

SELA
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WORLDS

ІНВЕСТИЦІЙНИЙ
АКЦЕЛЕРАТОР
ДЛЯ НАФТОГАЗОВИХ
АКТИВІВ

Feasibility study
of
**ICHNYANSKA,
OKHTYARSKA
AND GRUNIVSKA
PSA BLOCKS**

ICHNYANSKA PSA BLOCK

GRUNIVSKA PSA BLOCK

OKHTYRSKA PSA BLOCK





Content:

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Ichnyanska
PSA Block

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Grunivska
PSA Block

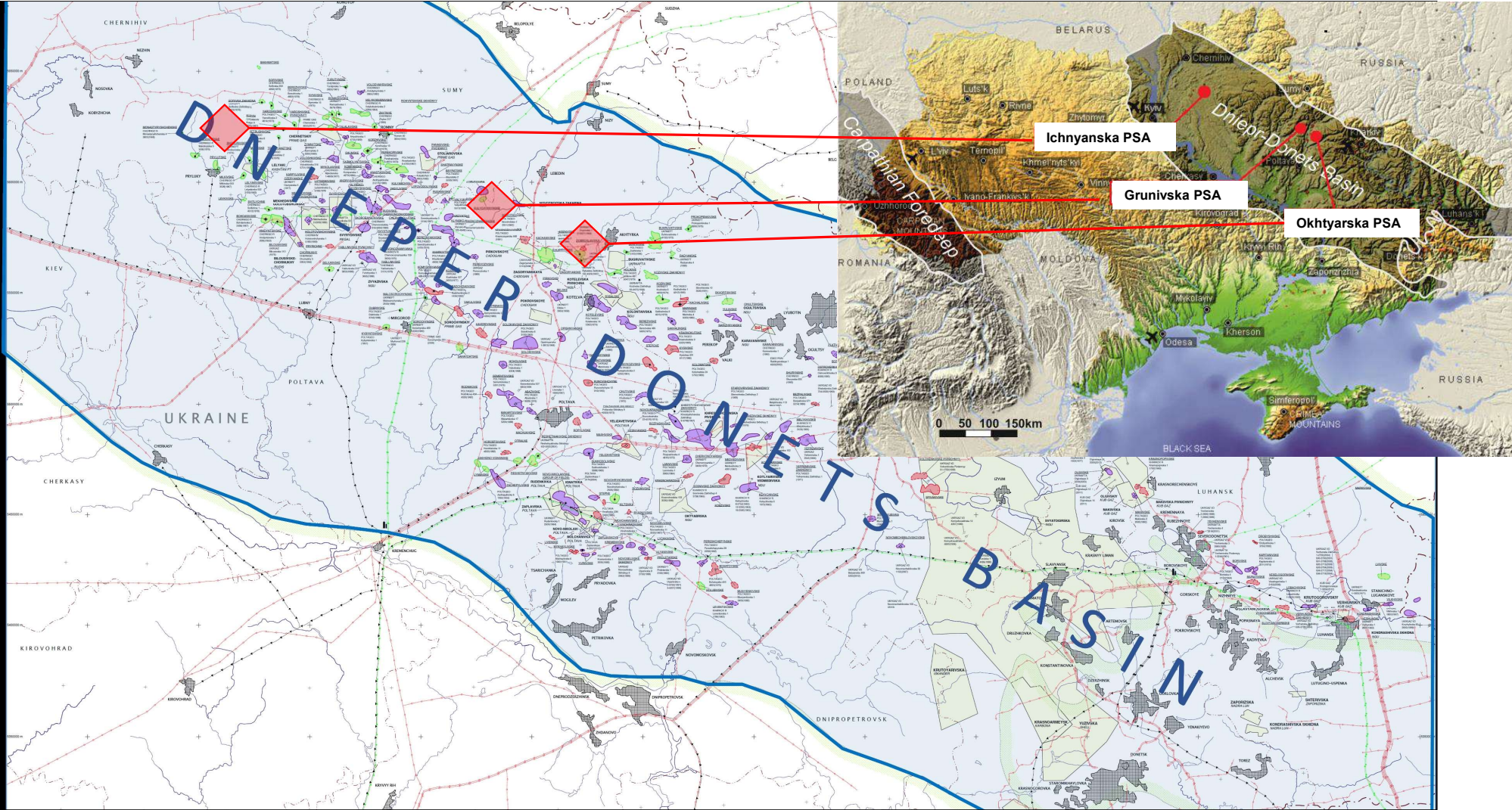
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Okhtyrska
PSA Block

04

Example
calculations

PSA Blocks Location





Ichnyanska PSA Block

The number of prospective structures in the PSA block	20
Completed seismic profiles	Yes
Year of completion	1972-2010
Seismic method	2D
Reinterpretation completed	15%
Number of wells drilled	69
The number of promising oil and gas horizons	15
Resource calculation	3 (Barburskaya; Korshakovskaya; North Rozhnivskaya)
Calculated reservoirs	V-19H-26
Logging Data	Yes
Logging Data format	Analog

Ichnyanska PSA Block



Ichnyanska PSA Block 2,086 sq km

Minimum work program: drilling of no less than three exploration wells, acquisition of 3D seismic survey works no less than 500 sq. km

Ichnyanska PSA Block Horizons

Period	Stage	Top (m)	Bottom (m)
P	A-1	1,991	2,090
C ₃	K-4	2,090	2,145
C ₃	K-5	2,145	2,200
C ₃	K-6	2,200	2,322
C _{2m}	M-2I	2,322	2,401
C _{2m}	M-4	2,401	2,436
C _{2m}	M-5-6	2,436	2,523
C _{2m}	M-7	2,523	2,626
C _{2b}	B-3I-4-5	2,626	2,716
C _{2b}	B-7	2,716	2,907
C _{2b}	B-12	2,907	3,045
C _{1V2}	V-15	3,045	3,847
C _{1V2}	V-18-19I	3,200	4,037
C _{1V2}	V-20-22	3,032	4,170
C _{1V2}	V-25-26	4,125	4,370

Ichnyanska PSA Block– Prospective Resources calculation (Sweet Spots)

