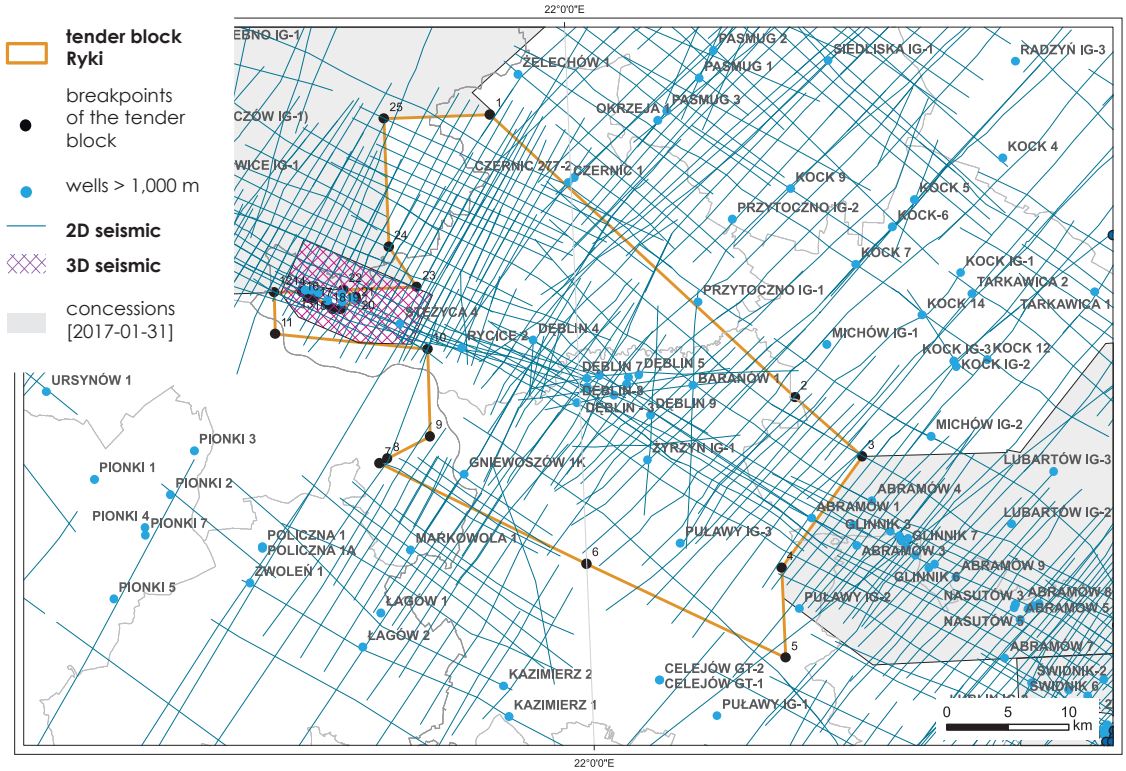
In the Devonian, the oil-field accumulation occurs in the Glinnik field in thin-layered sandstones and siltstones of the Famennian age. They are sealed by the Visean fine-grained clastics. The saturated horizon reaches 4.3 m in thickness, and the trap block is about 0.6 km$^2$. Numerous hydrocarbon shows, 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 block.

**Acreage:**
968.69 km$^2$
239,368 acres

**Block name:** Ryki
**Location:** onshore, part of Ministry of the Environment concession blocks: 276, 277, 296 and 297; in blocks of the following counties and communes: **Mazowieckie province:** Kozienice county, communes: Gniewoszów (participation in the concession block 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%), Stężyca (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%), Nałęczów (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**





# INFORMATION SHEET FOR TENDER BLOCK RYKI

Licensing rounds:
information and opportunities
2017

◄ 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-Radzyń Podlaski-Kock 2D (PGNiG)
1993 Żelechów-Radzyń 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-Stężyca 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 stage:**
Paleozoic

**Source rock:**
I – Devonian (Frasnian and Famennian) and Carboniferous 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:** Stężyca 1 (3,724 m)

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

**Glinnik (RN)** – discovered in 1991, cumulative production 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 $m^3$; 2014 production: 0.04 million $m^3$, reserves: recoverable 0.68 million $m^3$ (economic reserves in place: 0.52 million $m^3$)

**Stężyca (GZ)** – discovered in 2002, cumulative production 404.33 million $m^3$; 2014 production: 0.69 million $m^3$, reserves: recoverable 402.88 million $m^3$ (economic reserves in place: 106.42 million $m^3$)

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

**Ciecierzyn (GZ)** – discovered in 1988, cumulative production 171.59 million $m^3$ (from 2000); 2014 production: 15.24 million $m^3$, reserves: recoverable 472.32 million $m^3$ (economic reserves in place: 259.88 million $m^3$)

Mełgiew A and B (GZ) – discovered in 1997, cumulative production 451.57 million $m^3$ (from 2003); 2014 production: 23.13 million $m^3$, reserves: recoverable 800.43 million $m^3$ (economic reserves in place: 172.59 million $m^3$)

PGNiG S.A.

# ROUND 2
# 10 (8 –17) TENDER BLOCKS

# NO.8 TENDER BLOCK BOCHNIA ◂ ROUND 2

The hydrocarbon potential of the **"Bochnia"** tender block 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 blocks. At least two conventional working petroleum systems occur at the block. 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.

