CO2 EMISSION DENSITY AND GEOLOGICAL STORAGE OPPORTUNITIES IN BULGARIA

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OUTLINE OF TALK

- CO2 Emission sources (groups)
- Distribution of CO2 sources
- Country-wide density of CO2 emissions
- Geological framework
- Seismicity
- CO2 Storage opportunities
- Correspondence between CO2 emission density & storage opportunities
Total Country Industrial CO2 emissions
(from bigger sources - > 0,1 Mt/y)

52 Mt/y
CO2 Emission Source Groups
(contribution of industrial sectors)
CO2 Emission Source Groups

REFINERIES
CO2 Emission Source Groups
METALURGIC PLANTS
CO2 Emission Source Groups
CEMENT PLANTS
CO2 Emission Source Groups

CHEMICAL PLANTS
CO2 Emission Source Groups

OTHER INDUSTRY (Lime & Ceramics)
Fig. 5. Major tectonic units and sedimentary basins in Bulgaria (by Dabovski & Georgiev, 2005)
GEOLOGICAL FRAMEWORK

Fig. 8. Regional geological cross-section along line III - III.
GEOLOGICAL FRAMEWORK

Fig. 7. Regional geological cross-section along line II - II.
GEOLOGICAL FRAMEWORK

Fig. 6. Regional geological cross-section along line I - I.
Litho-Stratigraphic chart and Reservoir distribution

Fig. 9. Litho-Stratigraphic chart and reservoirs distribution
Fig. 10. Recorded stronger earthquakes and prognosis seismic intensity (by MSC-64) in Bulgaria.
CO2 Storage Options
AQUIFERS

Fig. 11. Distribution of the most promising aquifers for CO2 storage in Bulgaria
CO2 Storage Options
HYDRCARBON FIELDS

Fig. 12. Distribution of the main Oil and Gas fields in Bulgaria
CO2 Storage Options

HYDRICARBON FIELDS

Table 5. Characteristics of economic Oil and Gas fields

<table>
<thead>
<tr>
<th>No</th>
<th>Field name</th>
<th>Discover year</th>
<th>Field type</th>
<th>Reservoir</th>
<th>Lithology</th>
<th>Depth</th>
<th>Production status</th>
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<tbody>
<tr>
<td>1</td>
<td>Tjuleno</td>
<td>1951</td>
<td>Oil (19°API)+Gas</td>
<td>Valangin</td>
<td>carbonates</td>
<td>360-400</td>
<td>producing</td>
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<td>2</td>
<td>Dolni Dubnik</td>
<td>1962</td>
<td>Oil (42°API)+Gas</td>
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<td>carbonates</td>
<td>3200-3400</td>
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<td>3</td>
<td>Dolni Lukovit + Staroselitzki</td>
<td>1975</td>
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<td>L.Jurassic</td>
<td>sandstones</td>
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<td>4</td>
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<td>producing</td>
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<td>sandstones</td>
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<td>producing</td>
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<td>6</td>
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<td>1976</td>
<td>Oil (45°API)+Gas</td>
<td>M.Triassic</td>
<td>carbonates</td>
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GAS FIELDS:

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<tr>
<th>No</th>
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<th>Reservoir</th>
<th>Lithology</th>
<th>Depth</th>
<th>Production status</th>
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<tr>
<td>7</td>
<td>Tchiren</td>
<td>1963</td>
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<td>1987</td>
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<tr>
<td>10</td>
<td>Butan</td>
<td>1969</td>
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<td>L.Jurassic</td>
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<td>3300</td>
<td>producing</td>
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<td>Galata</td>
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<td>Gas</td>
<td>M.Eocene</td>
<td>sandstones</td>
<td>1050</td>
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Fig. 13. Generalized litho-stratigraphic chart for North Bulgaria with distribution of economic HC discoveries.
CO2 Storage Options
HYDRCARBON FIELDS

Fig. 15. Appropriate HC fields for CO2 storage
CO2 Storage Options
COAL FIELDS

Fig. 16. Major coal fields in Bulgaria (the number of fields corresponds to Table 6)
All CO2 Storage Options
CORRESPONDENCE
between CO2 country-wide density and Storage options