Input Resources data

Parameter	Pessimistic	Base	Optimistic
Initial Res. Pressure (bar)	320	340	380
Reservoir temperature (deg C)	90	95	100
Area (sqkm)	25.00	40.00	85.00
Gross Thickness(m)	50.00	70.00	120.00
Net/Gross(decimal)	0.15	0.20	0.30
Porosity(decimal)	7%	10%	14%
Water saturation	25.0%	20.0%	15.0%
Gas gravity	0.620	0.640	0.660
GOR m3/T	35.0	45.0	90.0
Oil spec. gravity	0.85	0.83	0.82

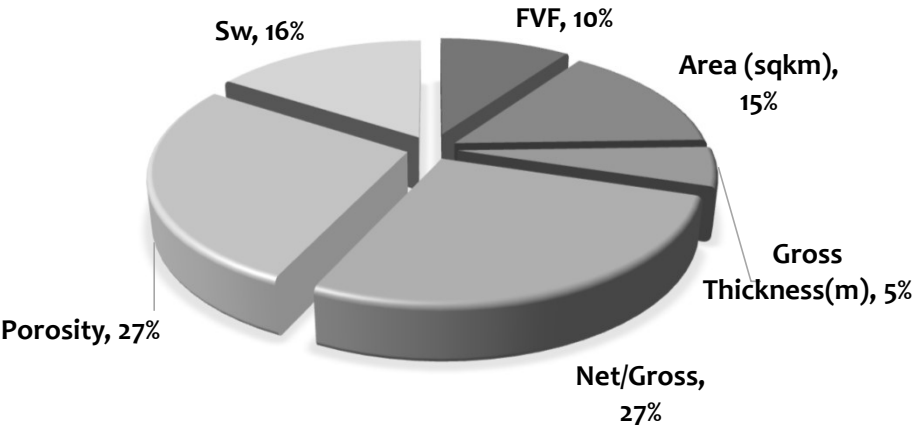
Gross STOIP

Resources	Total (MM Toe)
Mean	84.84
Standard deviation	15.96
Estimated data: Mode	80.47
P95	61.46
P90	65.71
P50	83.35
P10	105.85
P05	113.23

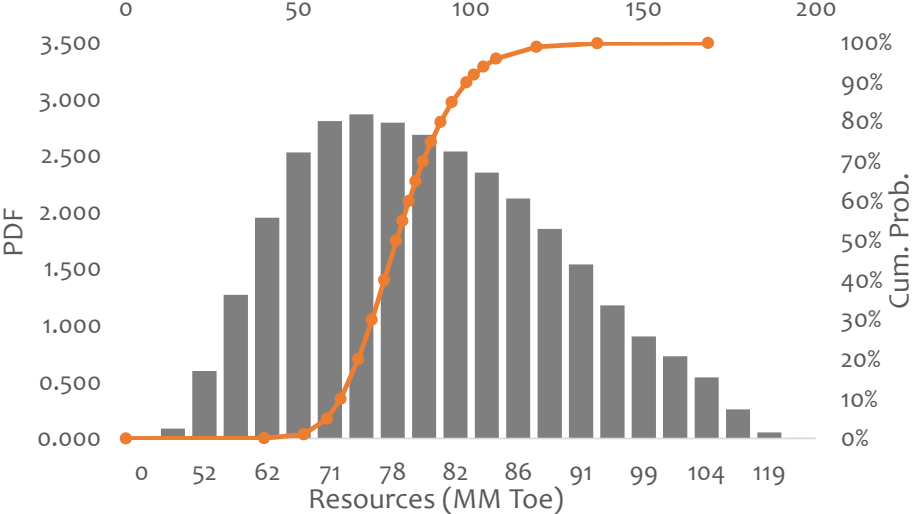
Net STOIP (GPOS=16.0%)

Resources	Total (MM Toe)
Mean	13.59
Standard deviation	2.56
Estimated data: Mode	12.89
P95	9.85
P90	10.52
P50	13.35
P10	16.95
P05	18.14

Resources uncertainty



Lognormal PDF & Cum Prob.