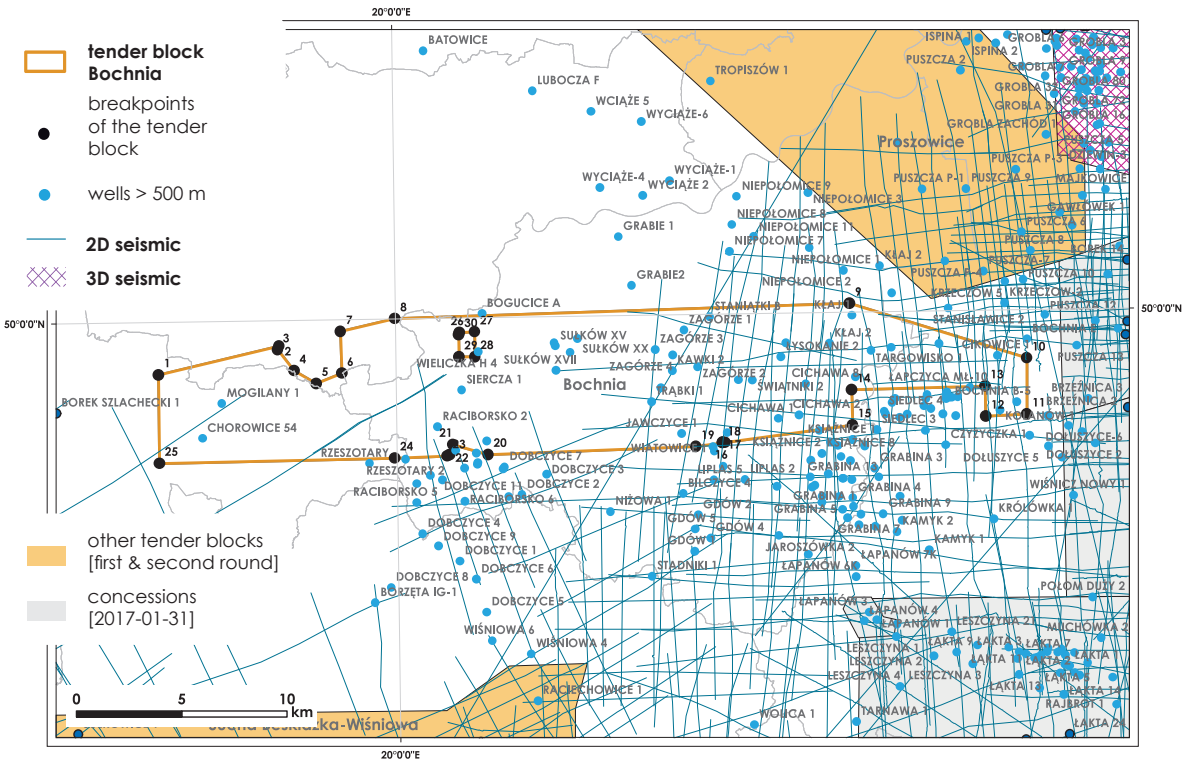
The second petroleum system occurs below, at depths between 500 and 4,500 m. Apart from the Jurassic and Cretaceous strata, high porosity was observed also in the Cambrian and Lower Devonian sandstones and in the Middle and Upper Devonian carbonates, while only the Middle Jurassic claystones are supposed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

**Acreage:**
218.9 km²
54.092 acres

**Block name:** Bochnia
**Location:** onshore, part of Ministry of the Environment concession blocks: 393, 412, 413; in block of the following counties and communes: **Małopolskie province:** Kraków county, communes: Skawina (participation in the concession block 1.7%), Mogilany (11.50%), Świątniki 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%)

**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 natural gas**





# INFORMATION SHEET FOR TENDER BLOCK BOCHNIA

Licensing rounds:
information and opportunities
2017

◄ 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 – Claystones of the autochthonous Miocene, Badenian evaporates and locally flysch of the Silesian and Subsilesian Units 500 – 1,000 m
II – Impermeable fine-grained flysch rocks 0 – 100 m
III – Locally flysch of the Silesian and Subsilesian Units, claystones of the autochthonous Miocene, locally Badenian evaporates,
generally 100 - 500 m

**Structural stage:**
Carpathian Orogenic Belt, West European Platform

**Source rock:**
I – Middle Jurassic mudstones and claystones, possible migration from southern blocks
II – Lower Cretaceous Cieszyn shales, Wierzowice shales, Grodzisk shales, Lgota shales, Oligocene minilite shales of all units
III – 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 – Structural, stratigraphical
II – Structural, structural-lithological, lithological
III – Structural, compaction antyclines

**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)



**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)

**INFORMATION CONTINUED ON THE NEXT PAGE**

# INFORMATION SHEET FOR TENDER BLOCK BOCHNIA



**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$^2$ 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$^3$; anticipated economic resources: 328 million m$^3$, production in 2015: 1.96 million m$^3$, economic resources in place 12.96 million m$^3$, sub-economic (marginal) resources: 431.77 million m$^3$

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

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

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

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

# 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.

CONTINUATION OF THE TENDER PROCEDURE OVERVIEW
ON THE PAGE 37

# NO.9 TENDER BLOCK
# BZIE-DĘBINA – STRUMIEŃ

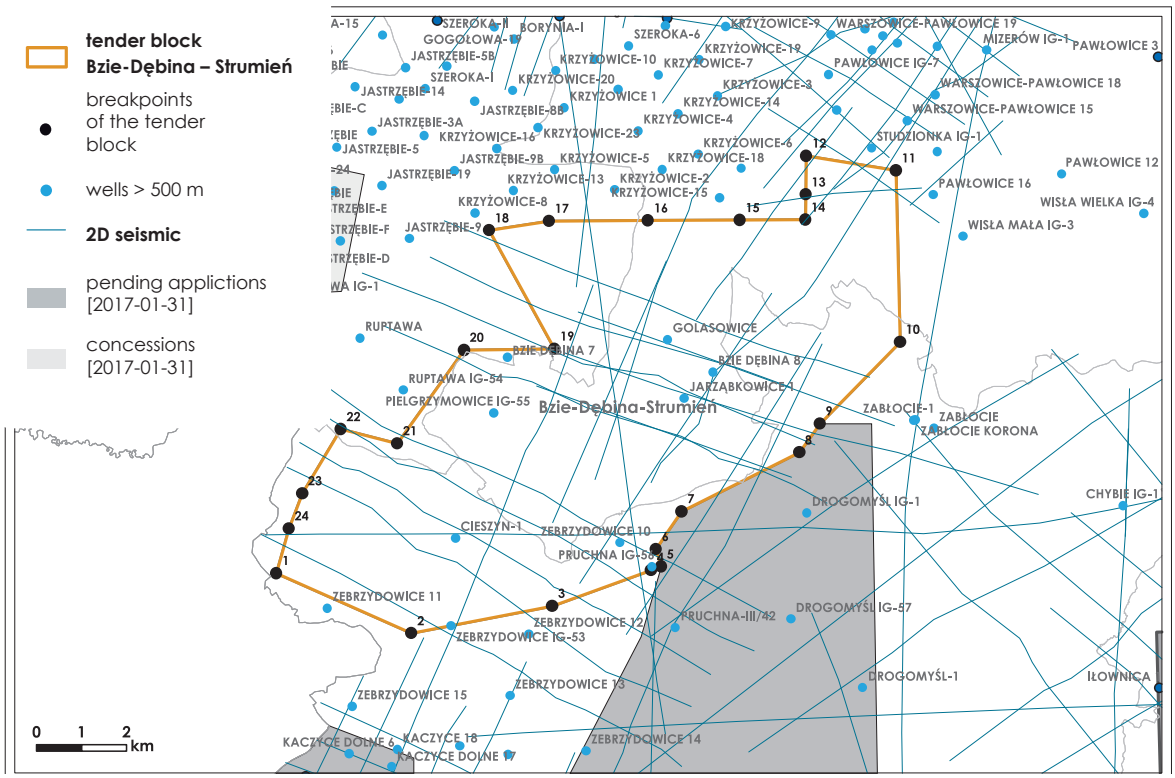
**"Bzie-Dębina – Strumień"** tender block is located in the southern part of the Upper Silesian Coal Basin. It is associated with unconventional gas deposits - Carboniferous coalbed methane (CBM). Coal, the largest energy natural resource in the country, has been widely mined in the nearby block since 18th century. Therefore, it is well examined by Jastrzębska Spółka Węglowa S.A., but also by Texaco Inc. (in the matter of CBM). Depths of 500-1,500 m, continuous seams, favorable coal seams thickness and high gas content prove this block as very promising.

