New Potential for Onshore Discoveries in Romania

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Event: SEE Upstream Conference & Exhibition 2015
Author: Gehrig Schultz
Romania is one of the most important hydrocarbon provinces of Eastern Central Europe. Oil Production started in 1854 and since then 465 oil pools and 430 gas pools have been discovered.

The cumulative oil production in 2007 was about 5 billion bbl, whereas the gas production exceeded 40 TCF.
Discovering the Earth’s Resources

24 to 120 BBOE in place in discovered fields

**Low Side**
If 5 billion BBL oil and 8 Billion BOE produced

Are 35% of original oil in place
Then 37 BBOE Original Oil in Place

*24 BBOE remain in place*

On average, only 35 percent of original oil in place in reservoirs has been recovered. Technology plays a pivotal role in increasing recovery rate, improving economics, and assisting in exploration of complex oil reservoirs.

*Bureau of Economic Geology*

**High Side**
If 5 billion BBL oil and 8 Billion BOE produced

Are 10% of original oil in place
130 BBOE Original Oil in Place

*120 BBOE remain in place*

Only about 10 percent of a reservoir’s original oil in place is typically produced during primary recovery. Secondary recovery techniques result in the recovery of 20 to 40 percent of the original oil in place.

*US Department of Energy*
Undiscovered resources in the Carpathian–Balkanian Basin Province are estimated at:

- 2.076 trillion cubic feet of gas,
- 1,013 million barrels of oil, and
- 116 million barrels of natural gas liquids

Transylvanian Total Petroleum System undiscovered reserves are estimated at:

- 2.083 trillion cubic feet of gas

USGS World Petroleum Assessment 2010
OMV Petrom said drilling success at its Totea exploration well in the south-western region of Oltenia, could be the "most important onshore gas discovery in the last six years". It is potentially the largest discovery in the past 30 years, in the Muntenia region, said Gabriel Selischi.
ROMGAZ completed two new gas accumulations in the Moldavian Platform & in the Transylvanian Basin. The daily production of these two new Romgaz wells exceeds 2,600 barrels of oil equivalent per day, which is approximately 3% of the company’s daily gas production.
OMV Petrom & Hunt Oil announce the discovery of a new oil and gas field in the south of Buzău County. Estimates from production tests indicate a potential production per well of 1,200 – 2,100 boe per day from two geological layers.
Serinus Energy discovered seven Cenezoic aged sandstones with an aggregate of 90.5 meters of hydrocarbon bearing rock, and 22 meters of potential net pay.
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IHS Report 2015
How do we find these resources?
Big Impact Technologies All Linked to 3D

Most Beneficial Technologies

- Enhanced Recovery
- Fracturing Stimulation
- Directional
- 3D Seismic

Percentage of Operators Who Marked

Survey of Independent Operators
American Oil & Gas Reporter
Success in Other Countries

Major Factors in Success

- Stacked pay objectives
- Excellent acreage position
- 3D Seismic coverage (~35,000 km²)
- Frac technologies & water floods
- Aggressive drilling campaigns
Low level of essential 3D seismic technology application

- Approximately 16,000 km$^2$ of 3D seismic covering about 10% of sedimentary basins
- Much of acquired seismic is focused between 1,000 m to 3,500 m
- Deeper steep dipping targets not imaged
- Shallow producing reservoirs not imaged
Combination of geophysical methods for investigation of deep, difficult targets
The most prospective areas are:

- Basin-floor fans in the central basin.
- Slope channels & fans in north & east.
- Stratigraphic traps mapped with 3D seismic and AVO.
- Structural closures on East margin covered by backarc volcanics.
- Thin-bedded reservoirs in the west.

Unproven petroleum system in deeper (subsalt). Indication in deep well that found Jurassic dolomites above the basement of the basin. The source of this oil is not known. The effectiveness of the deep petroleum system is questionable.

Petroleum Systems of Romania* Csaba Krézsek1
Search and Discovery Article #10349
Stratigraphic plays drilled in the Hungarian part of the basin using AVO attributes have not been tested in Romania. These are

- Upper Miocene (Pannonian) turbidites onlapping on basement highs.
- Tight gas play currently explored in the Hungarian part of the basin most likely extends into Romania.

However, the exploration risks on the Romanian part are higher, because of the relatively thin and shallow sedimentary section, the late tilt of the basin margins, and the presence of volcanic gases in some areas.
Large Field Potential in Carpathian Napes

The Carpathian Napes has potential:

- Analogous to plays in Sub-Andean fold thrust belt,
- Recent deep Kliwa discoveries in Moinesti area,
- Recent discovery in Frasin

Complex geology requires use of multi-physics methods to image deep seated structures. Long offset seismic identified that the tilted fault block play of Moesia, in the reach of deep drilling, is present under the outer nappes of the Carpathians.
Potential Petroleum Systems

Central-Eastern Romania Petroleum System
Thank you!