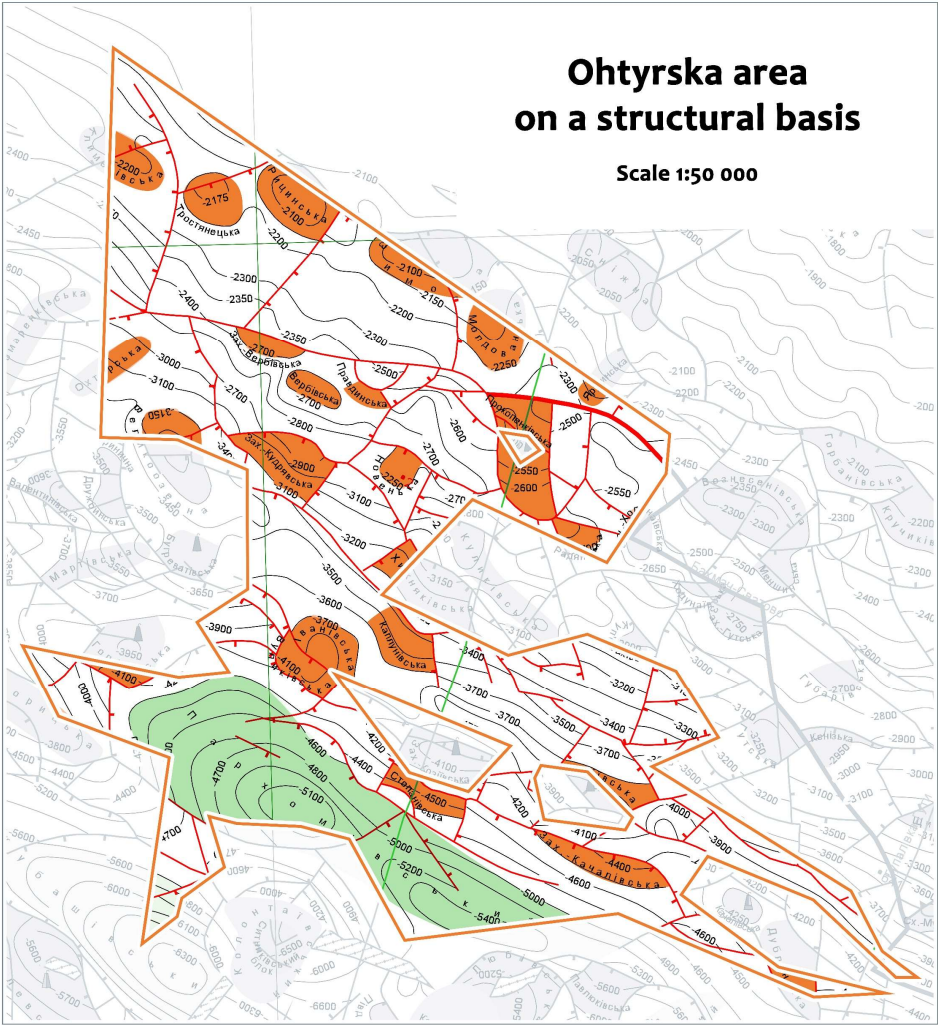


2

Okhtyarska PSA Block

The number of prospective structures in the PSA block	15
Completed seismic profiles	Yes
Year of completion	1973-2007
Seismic method	2D
Reinterpretation completed	20%
Number of wells drilled	2
The number of promising oil and gas horizons	24
Resource calculation	3 (Khizhnykivska, Ritsinska, Verbyvska)
Calculated reservoirs	V-21-22, D-9
Logging Data	Yes
Logging Data format	Analog

Okhtyarska PSA Block



Ohtyrsk PSA Block 672 sq km

Minimum work program: drilling of no less than two exploration wells, acquisition of 3D seismic survey works

Ohtyrsk PSA Block Horizons

Period	Stage	Top (m)	Bottom (m)
T	I-1-2	1,395	1,609
T	I-3	1,500	1,609
P	A-2	1,609	1,636
C ₃	G-11	1,636	1,645
C ₃	G-12	1,645	1,933
C ₃	K-3	1,933	1,777
C ₃	K-4	1,777	1,864
C ₃	K-5	1,864	2,173
C ₃	K-6	2,173	2,190
C _{2m}	M-3	2,190	2,223
C _{2m}	M-4	2,223	2,254
C _{2m}	M-5-6	2,254	2,308
C _{2m}	M-7	2,308	2,400
C _{2b}	B-3-4	2,400	2,370
C _{2b}	B-11	2,370	4,529
C _{1s}	S-4	4,529	4,981
C _{1s}	S-5	4,981	5,047
C _{1s}	S-8-9	2,892	3,120
C _{1v2}	V-14-19I	2,881	3,658
C _{1v2}	V-20-22	3,189	3,688
C _{1v2}	V-23-26	3,688	4,030
C _{1v}	T-1	3,404	3,863
D ₃	D-7	3,800	4,444
D ₃	D-8	3,863	4,483

Okhtyarska PSA Block– Prospective Resources calculation (Sweet Spots)

Input Resources data

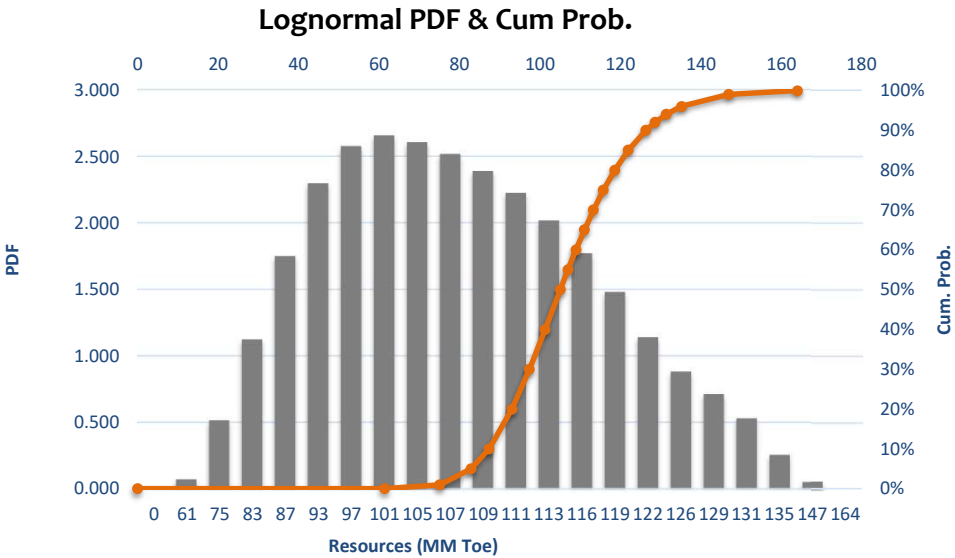
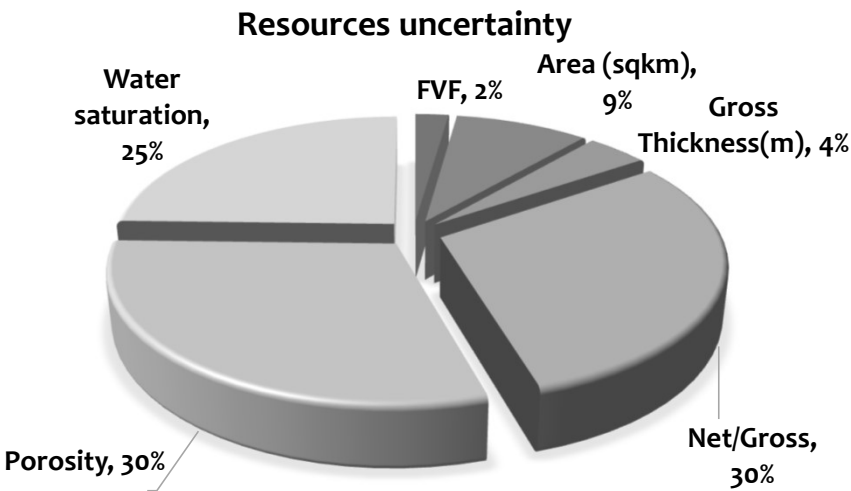
Parameter	Pessimistic	Base	Optimistic
Initial Res. Pressure (bar)	300	340	420
Reservoir temperature (deg C)	95	110	115
Area (sqkm)	40.00	50.00	90.00
Gross Thickness(m)	50.00	60.00	90.00
Net/Gross(decimal)	0.20	0.30	0.35
Porosity(decimal)	8%	10%	14%
Water saturation	33.0%	25.0%	20.0%
Gas gravity	0.620	0.640	0.660
GOR m3/T	35.0	45.0	60.0
Oil spec. gravity	0.85	0.83	0.82