**Acreage:**
78.13 km²
19,305 acres

**Block name:** Bzie-Dębina – Strumień
**Location:** onshore; Ministry of the Environment concession: block 410; in blocks of the following counties and communes: **Śląskie province:** Cieszyn county, communes: Strumień (participation in the concession block 15.86%), Zebrzydowice (22.41%), Pszczyna county, communes Pawłowice (45.37%), Pszczyna (5.09%), Jastrzębie Zdrój county, commune Jastrzębie Zdrój (11.27%)

**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:** **Coal Bed Methane (CBM)**





# 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 stage:**
Paleozoic (Carboniferous)

**Source rock:**
Upper Mississippian to Lower Pennsylvanian

**Seal rock:**
Miocene (Skawina Formation)

**Trap type:**
lithological

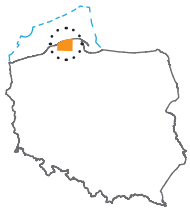
**Key and offset wells (MD):**
**Key wells:** Bzie-Dębina 2/91,-3/91 (1,552.3-1,610.0 m), Bzie-Dębina 3,-4,-7,-8,-13,-16,-17,-18,-19,-20,-21,-24,-25,-26,-27,-28,-31,-33,-42,-45,-46,-47,-48,-49,-50,-51,-52,-54,-55,-60,-61 (1,345.0-1,856.0 m), Pawłowice 18,-19 (1,484.0-1,545.0 m), Zebrzydowice-7,-8,-9,-10 (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$^3$
**Bzie-Dębina 1 (CMM)** – reserves: recoverable 398.38 million m$^3$
**Bzie-Dębina (CMM)** – reserves: recoverable 5,371.3 million m$^3$
**Pawłowice – rej. (CMM)** – reserves: recoverable 1,708.60 million m$^3$
**Zebrzydowice (VCBM)** – reserves: recoverable 1,424.75 million m$^3$
**Bzie-Dębina 2 Zachód (CMM)** – 2015 production: none, emissions: 2.42 million m$^3$, reserves: recoverable 276.8 million m$^3$ (economic reserves in place 26.82 million m$^3$)
**Zofiówka (CMM)** – 2015 production: 17.04 million m$^3$, emissions: 27.02 million m$^3$, reserves: recoverable 736.96 million m$^3$ (economic reserves in place 347.01 million m$^3$)
**Pniówek (CMM)** – 2015 production: none, emissions: 2.63 million m$^3$, reserves: recoverable 3,108.42 million m$^3$ (economic reserves in place 659.23 million m$^3$)
**Pawłowice 1 (CMM)** – 2015 production: 42.8 million m$^3$, emissions: 77.09 million m$^3$, reserves: recoverable 1,627.34 million m$^3$ (economic reserves in place 228.23 million m$^3$)

# NO.10 TENDER BLOCK DAMNICA ◂ ROUND 2

**"Damnica"** tender block 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 block. Shale gas production rates reported at Warblino site (2011) on "Damnica" tender block and exploration sites on the neighboring "Żarnowiec" tender block are believed to be a good prognostics for future continuation of shale gas exploration on the „Damnica" tender block.

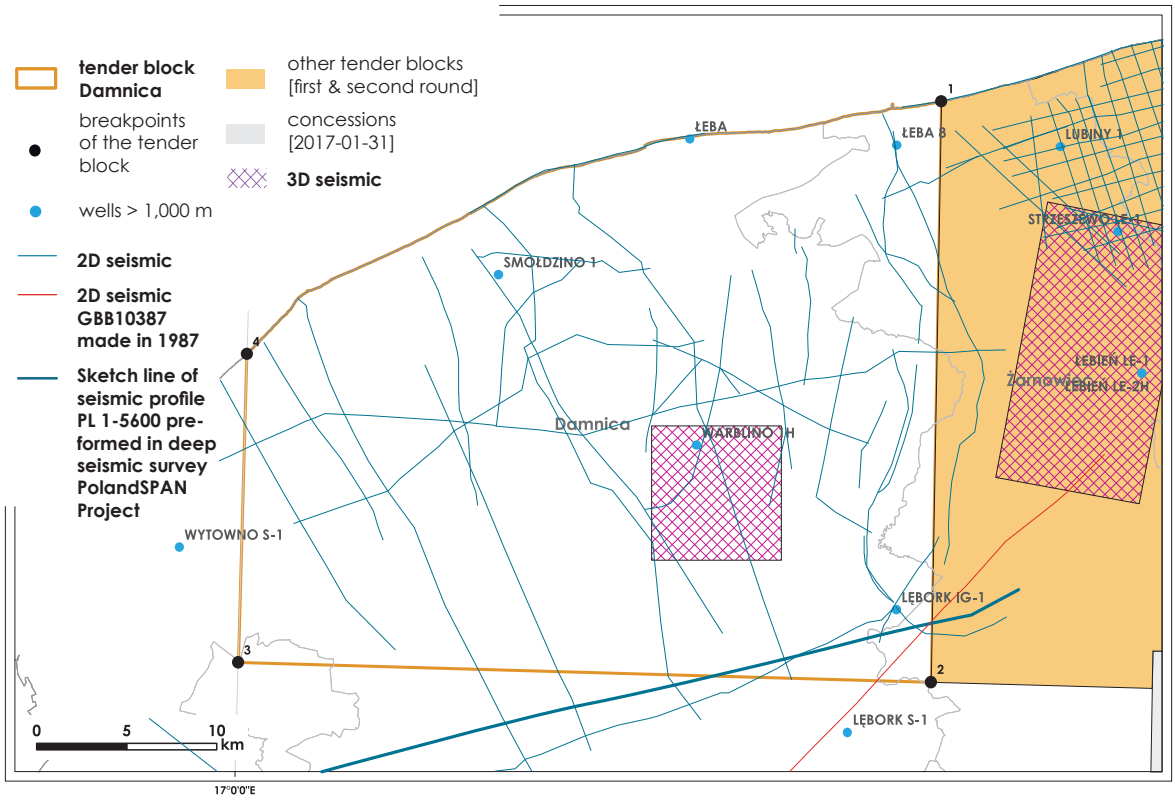


**Acreage:**
1,039.29 km²
256,814 acres

**Block name:** Damnica
**Location:** onshore, part of Ministry of the Environment concession blocks: 7, 8, 27, 28, 47, 48; in block of the following counties and communes: **Pomorskie province:** Słupsk county, communes: Ustka (participation in the concession block 7.40%), Smołdzino (25.01%), Słupsk (9.48%), Główczyce (30.57%), Damnica (10.15%), Potęgowo (7.17%), Słupsk city county: commune Słupsk (0.50%); Lębork county: communes Nowa Wieś Lęborska (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**





