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# Greater Hungarian Plain Basins Assessment Unit 40480101


Greater Hungarian Plain Basins Assessment Unit 40480101

Pannonian Basin Geologic Province 4048

Geologic Summary

Detailed map of this assessment unit

Exploration/Discovery-History Data

- Plots of Known Field Sizes
- Plots of Grown Resources
- Tables

Assessment Input Data

Assessment Results

- Assessment Unit Summary
- Detailed Assessment Results
- Undiscovered Field-Size Distributions

**USGS PROVINCE:** Pannonian Basin (4048) **GEOLOGIST:** G.L. Dolton

**TOTAL PETROLEUM SYSTEM:** Greater Hungarian Plain Neogene (404801)

**ASSESSMENT UNIT:** Greater Hungarian Plain Basins (40480101)

**DESCRIPTION:** This assessment unit represents petroleum generation and migration from Neogene source rocks into reservoirs of the Neogene basin fill of the Great Hungarian Plain and into underlying basement rock reservoirs of the Alpine thrust system. Vertical and lateral migration is extensive. The petroleum system is compound and contains five or six depocenters within which source rocks have passed through oil into the gas generative phase. Traps in the Tertiary fill are structural, stratigraphic, and a combination of these, including a variety of tectonic, compactional, syndepositional and stratigraphic types. Local Paleogene reservoir rocks encompassed in the limits of the assessment unit are also included, principally the Szolnok flysch unit of the Szolnok trough.

**SOURCE ROCKS:** Marine Miocene Pre-Pannonian and lower Pannonian lacustrine organic-rich rocks are considered the principal sources of oil and natural gas. Geochemical and biomarker analysis has shown that, in general, source rock quality is moderate to poor, although individual units of better quality are found. Pliocene source rocks may also have thermally generated hydrocarbons in some of the deeper basins and biogeneic gas in shallow sediments.

**MATURATION:** Generation from Miocene source rocks started about 6 to 7 Ma and is still in progress and has progressed so that sedimentary rocks currently below a depth of 4 to 5 km generally have passed through the oil generation window, while the upper 2 to 3.5 km of sedimentary rocks are immature. In a few cooler areas, maturity zones are at greater depth.

**MIGRATION:** Timing of migration is favorable with reference to trap formation. Lateral migration is evident although most fields are in or in close proximity to areas of mature source rocks. Vertical migration appears extensive, with oil and gas found in basement rocks as well as in immature sediments above mature sources. The entrapped gas locally contains substantial $CO_2$ as a result of thermal decomposition of carbonates in basement nappes.

**RESERVOIR ROCKS:** Most important reservoir rocks are those of the Neogene basin fill, particularly Miocene Lower Pannonian sandstones, conglomerates, and marls and, locally, older Miocene rocks and Upper Pannonian and Pontian (Pliocene) sandstones. The sandstones are of highly varied origin, representing marine, lacustrine and deltaic settings. Miocene patch reefs also provide objectives in the Sarmatian and Badenian sequences. Paleogene reservoirs may be present in areas of Szolnok flysch, including sandstones, siltstones, and marls.

Reservoir rocks of the basement complex range in age from Mesozoic to Precambrian. They are largely fractured and weathered Paleozoic and Precambrian crystalline rocks and, occasionally, dolomites and metamorphosed limestones and marls of Mesozoic age. Matrix porosity is low and fracturing is important in reservoir development.

**TRAPS AND SEALS:** Traps in the Neogene fill include a suite of structural, stratigraphic, and a combination of types. Particularly important are those associated with growth faults and compaction features over basement highs and pinchouts in fluvial, shallow water, and turbidite sandstones and conglomerates, patch reefs, and unconformity traps–particularly those at the regional unconformity between synrift and postrift sequences. Traps are also associated with flower structures along strike-slip faults. Traps in the basement include structural and paleotopographic highs. Seals for both Neogene and basement reservoirs are provided by fine grained rocks of the Neogene basin fill.