Gross STOIP

Resources	Total (MM Toe)
Mean	106.16
Standard deviation	15.40
Estimated data: Mode	102.89
P95	82.93
P90	87.35
P50	105.06
P10	126.38
P05	133.13

Net STOIP (GPOS=21.4%)

Resources	Total (MM Toe)
Mean	22.67
Standard deviation	3.29
Estimated data: Mode	21.97
P95	17.71
P90	18.66
P50	22.44
P10	26.99
P05	28.43





Grunivska PSA Block

The number of prospective structures in the PSA block	15
Completed seismic profiles	Yes
Year of completion	1973-2002
Seismic method	2D
Reinterpretation completed	No
Number of wells drilled	17
The number of promising oil and gas horizons	18
Resource calculation	By analogy to neighboring fields
Calculated reservoirs	V-26
Logging Data	Yes
Logging Data format	Analog



Grunivska PSA Block Horizons

Period	Stage	Top (m)	Bottom (m)
T	I-1-2	1,395	1,609
P	A-2	1,609	1,636
C ₃	G-11	1,636	1,680
C ₃	G-12-13	1,680	1,777
C ₃	K-4	1,777	1,864
C ₃	K-5	1,864	2,050
C ₃	K-6	2,050	2,136
C _{2m}	M-3	2,136	2,223
C _{2m}	M-4	2,223	2,254
C _{2m}	M-5-6	2,254	2,308
C _{2m}	M-7	2,308	2,400
C _{2b}	B-3-4	2,400	2,892
C _{1S}	S-8-9	2,892	2,881
C _{1V2}	V-14	2,881	3,055
C _{1V2}	V-19I	3,055	3,238
C _{1V2}	V-20-22	3,238	3,800
C _{1V2}	V-25-26	3,404	3,800
C _{1t}	T-1	3,800	4,300



Grunivska PSA Block – Prospective Resources calculation (Sweet Spots)

Input Resources data

Parameter	Pessimistic	Base	Optimistic
Initial Res. Pressure (bar)	270	300	340
Reservoir temperature (deg C)	90	95	105
Area (sqkm)	40.00	50.00	90.00
Gross Thickness(m)	30.00	35.00	80.00
Net/Gross(decimal)	0.30	0.50	0.55
Porosity(decimal)	8%	10%	12%
Water saturation	35.0%	30.0%	20.0%
Gas gravity	0.620	0.640	0.660
GOR m3/T	35.0	45.0	60.0
Oil spec. gravity	0.85	0.83	0.82

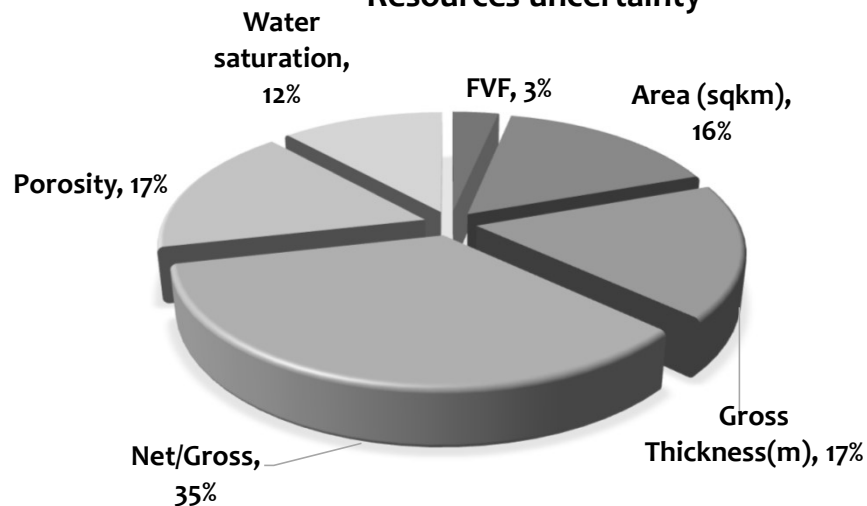
Gross STOIP

Resources	Total (MM Toe)
Mean	85.36
Standard deviation	12.38
Estimated data: Mode	82.72
P95	66.68
P90	70.23
P50	84.47
P10	101.61
P05	107.03

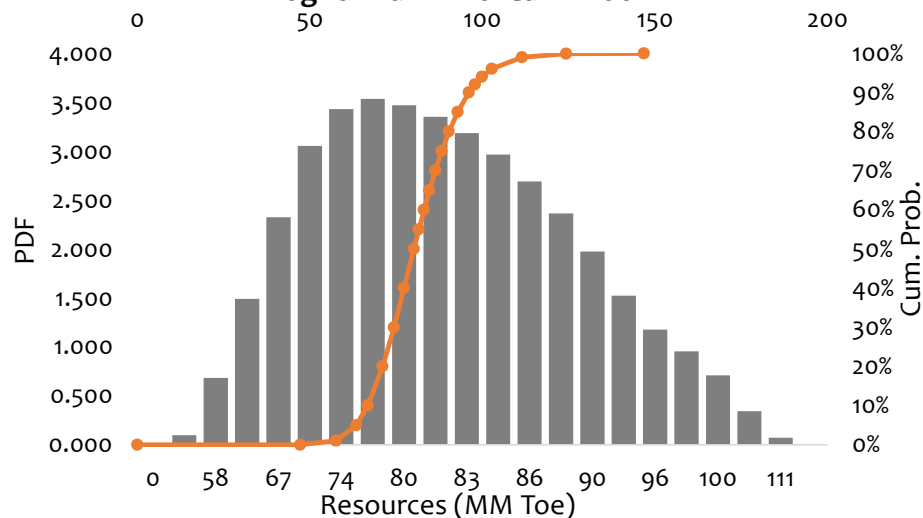
Net STOIP (GPOS=16.0%)

Resources	Total (MM Toe)
Mean	13.67
Standard deviation	1.98
Estimated data: Mode	13.25
P95	10.68
P90	11.25
P50	13.53
P10	16.28
P05	17.14

Resources uncertainty



Lognormal PDF & Cum Prob.