# INFORMATION SHEET FOR TENDER BLOCK DAMNICA

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 and Lower Cambrian sandstones

**Thickness of overburden:**
Average 2,990 m (value for well Lębork IG 1)

**Key and offset wells (MD):**
Lębork 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-Słupsk-Łeba (State Treasury)
1971 Darłowo – Wejherowo (State Treasury)
1972 Ustka - Łeba, Żarnowiec – Władysławowo (State Treasury)
1987 Kostrzyn – Lębork (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 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 stage:**
Lower Paleozoic

**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 – Unconvetional 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 (ktonnes) of condensate, natural gas associated: 26.93 million m$^3$; in 2015 production 0.11 ktonnes of condensate, natural gas associated: 0.07 million m$^3$; exploitable resources 42.33 ktonnes, (economic resources in place 1.68 ktonnes); 6.96 million m$^3$, (economic resources in place 1.39 million m$^3$)
**„Żarnowiec W" (RN)** – discovered in 1990, cumulative production (21 years) 4.2 ktonnes of condensate, natural gas associated: 25.65 million m$^3$; in 2015 production 0.11 ktonnes of condensate, natural gas associated: 0.07 million m$^3$; exploitable resources 17.81 ktonnes, (economic resources in place 3.85 ktonnes); 2.35 million m$^3$, (economic resources in place 1.50 million m$^3$ )
**„Dębki" (RN)** – discovered in 1978, cumulative production (44 years) 36.169 ktonnes of crude oil, natural gas associated: 10.201 million m$^3$; in 2015 production 0.61 ktonnes of crude oil, natural gas associated 0.22 million m$^3$; exploitable resources 8.62 ktonnes, (economic resources in place 5.19 ktonnes); 3.0 million m$^3$ (economic resources in place 4.23 million m$^3$ )
**„Białogóra–E" (RN)** – discovered in 1991, cumulative production (16 years) 2.917 ktonnes of crude oil, natural gas associated: 2.4185 million m$^3$; 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$^3$, (economic resources in place 1.02 million m$^3$)

# NO.11 TENDER BLOCK DEBRZNO – CZŁUCHÓW

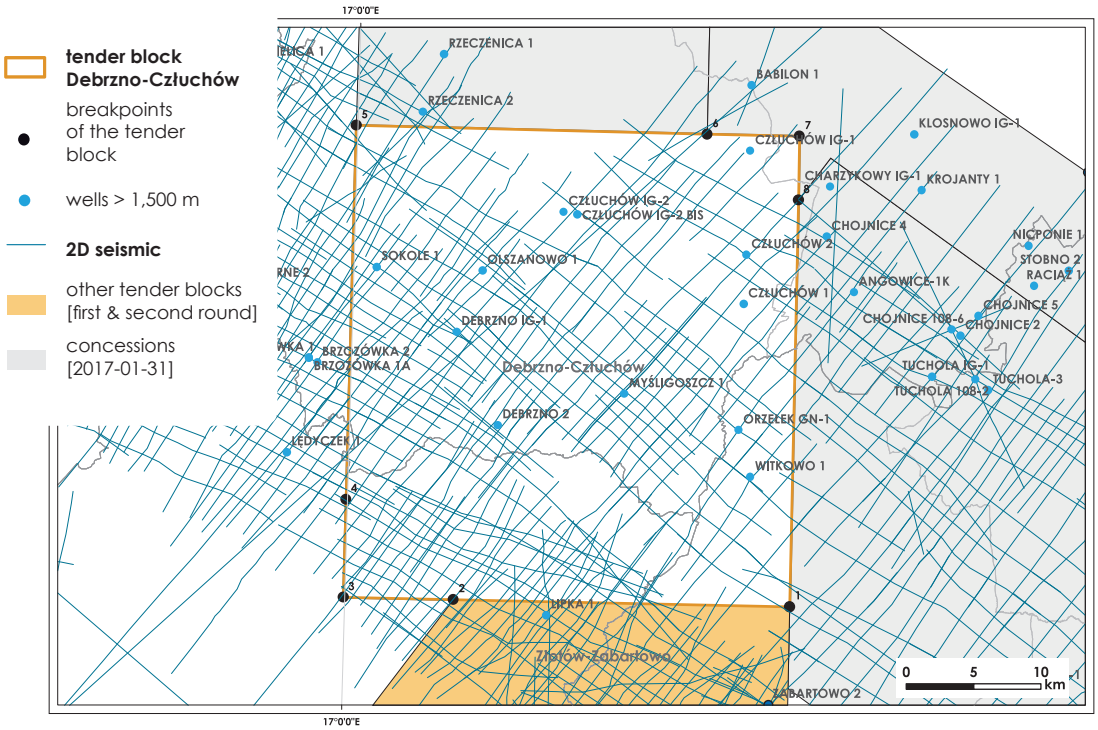
The **"Debrzno-Człuchów"** tender block is located on the edge of East European Craton and Paleozoic-Mesozoic platform margin zone, which is widely considered as prospection target. The hydrocarbon prospects of the "Debrzno-Człuchów" tender block are associated with complex and multistage petroleum system. 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 considered secondary source rocks. Lithological, structural, tectonic and stratigraphic traps are expected. 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 intra-formation seals. Hydrocarbon deposits have been documented in its wide neighborhood, confirming the potential for oil and gas-exploration.

**Block name:** Debrzno - Człuchów
**Location:** onshore, part of Ministry of the Environment concession blocks: 107, 127; in block of the following counties and communes: **Pomorskie province:** Człuchów county, commune: Czarne (participation in the concession block 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%)



**Acreage:**
1,158.97 km$^2$
286,388 acres

**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**



# INFORMATION SHEET FOR TENDER BLOCK DEBRZNO – CZŁUCHÓW

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)
II – Zechstein – Main Dolomite

**Reservoir rock:**
I – Devonian sandstones and carbonate rocks, Carboniferous sandstones and 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 stage:**
Lower Paleozoic

**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- Lędyczek], (PGNiG S.A.); 1993 Szczecinek-Złotów [Rzeczenica-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-Lędyczek 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$^2$ 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$^3$ (32 years), in 2015 production – natural gas 14.13 million m$^3$, exploitable resources of natural gas 59.43 million m$^3$ (pending evaluation of resources)