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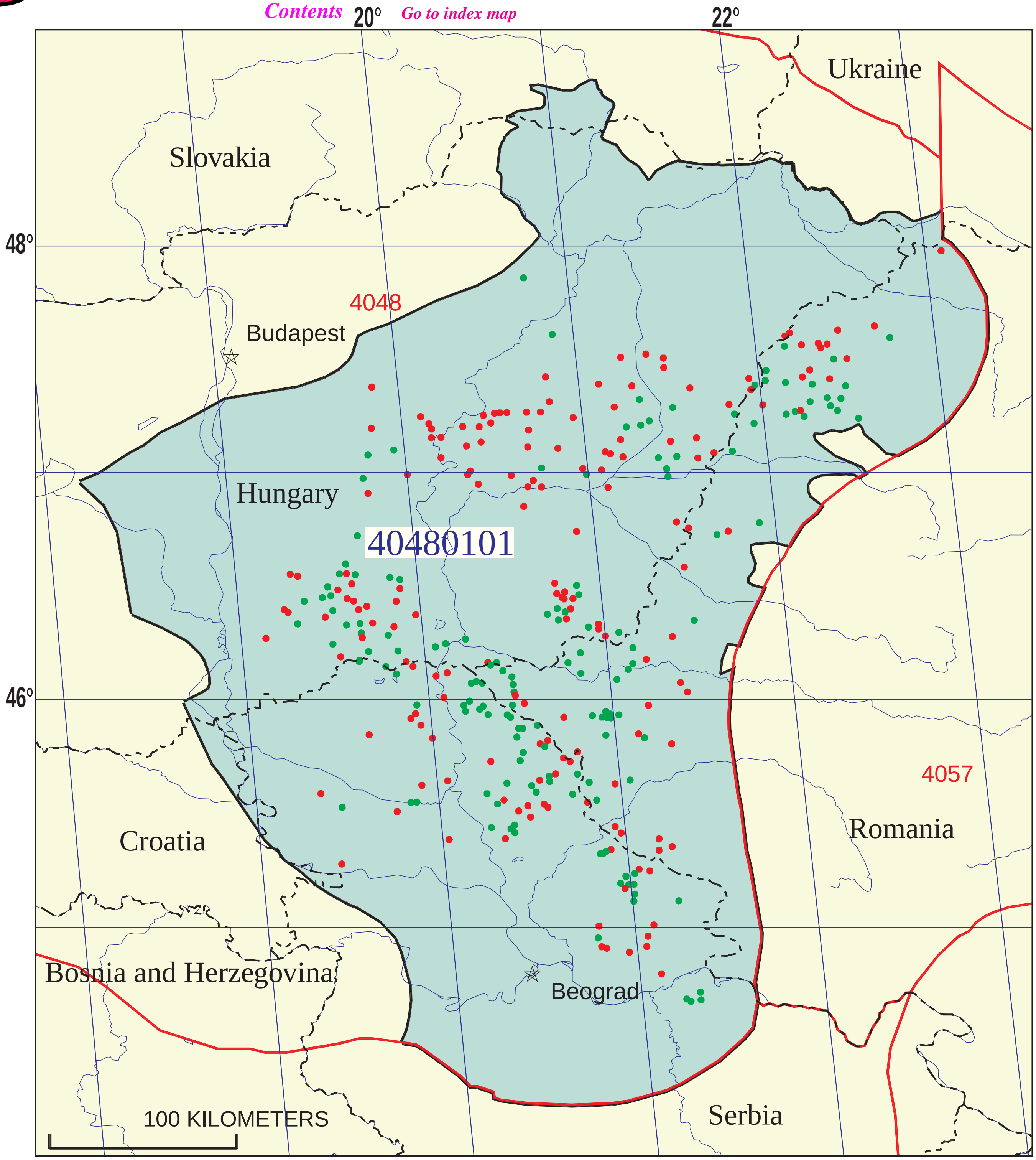