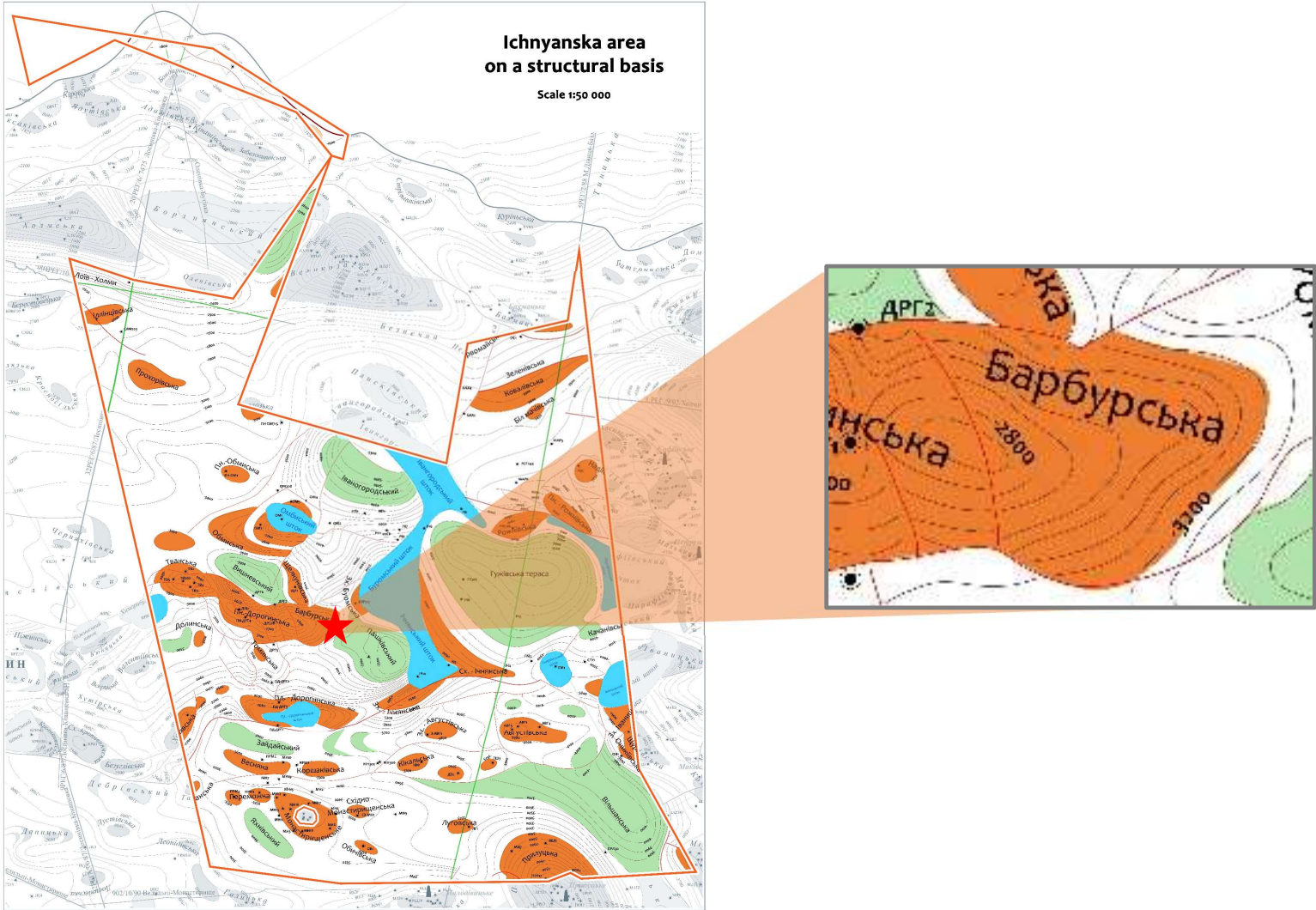
The background of the slide features a blurred image of an industrial oil refinery with several tall distillation columns and piping. Overlaid on this image is a semi-transparent orange grid with a candlestick chart. The chart consists of numerous vertical bars, some colored red and others green, representing price movements. A smooth, wavy orange line is also visible, likely representing a moving average or trend line.