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

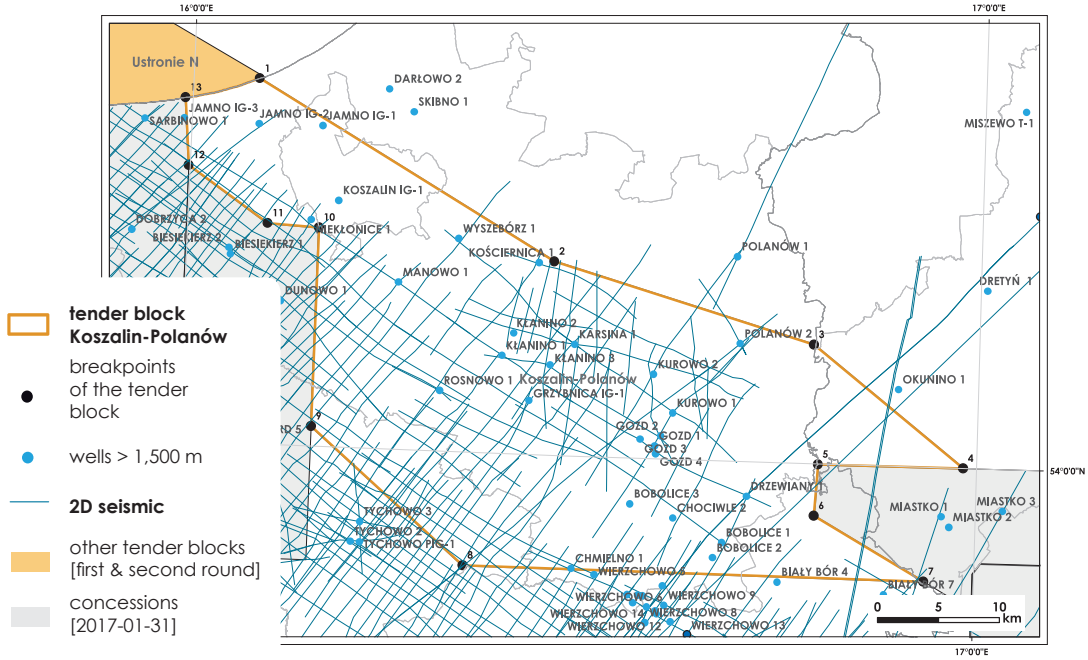
# NO.12 TENDER BLOCK KOSZALIN – POLANÓW

The hydrocarbon prospects of the **"Koszalin-Polanów"** tender block 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 block. 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 intraformation seals, whereas the Ordovician shales are considered as additional seal in the fault zones. The "Koszalin-Polanów" tender block 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.

**Acreage:**
1,198.69 km²
296,200 acres

**Block name:** Koszalin - Polanów
**Location:** onshore, Part of Ministry of the Environment concession blocks: 44, 45, 64, 65, 66, 85, 86; in blocks of the following administrative districts: **Pomorskie province:** Słupsk county, commune Kępice (participation in the concession block <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%), Szczecinek 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**



# 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)
II – Zechstein – Main Dolomite

**Reservoir rock:**
I – Devonian sandstones and carbonate rocks, Carboniferous sandstones and limestones, Permian sandstones
II – Zechstein dolomites and limestones

**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 stage:**
Paleozoic

**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
Rotliegend – structural, tectonic and stratigraphic
II – Main Dolomite – lithological-facial and structural



**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$^2$ 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$^3$ of natural gas (26 years), in 2015 production – 25.25 million m$^3$, exploitable resources 999.47 million m$^3$; Economic resources in place 225.74 million m$^3$

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

**Daszewo (RN)**, discovered in 1980, cumulative production – 180.61 ktonnes of crude oil (21 years), 97.75 million m$^3$ 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$^3$ of natural gas (buffer gas)

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

**Tychowo (RN)**, discovered in 1988, cumulative production – 20.742 ktonnes of crude oil, 5.972 million m$^3$ of natural gas (8 years), in 2015 production – none, exploitable resources: 19 ktonnes of crude oil, 5.86 million m$^3$ 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$^3$ (42 years), in 2015 production – none, exploitable resources: 10.78 million m$^3$ of natural gas, economic resources in place 10.69 million m$^3$

# 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 | for a consortium member |
|---|---|
| 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 | 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.**



**CONTINUATION OF THE TENDER PROCEDURE OVERVIEW ON THE PAGE 41**

# NO.13 TENDER BLOCK SUCHA BESKIDZKA – WIŚNIOWA

The hydrocarbon prospects in the **"Sucha Beskidzka – Wiśniowa"** tender block 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 overthrusted over the autochthonous Miocene of the Carpathian 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 block. At least 7 traps documented on the seismic profiles are still waiting for exploration.

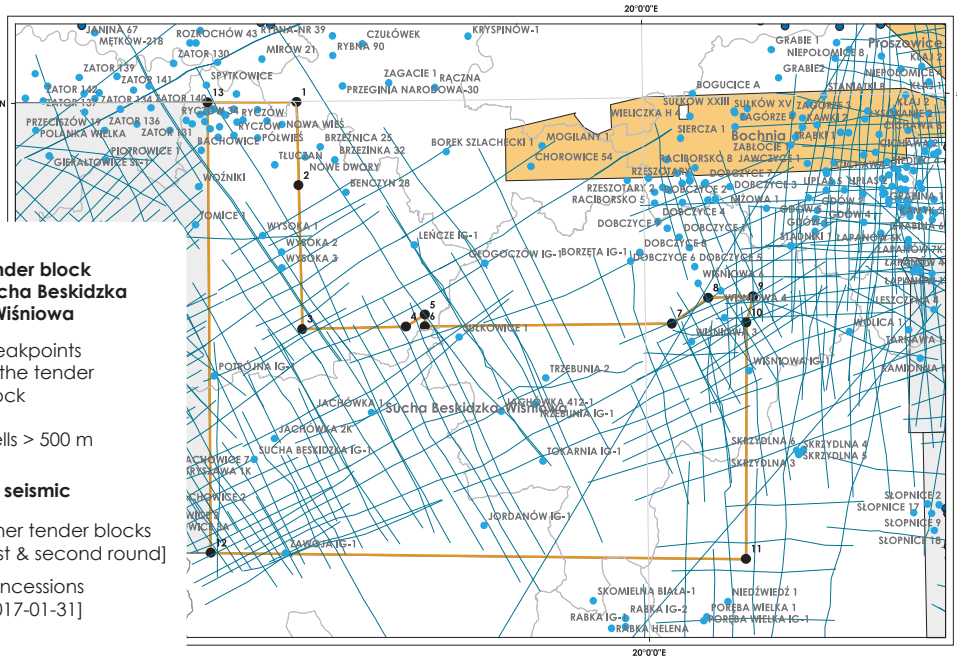
**Block name:** Sucha Beskidzka-Wiśniowa
**Location:** onshore, part of Ministry of the Environment concession blocks: 412, 413, 432, 433; in block of following counties and communes: **Małopolskie province:** Kraków county, commune: Czernichów (participation in the concession block 0.16%), Limanowa 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%), Spytkowice (2.42%), Tomice (2.09%)