# Greater Hungarian Plain Basins Assessment Unit - 40480101

EXPLANATION

- Hydrography
- Shoreline
- 4048 Geologic province code and boundary
- Country boundary
- Gas field centerpoint
- Oil field centerpoint
- 40480101 Assessment unit code and boundary

Projection: Robinson. Central meridian: 0

**SEVENTH APPROXIMATION**
**NEW MILLENNIUM WORLD PETROLEUM ASSESSMENT**
**DATA FORM FOR CONVENTIONAL ASSESSMENT UNITS**

| | | | |
|---|---|---|---|
| Date:…………………………. | 6/1/99 | | |
| Assessment Geologist:…….. | G.L. Dolton | | |
| Region:……………………….. | Europe | Number: | 4 |
| Province:……………………… | Pannonian Basin | Number: | 4048 |
| Priority or Boutique………… | Priority | | |
| Total Petroleum System:…… | Greater Hungarian Plain Neogene | Number: | 404801 |
| Assessment Unit:…………… | Greater Hungarian Plain Basins | Number: | 40480101 |
| * Notes from Assessor | Lower 48 growth factor. | | |

**CHARACTERISTICS OF ASSESSMENT UNIT**

Oil (<20,000 cfg/bo overall) **or** Gas (≥20,000 cfg/bo overall):… Oil

What is the minimum field size?………. 1 mmboe grown (≥1mmboe)
(the smallest field that has potential to be added to reserves in the next 30 years)

Number of discovered fields exceeding minimum size:………… Oil: 75 Gas: 79
Established (>13 fields) X Frontier (1-13 fields) ____ Hypothetical (no fields) ____

Median size (grown) of discovered oil fields (mmboe):
1st 3rd 13.9 2nd 3rd 6.1 3rd 3rd 3.4
Median size (grown) of discovered gas fields (bcfg):
1st 3rd 38.7 2nd 3rd 27.6 3rd 3rd 23.9

**Assessment-Unit Probabilities:**

| Attribute | Probability of occurrence (0-1.0) |
|---|---|
| 1. **CHARGE:** Adequate petroleum charge for an undiscovered field ≥ minimum size……………… | 1.0 |
| 2. **ROCKS:** Adequate reservoirs, traps, and seals for an undiscovered field ≥ minimum size…… | 1.0 |
| 3. **TIMING OF GEOLOGIC EVENTS:** Favorable timing for an undiscovered field ≥ minimum size | 1.0 |

***Assessment-Unit GEOLOGIC Probability*** (Product of 1, 2, and 3):……..………...…. 1.0

4. **ACCESSIBILITY:** Adequate location to allow exploration for an undiscovered field ≥ minimum size………………………………………………………..………………..……..…………… 1.0

**UNDISCOVERED FIELDS**

**Number of Undiscovered Fields:** How many undiscovered fields exist that are ≥ minimum size?:
(uncertainty of fixed but unknown values)

| | | | | | | |
|---|---|---|---|---|---|---|
| Oil fields:…………………………………min. no. (>0) | 15 | median no. | 50 | max no. | 100 |
| Gas fields:……………………………….min. no. (>0) | 15 | median no. | 65 | max no. | 130 |

**Size of Undiscovered Fields:** What are the anticipated sizes (**grown**) of the above fields?:
(variations in the sizes of undiscovered fields)

| | | | | | |
|---|---|---|---|---|---|
| Oil in oil fields (mmbo)………………..……min. size | 1 | median size | 2.5 | max. size | 50 |
| Gas in gas fields (bcfg):……………………min. size | 6 | median size | 20 | max. size | 500 |



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U.S. Geological Survey World Energy Assessment Team