04

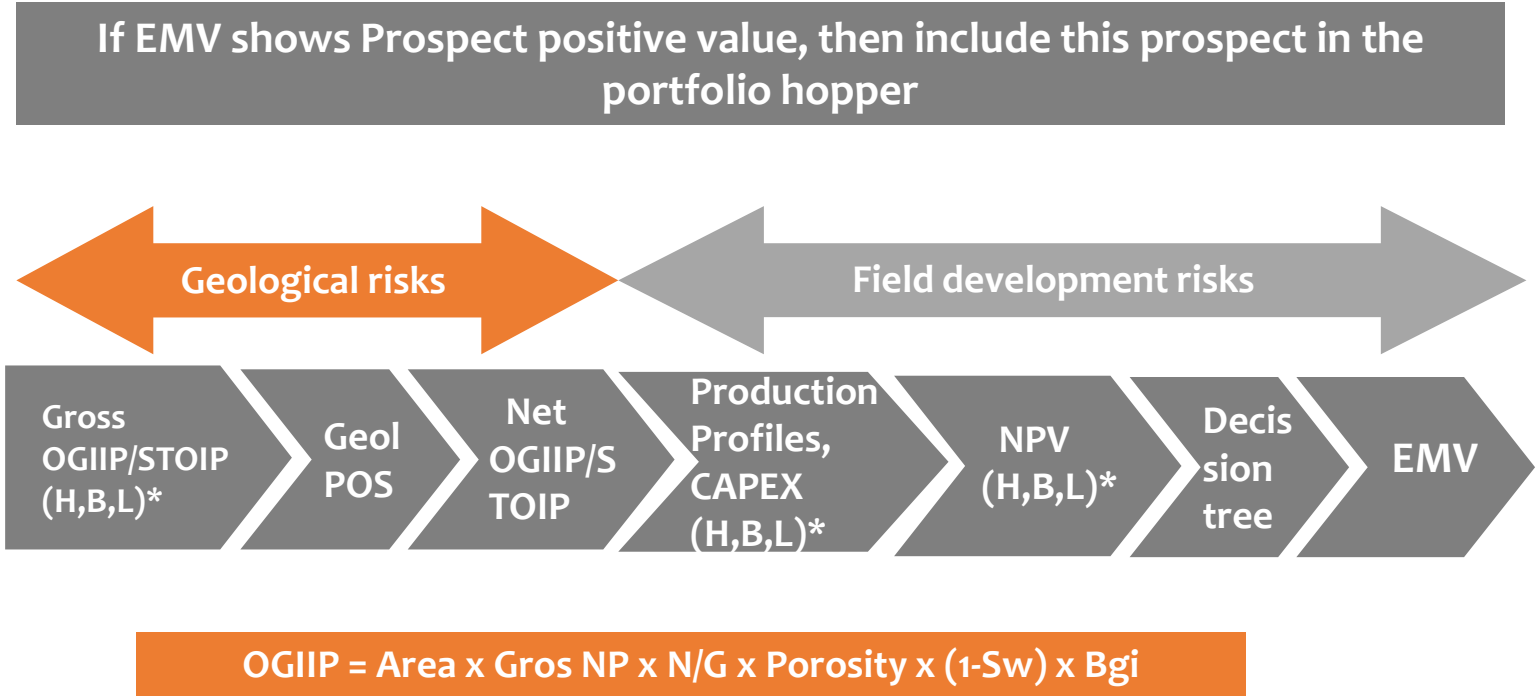
Barburska structure

Oil bearing - Example calculations

Ichnyanska PSA Block - Barburska structure example calculations



Prospective resources evaluation algorithm



*) Monte Carlo uncertainty analysis

Prospective Oil Resources calculation

Input Resources data

Parameter	Pessimistic	Base	Optimistic
Initial Res. Pressure (bar)	320	368	380
Reservoir temperature (deg C)	90	97	99
Recovery Factor	9.0%	12.0%	15.0%
Area (sqkm)	5.00	7.00	12.00
Gross Thickness(m)	30.00	50.00	90.00
Net/Gross(decimal)	0.45	0.50	0.55
Porosity(decimal)	13%	15%	18%
Water saturation	35.0%	30.0%	20.0%
Gas gravity	0.620	0.640	0.660
GOR m3/T	35.0	45.0	150.0
Oil spec. gravity	0.85	0.83	0.82

Gross STOIP

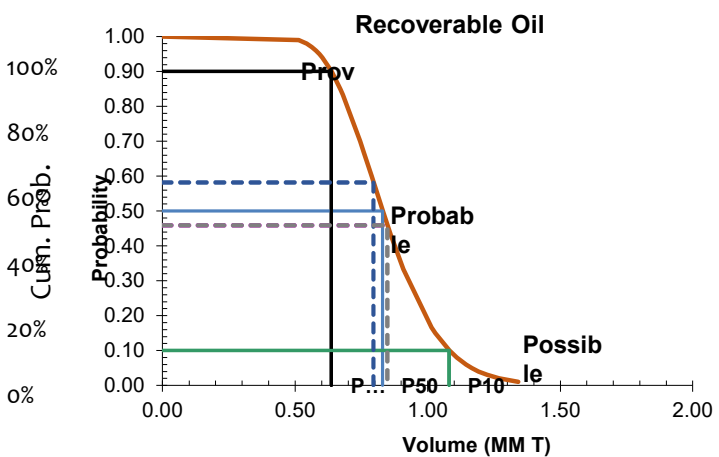
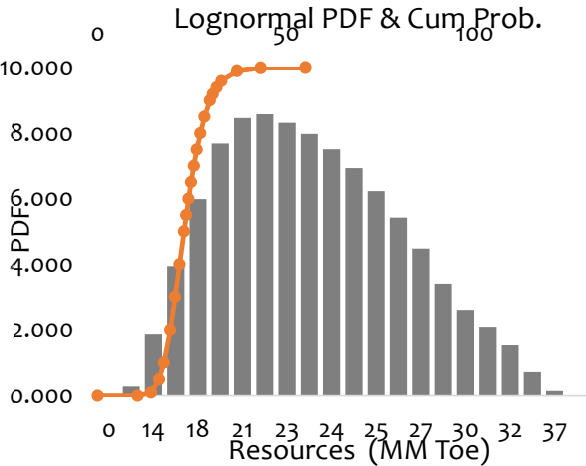
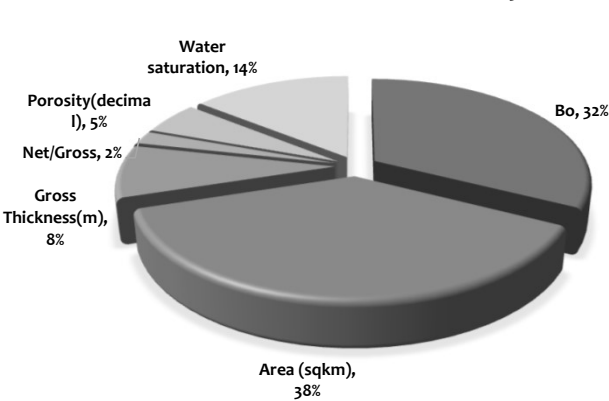
Resources	Oil (MM T)	Gas (bcm)	Total (MM Toe)
Mean	23.37	1.86	25.49
Standard deviation	4.88	0.76	5.75
Estimated data: Mode	21.92	1.48	23.60
P95	16.30	0.91	17.33
P90	17.56	1.04	18.75
P50	22.88	1.72	24.84
P10	29.81	2.85	33.05
P05	32.11	3.28	35.85

Net STOIP (GPOS=28.5%)

Resources	Oil (MM T)	Gas (bcm)	Total (MM Toe)
Mean	6.66	0.53	7.26
Standard deviation	1.39	0.22	1.64
Estimated data: Mode	6.24	0.42	6.72
P95	4.64	0.26	4.94
P90	5.00	0.30	5.34
P50	6.52	0.49	7.07
P10	8.49	0.81	9.41
P05	9.14	0.93	10.21