**Acreage:**
981.67km²
242,576 acres

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

**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



# 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

**Structural stage:**
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 menilite 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, stuctural, complex

**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-Myslenice Geofizyka Kraków Sp. z o.o., Kraków (PGNiG S.A.)
1993 Lachowice-Myslenice [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)

**INFORMATION CONTINUED ON THE NEXT PAGE**

# INFORMATION SHEET FOR TENDER BLOCK SUCHA BESKIDZKA – WIŚNIOWA



**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 – Stryszawa (GZ, RN)** – discovered in 1995; unexploited – exploitable resources: 240 million $m^3$

**Łapanów (GZ)** – discovered in 2008; cumulative production (2 years): 18.04 million $m^3$; in 2015 production: 17.92 million $m^3$; exploitable resources – economic resources in place: 307.28 million $m^3$

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

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

# THE TENDER PROCEDURE SCHEME

**Selection of the tender blocks and definition of the minimum scope of works, based on perspectivity assessment**
Ministry of the Environment

▼

**Preparation of tender blocks information packages**
(Polish Geological Survey, in consultation)
with Ministry of the Environment

▼

OFFSHORE

**Approval**
Ministry of Economy, Maritime Office, head of local administration, mayor of town/city
Ministry of the Environment

ONSHORE

**Opinion**
head of local administration, mayor of town/city
Ministry of the Environment

▼

**Publication of a tender notice in the Official Journal of EU**
Ministry of the Environment

▼

**Reception of offers**
Ministry of the Environment

▼

**Evaulation and the selection of the most favourable offer**
Ministry of the Environment

▼

**The granting of a concession and the conclusion of an agreement on the establishment of the mining usufruct**
Ministry of the Environment

# NO.14 TENDER BLOCK SZAMOTUŁY – POZNAŃ PÓŁNOC

Hydrocarbon exploration prospects for tender block **"Szamotuły-Poznań Północ"** are associated with Upper Paleozoic and Permian petroleum system. The most important target for natural gas exploration are Rotliegend sandstones which are the major reservoir rocks in this block. 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 blocks, especially those located to the south-west.

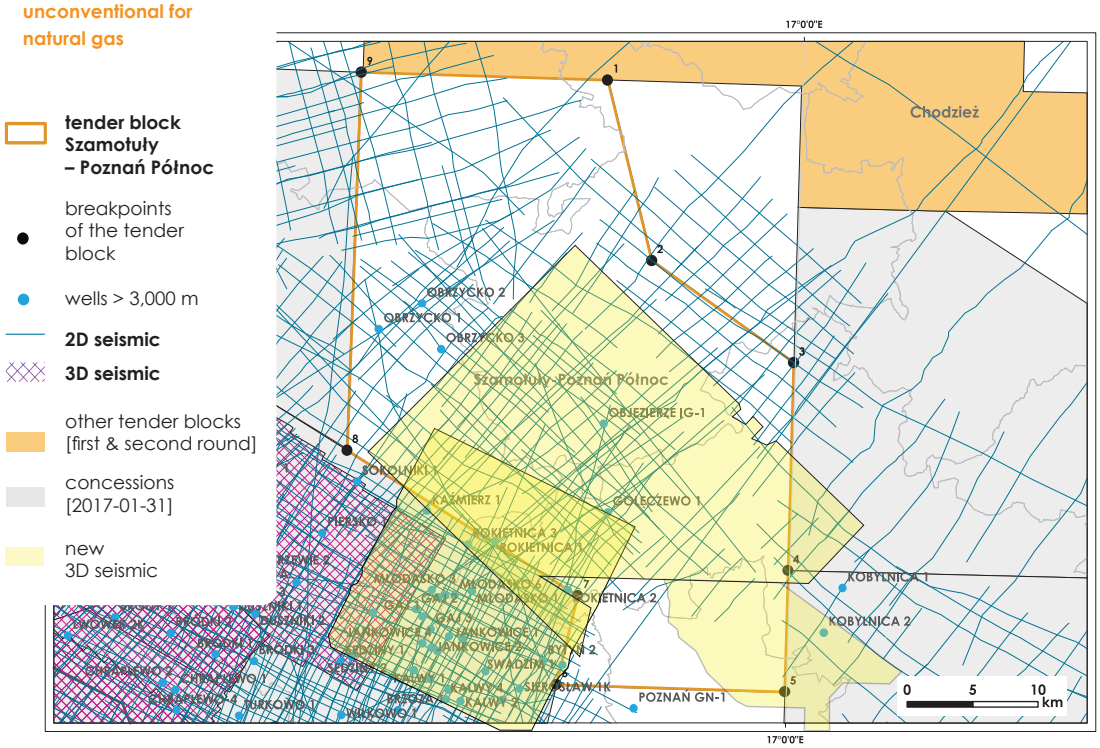
**Acreage:**
1,138.34 km²
281,289 acres

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

**Block name:** Szamotuły-Poznań Północ
**Location:** onshore, part of Ministry of the Environment concession blocks:186, 166, 206; in block of the following counties and communes: **Wielkopolskie province:** Czarnków-Trzcianka county, communes: Czarnków (participation in the concession block <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%), Murowana 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%), Kaźmierz (<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





# 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, Zechstein Limestone, Main Dolomite, Carboniferous sandstones

**Thickness of overburden:**
> 2,750 m

**Key and offset wells (MD):**
Człuchów-1(1,953 m); Debrzno IG-1(5,010 m)

**Structural stage:**
Paleozoic

**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 Stęszew] (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-Stęszew [Pniewy-Stęszew] (PGNiG S.A.)
1998 Pniewy-Stęszew [Opalenica] (PGNiG S.A.)
1999 Pniewy-Stęszew [Tarnowo Podgórne] (PGNiG S.A.)
2004 Pniewy-Stęszew [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$^3$ (24 years); in 2015 production – 27.28 million m$^3$; exploitable resources – 44.1 million m$^3$; economic resources in place – 43.86 million m$^3$