Assessment Unit (name, no.)
Great Hungarian Plain Basins, 40480101

**AVERAGE RATIOS FOR UNDISCOVERED FIELDS, TO ASSESS COPRODUCTS**
(uncertainty of fixed but unknown values)

| Oil Fields: | minimum | median | maximum |
|---|---|---|---|
| Gas/oil ratio (cfg/bo)……………………...……… | 500 | 1000 | 2000 |
| NGL/gas ratio (bngl/mmcfg)………………….....… | 20 | 40 | 60 |

| Gas fields: | minimum | median | maximum |
|---|---|---|---|
| Liquids/gas ratio (bngl/mmcfg)……………..…….. | 10 | 30 | 50 |
| Oil/gas ratio (bo/mmcfg)…………………………… | | | |

**SELECTED ANCILLARY DATA FOR UNDISCOVERED FIELDS**
(variations in the properties of undiscovered fields)

| Oil Fields: | minimum | median | maximum |
|---|---|---|---|
| API gravity (degrees)………………………………. | 10 | 35 | 50 |
| Sulfur content of oil (%)…………………….…….. | 0.2 | 0.6 | 2.8 |
| Drilling Depth (m) ……………...…………………. | 500 | 2000 | 3500 |
| Depth (m) of water (if applicable)……………..….. | | | |

| Gas Fields: | minimum | median | maximum |
|---|---|---|---|
| Inert gas content (%)…………………………...….. | 2 | 6 | 20 |
| $CO_2$ content (%)……………………………….....… | 0.5 | 7 | 64 |
| Hydrogen-sulfide content (%)……………...……. | | | |
| Drilling Depth (m)…………………………………. | 500 | 2500 | 5000 |
| Depth (m) of water (if applicable)…………………. | | | |

Assessment Unit (name, no.)
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**ALLOCATION OF UNDISCOVERED RESOURCES IN THE ASSESSMENT UNIT TO COUNTRIES OR OTHER LAND PARCELS** (uncertainty of fixed but unknown values)

1. Hungary represents 50 areal % of the total assessment unit

| Oil in Oil Fields: | minimum | median | maximum |
|---|---|---|---|
| Richness factor (unitless multiplier):……………… | | | |
| Volume % in parcel (areal % x richness factor):… | | 40 | |
| Portion of volume % that is offshore (0-100%)…… | | 0 | |

| Gas in Gas Fields: | minimum | median | maximum |
|---|---|---|---|
| Richness factor (unitless multiplier):……………… | | | |
| Volume % in parcel (areal % x richness factor):… | | 85 | |
| Portion of volume % that is offshore (0-100%)…… | | 0 | |

2. Serbia and Montenegro represents 29 areal % of the total assessment unit

| Oil in Oil Fields: | minimum | median | maximum |
|---|---|---|---|
| Richness factor (unitless multiplier):……………… | | | |
| Volume % in parcel (areal % x richness factor):… | | 25 | |
| Portion of volume % that is offshore (0-100%)…… | | 0 | |