Based on recoverable reserves density of 50, 80, 100 (Min, Base, Max) thousand T per well and applying RF of 12.7%, calculated optimum number of wells is 13 (min), 10 (base) and 11 (max)

Resources uncertainty



Geological POS

Risked by: **Sela Energy** Date: **19/Nov/18**

Play name: Average
Stratigr. age: Viséan
HC province: Dnepro-Donetsk

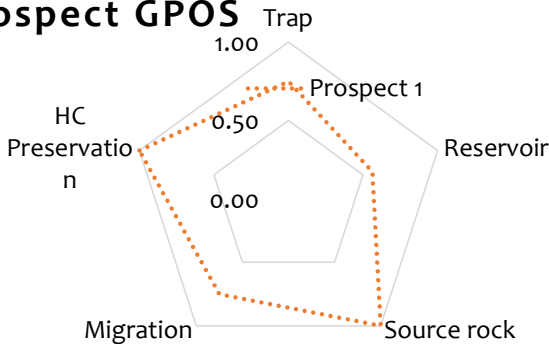
COMMENT: POS calculation for recoverable HC in "potential" discovery in Dnipro-Donetsk Basin System

Trap			Reservoir		Source Rocks			Migration			HC Preservation	
Structural	Stratigraphic or combined	Quality of cap rock	Reservoir type	Porosity features	Source facies	Maturity	Data sources	HC shows	Position of trap	Timing	Reservoir pressure	Formation water
Value		Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value
0.75		1.00	0.75	0.75	1.00	1.00	1.00	1.00	0.75	1.00	1.00	1.00
a		b	c	d	e	f	g	h	i	j	k	l

Probability (TRAP) = a x b	0.75
Probability (RESERVOIR) = c x d	0.56
Probability (SOURCE ROCKS) = e x f x g	1.00
Probability (MIGRATION) = h x i x j	0.75
Probability (HC PRESERVATION) = k x l	1.00
OPTIONAL: Weighting of seismic and production data quality	0.90
TOTAL probability (POS) = p(trap x reservoir x source rocks x migration x HC preservation)	28.5%

Descriptive probability	Numerical probability
Proven	1.00
Highly reliable	0.75
Fairly reliable	0.50
Unreliable	0.25
Missing	0.05

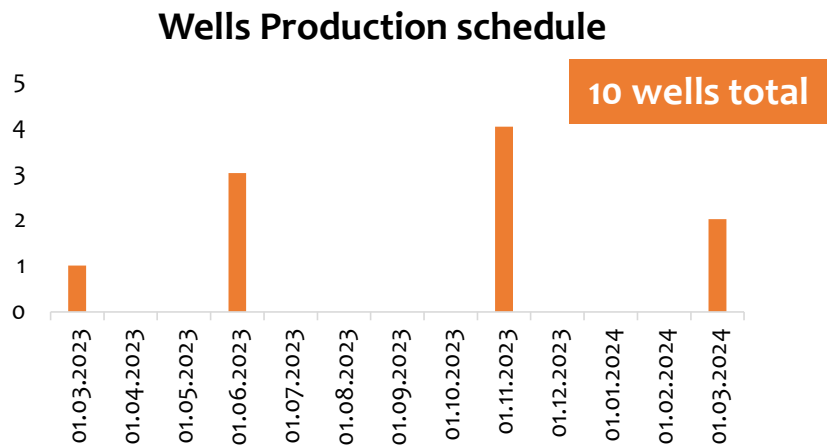
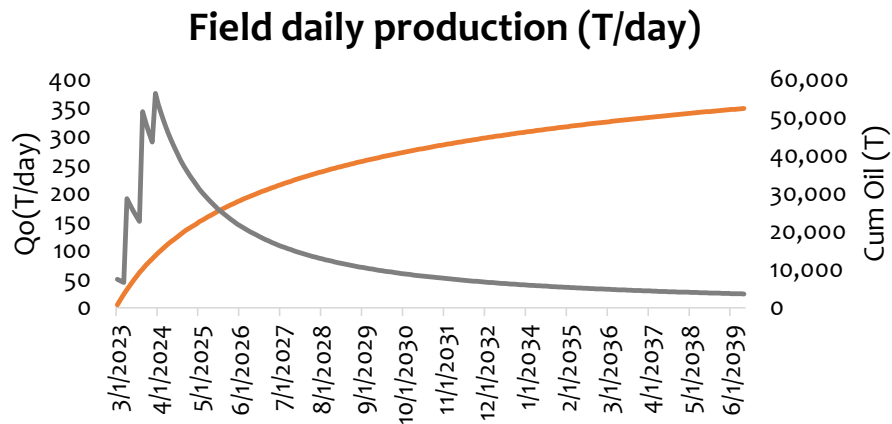
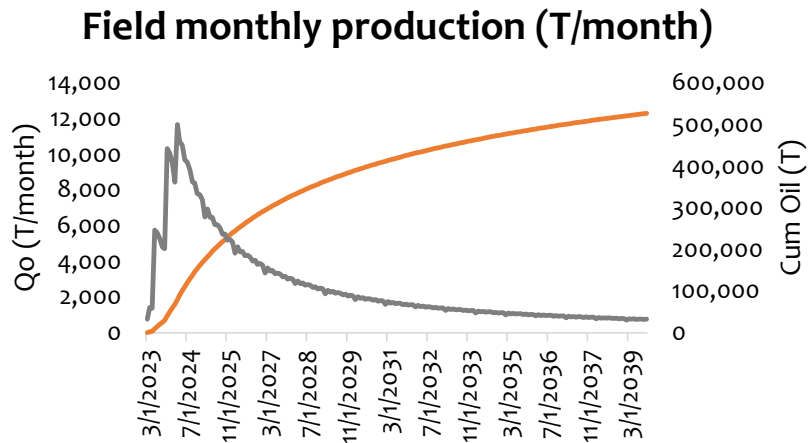
Prospect GPOS



GPOS =

Source Quality	Reservoir Presence	Trap Quality
Source Maturation	Reservoir Quality	Seal Adequacy
HC Migration	Biodegradation	HC Saturation

Production Profiles, schedule, CAPEX (Base Case)