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

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

# NO.15 TENDER BLOCK USTRONIE N

## ◂ROUND 2

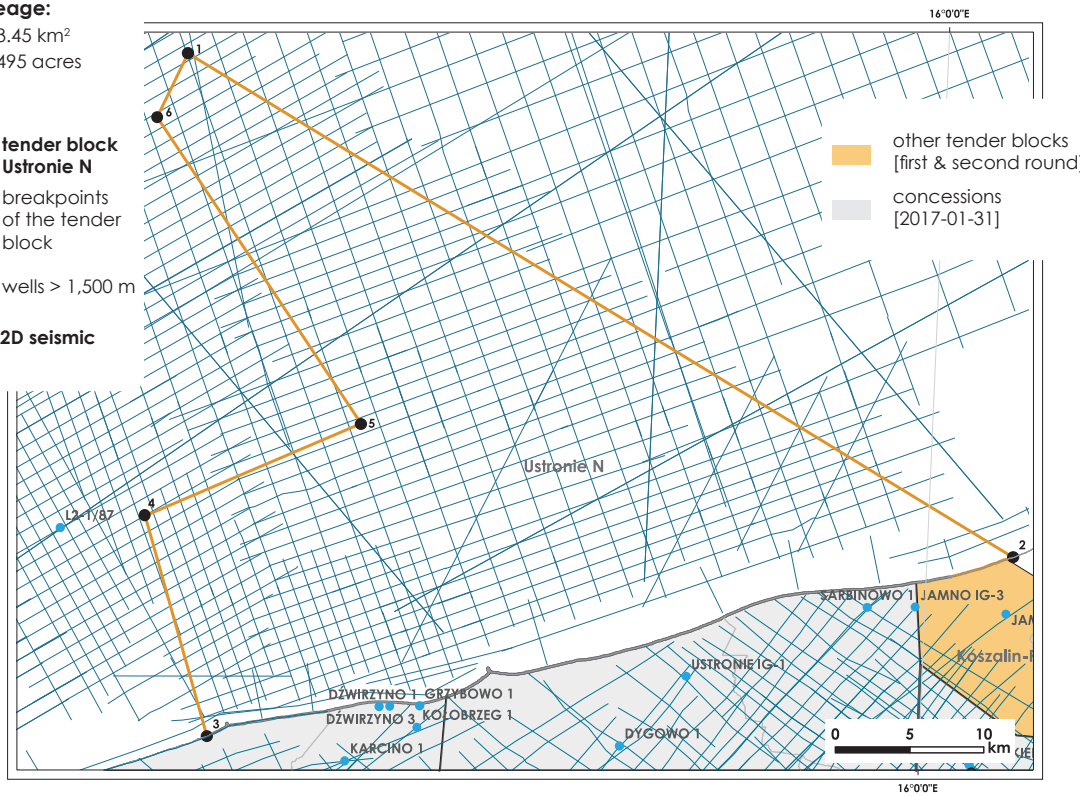
Three different petroleum systems are developed in the **"Ustronie N"** tender block. They occur in the sub-Variscan Lower and Upper Palaeozoic, as well as in the Permian Strata. High potential for oil and gas-exploration of these systems is proved by hydrocarbon accumulations discovered on the onshore 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 block occur in the stratigraphic-structural traps developed along a system of faults, which continuation is expected also on the offshore block. The Zechstein evaporites constitute the regional horizon of seal rocks with effective isolation in the southern and western part of the tender block. At least three traps – L1, L12 and L15 are still waiting for exploration.

**Block 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 km²
287,495 acres



# INFORMATION SHEET FOR TENDER BLOCK USTRONIE N

Licensing rounds:
information and opportunities
2017

◄ 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 – Baltic Sea (State Treasury)
1978-1979 – Baltic Sea (State Treasury)
1981-1982 – Baltic Sea, western part (State Treasury)
1984 – Baltic Sea, block Kołobrzeg (State Treasury)
1987 – Baltic Sea, objects L1 and L12 (data - State Treasury, documentation – LOTOS Petrobaltic SA)
1987 – Baltic Sea, block L (data - State Treasury, documentation - LOTOS Petrobaltic SA)
1996-1998 – Geological Map of Baltic Sea 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 stage:**
Paleozoic

**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$^3$ (26 years), in 2015 production – 25.25 million m$^3$, exploitable resources 999.47 million m$^3$; Economic resources in place 225.74 million m$^3$; **Daszewo N (RN)** – discovered in 1988, cumulative production – 57.893 ktonnes of crude oil, natural gas associated: 10.33 million m$^3$ (17 years), in 2015 production – none, exploitable resources 60 ktonnes of crude oil, natural gas associated: 15 million m$^3$; **Daszewo (RN)** – discovered in 1980, cumulative production – crude oil: 180.61 ktonnes (21 years), natural gas: 97.75 million m$^3$ (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$^3$ (buffer gas); **Białogard (GZ)** – discovered in 1982, cumulative production –595.66 mln m$^3$ of gas (32 years), in 2015 production –14.13 million m$^3$ of gas, exploitable resources of gas 59.43 million m$^3$ (pending evaluation of resources); **Tychowo (RN)** – discovered in 1988, cumulative production – 20.742 ktonnes of crude oil, 5.972 million m$^3$ of gas (8 years), in 2015 production – none, exploitable resources: 19 ktonnes of crude oil, 5.86 million m$^3$ 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$^3$ (42 years), in 2015 production – none, exploitable resources: 10.78 million m$^3$ of natural gas, economic resources in place 10.69 million m$^3$; **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$^3$ 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

## ◄ROUND 2

Hydrocarbon exploration prospects for **"Złotów-Zabartowo"** tender block 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 block, however, the expected traps would occur at the depths ranging from 4,500 to 5,500 m.

**Acreage:**
1,071.01 km²
264,652 acres

**Block name:** Złotów-Zabartowo

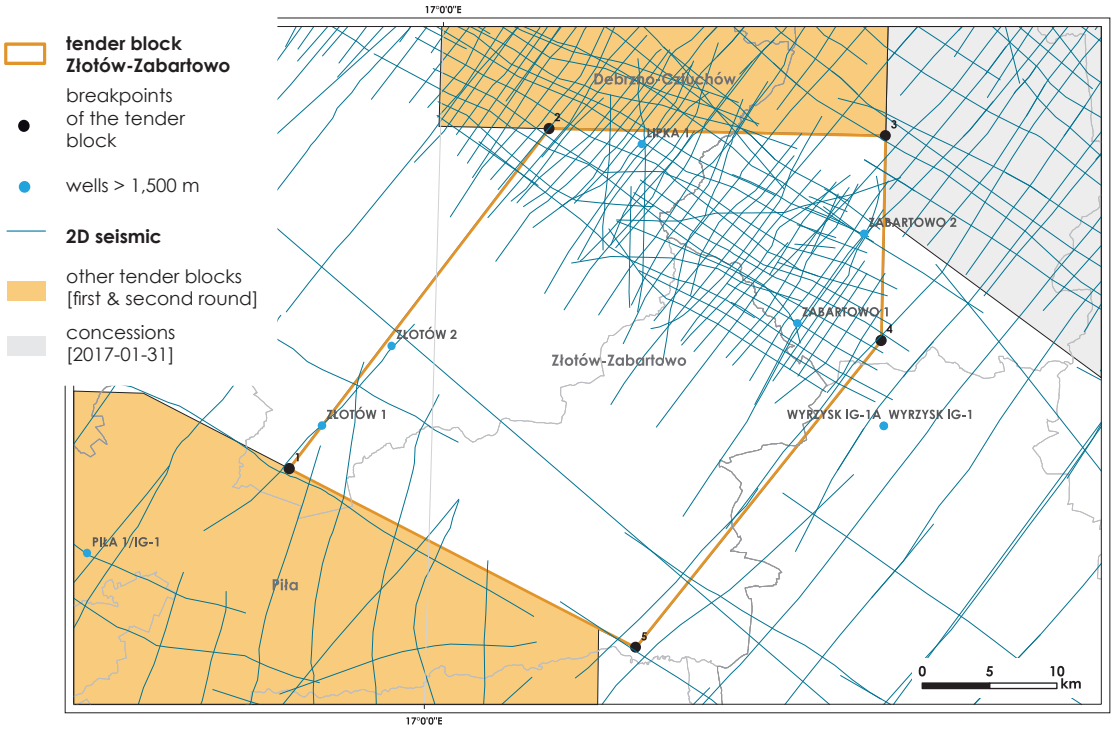
**Location:** onshore; parts of Ministry of the Environment concession blocks:126, 127, 146, 147; in blocks of the following counties and communes: **Wielkopolskie province:** Piła county, communes: Kaczory (participation in the concession block 1.82%), Białośliwie (3.75%), Łobżenica (17.80%), Miasteczko 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**