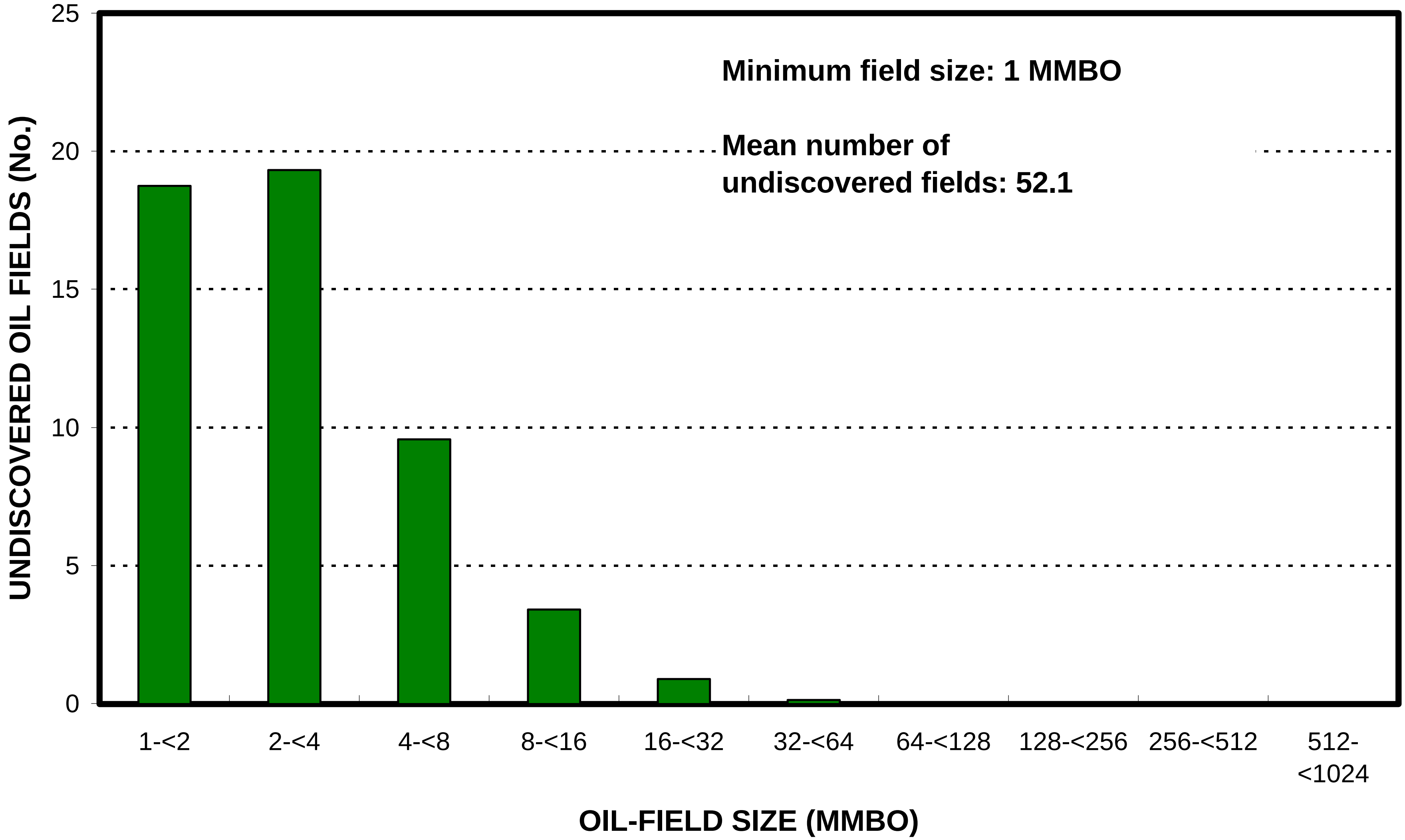
| Gas in Gas Fields: | minimum | median | maximum |
|---|---|---|---|
| Richness factor (unitless multiplier):……………… | | | |
| Volume % in parcel (areal % x richness factor):… | | 10 | |
| Portion of volume % that is offshore (0-100%)…… | | 0 | |

3. Romania represents 21 areal % of the total assessment unit

| Oil in Oil Fields: | minimum | median | maximum |
|---|---|---|---|
| Richness factor (unitless multiplier):……………… | | | |
| Volume % in parcel (areal % x richness factor):… | | 35 | |
| Portion of volume % that is offshore (0-100%)…… | | 0 | |

| Gas in Gas Fields: | minimum | median | maximum |
|---|---|---|---|
| Richness factor (unitless multiplier):……………… | | | |
| Volume % in parcel (areal % x richness factor):… | | 5 | |
| Portion of volume % that is offshore (0-100%)…… | | 0 | |

# Great Hungarian Plain Basins, AU 40480101
## Undiscovered Field-Size Distribution

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