CAPEX		
Frac stimulation	\$US mil	2.5
CAPEX New Well (8 wells)	\$US mil	40.0
Facilities	\$US mil	6.0
Project Mgmt	\$US mil	2.0
Exploration (3 wells)	\$US mil	15.0
Surveillance (3D seismic)	\$US mil	3.0
Total Gros	\$US mil	68.5

Field development NPV, Sensitivity – Tornado Plot

Maximum case NPV

NPV	\$US mln.	28.62
IRR	%	24%
PI		1.39
Max exposure	\$USmln.	-14.40
Pay out	months	81.30
Capex (11 wells)	\$USmln.	72.75

Base case NPV

NPV	\$US mln.	11.65
IRR	%	17%
PI		1.17
Max exposure	\$USmln.	-14.40
Pay out	months	104.09
Capex (10 wells)	\$USmln.	68.50

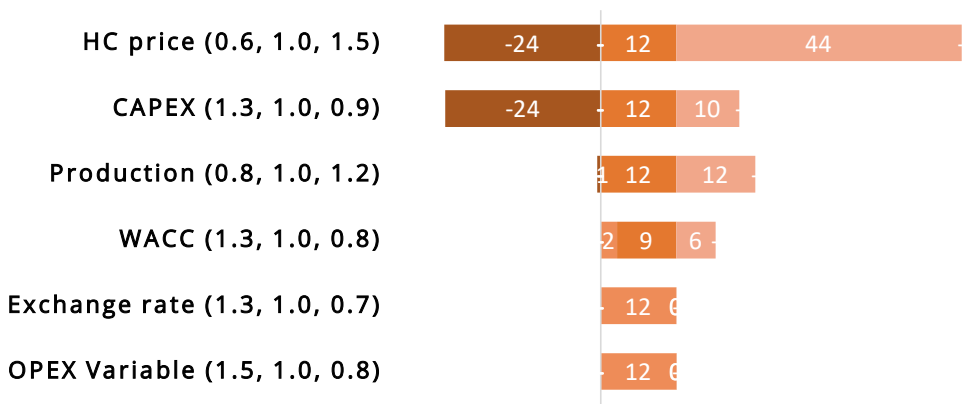
Minimum case NPV

NPV	\$US mln.	3.43
IRR	%	13%
PI		1.04
Max exposure	\$USmln.	-14.40
Pay out	months	147.79
Capex (13 wells)	\$USmln.	81.25

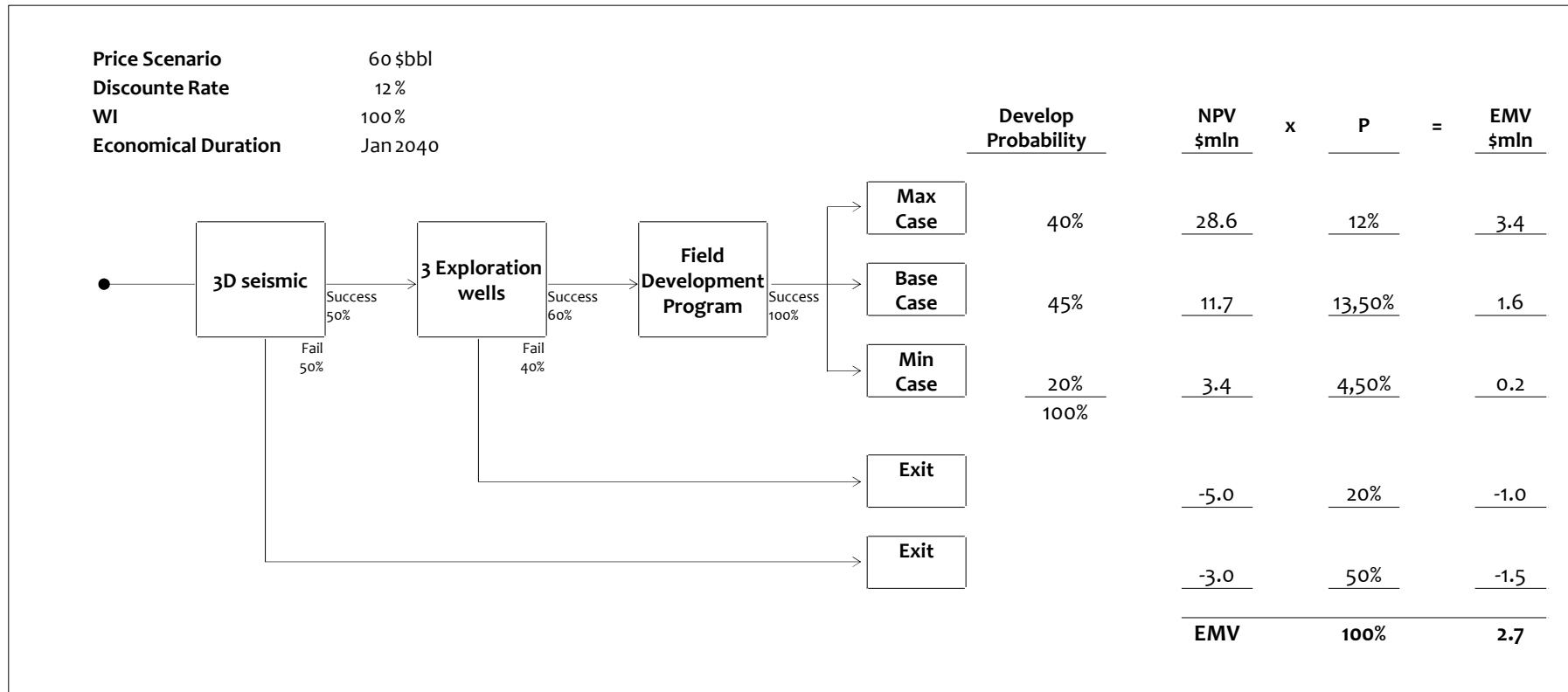
- Sensitivity analysis is a technique used to show the effects of changing one or more variables on an outcome
- Tornado plot showing the relative influence of the main variables for economical evaluation

Base case NPV sensitivity

NPV Sensitivity – Base NPV \$11.7 mln



Barburska structure EMV



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Thank You!

The calculations are based on data available through an open access (Data room State Geo-Service)