# INFORMATION SHEET FOR TENDER BLOCK ZŁOTÓW – ZABARTOWO



**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 stage:**
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$^3$ (during 42 years); 2015 production: lacking, reserves: recoverable 10.78 million m$^3$ (economic reserves in place: 10.69 million m$^3$)

**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$^2$) 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

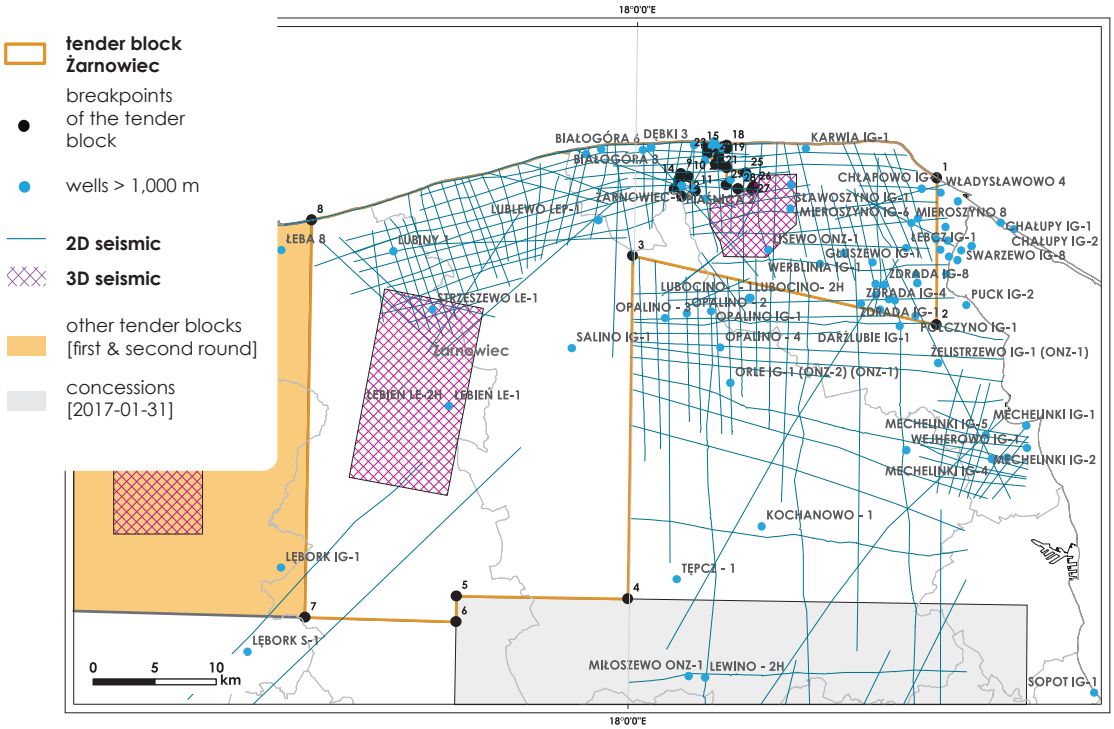
**"Żarnowiec"** tender block is dedicated to the exploration of unconventional and conventional prospects in the onshore part of the Baltic Basin. Shale oil and shale gas accumulations occur within the Upper Cambrian (Furongian), Ordovician (Caradocian) and Silurian (Llandovery) strata. Tight oil and 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 block. Best shale gas production rates were reported so far on the Lebien and Lublewo sites (2010 and 2014 respectively) located on the tender block, making it probably one of the best blocks for future shale gas exploration in Poland.

**Acreage:**
1,196.31 km²
295,614 acres

**Block name:** Żarnowiec
**Location:** onshore, part of Ministry of the Environment concession blocks: 8, 9, 28, 29, 48; in block of the following counties and communes: **Pomorskie province:** Lębork county, communes: Nowa Wieś Lęborska (participation in the concession block 20,22%), Łeba (0,35%), Lębork (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%), Główczyce (0.35%), Wejherowo country, communes: Gniewino (7.70%), Choczewo (15.30%), Łęczyce (15.91%)

**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-Ustka-Łeba 2D (State Treasury) 1976 Puck Bay Block 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 Block. (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 stage:**
Lower Paleozoic

**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 m³ of associated natural gas; in 2015 production 0.11 ktonnes of condensate, 0.07 million m³ of associated natural gas. Exploitable resources 42.33 ktonnes, (economic resources in place 1.68 ktonnes); 6.96 million m³, (economic resources in place 1.39 million m³)
**„Żarnowiec W" (RN)** – discovered in 1990, cumulative production (21 years) 4.2 ktonnes of condensate, 25.65 million m³ of associated natural gas; in 2015 production 0.11 ktonnes of condensate, 0.07 million m³ of associated natural gas; Exploitable resources 17.81 ktonnes, (economic resources in place 3.85 ktonnes); 2.35 million m³, (economic resources in place 1.50 million m³)
**„Dębki" (RN)** – discovered in 1978, cumulative production (44 years) 36.169 ktonnes of crude oil, 10.201 million m³ of associated natural gas; in 2015 production 0.61 ktonnes of crude oil, 0.22 million m³ of associated natural gas; exploitable resources 8.62 ktonnes, (economic resources in place 5.19 ktonnes); 3.0 million m³, (Economic resources in place 4.23 million m³)
**„Białogóra–E" (RN)** – discovered in 1991, cumulative production (16 years) 2.917 ktonnes of crude oil, 2.4185 million m³ 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 m³, (economic resources in place 1.02 million m³)

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