Herausforderungen die Mineralöllindustrie

Mobilität Zukunft Luftfahrt
Panel ENERGIE
Flughafen München, 26. April 2007

Walter Böhme
Innovation, OMV AG
Content

- OMV group
- Fossil fuels market
- The JET fuel
- The alternatives
- Resumes
OMV Group

- **Exploration and Production**
  - Worldwide activities in 5 core regions
  - Production: 338,000 boe/d (53% oil - 47% gas)
  - Reserves: 1,365 mn boe (57% oil - 43% gas)

- **Refining and Marketing incl. petrochemicals**
  - Active in 13 Central European countries (market share 20%)
  - 5 refineries with capacity of 26.4 mn t (540,000 boe/d)
  - Marketing: 2,451 retail stations
  - Joint control (34%) in Petrol Ofisi with 3,356 retail stations in Turkey
  - 35% Borealis (#2 polyolefins producers in Europe)

- 2,000 km pipeline system (43 bcm transport capacity)
- 1/3 of Russian exports via Baumgarten to Western Europe
- Gas sales: 14.2 bcm
- 50% of EconGas GmbH
E&P - Worldwide Activities 2006

- Production dominated by Romania and Austria
- Strong positions in Libya and Pakistan
- Additional development projects in New Zealand, Kazakhstan, Yemen
- Appraisal projects in UK, Iran, Tunisia
- Seeking Russian entry

320,000 boe/d

Production dominated by Romania and Austria
Strong positions in Libya and Pakistan
Additional development projects in New Zealand, Kazakhstan, Yemen
Appraisal projects in UK, Iran, Tunisia
Seeking Russian entry
# R&M - Clear Leadership in CEE and Market Entry into Turkey

## Refining capacity (in mn t)

<table>
<thead>
<tr>
<th>Company</th>
<th>Capacity (mn t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>OMV</td>
<td>26.4</td>
</tr>
<tr>
<td>PKN</td>
<td>19</td>
</tr>
<tr>
<td>MOL</td>
<td>16.9</td>
</tr>
<tr>
<td>Lukoil</td>
<td>14.2</td>
</tr>
</tbody>
</table>

## Retail sites (# of sites)

<table>
<thead>
<tr>
<th>Company</th>
<th>Sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>OMV</td>
<td>2,451</td>
</tr>
<tr>
<td>PKN</td>
<td>2,717</td>
</tr>
<tr>
<td>MOL</td>
<td>949</td>
</tr>
<tr>
<td>Lukoil</td>
<td>3,366</td>
</tr>
</tbody>
</table>

### OMV market share (in %)

<table>
<thead>
<tr>
<th>Year</th>
<th>Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>9</td>
</tr>
<tr>
<td>2002</td>
<td>10</td>
</tr>
<tr>
<td>2004</td>
<td>18</td>
</tr>
<tr>
<td>2006</td>
<td>20</td>
</tr>
</tbody>
</table>

1: incl. Petrom (100%) & Bayernoil (45%)
2: incl. Poland & 51% Unipetrol
3: incl. Slovnaft & INA (26%)
4: OMV holds 34% stake in Petrol Ofici

### Maps

- **Mature markets**
- **Growth markets**

### Table: CEE13 vs Turkey

<table>
<thead>
<tr>
<th>Region</th>
<th>Refining bulk capacity</th>
<th>Retail sites</th>
<th>Market volume 2005/11</th>
<th>Market share</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEE13</td>
<td>123 mn t</td>
<td>22,110</td>
<td>82 (78 mn t)</td>
<td>20%</td>
</tr>
<tr>
<td>Turkey</td>
<td>29 mn t</td>
<td>13,174</td>
<td>30 (34 mn t)</td>
<td>35%</td>
</tr>
</tbody>
</table>

1: Growth 2005-2011; fuels incl. bio components

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1: Market share: OMV and Petrom Retail and Commercial sales
2: Countries: Austria, Germany, Czech Rep., Slovakia, Bulgaria, Romania
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World’s crude oil reserves and production

World’s crude oil reserves

[m tons]


88.352 95.510 135.734 136.890 139.626 173.340 175.384

World’s crude oil production


3059,0 2721,9 3164,3 3278,1 3614,0 3868,6 3920,6

Source: ÉSSO
Jet Fuel OECD Europe Production & Demand

- Demand
- Production

Production & Demand [1000 b/d]

Future Europe Oil Product Balances

Includes refinery investments to 2010 only

Source: Refining Capacity Study, EUROPIA Strategy Council
Middle distillates worldwide flows at 2015

Source: ENI R&M at 7th Annual European Fuels Conference, Paris 2006

Refineries follow the demand changes

Market Demand

Production Refinery

[mt]

[mt]

1995 2000 2005

1995 2000 2005

Diesel

Diesel

Gasoline

Gasoline
Refinery Schwechat – An Airport Refinery
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Boiling diagramm crude oil

Source: OMV
### Fuel Composition HC-HydroCarbon

<table>
<thead>
<tr>
<th>Name</th>
<th>Synonyms</th>
<th>Components</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel gas</td>
<td></td>
<td>C1 - C2</td>
</tr>
<tr>
<td>LPG</td>
<td></td>
<td>C3 - C4</td>
</tr>
<tr>
<td>Gasoline</td>
<td></td>
<td>C5 - C12</td>
</tr>
<tr>
<td>Naphtha</td>
<td></td>
<td>C8-C12</td>
</tr>
<tr>
<td>Kerosene</td>
<td>Jet fuel</td>
<td>C11-C13</td>
</tr>
<tr>
<td>Diesel Fuel oil</td>
<td></td>
<td>C13-C17</td>
</tr>
<tr>
<td>Middle distillates</td>
<td>Light gas oil</td>
<td>C10-C20</td>
</tr>
<tr>
<td>Soft wax</td>
<td></td>
<td>C19 - C23</td>
</tr>
<tr>
<td>Medium wax</td>
<td></td>
<td>C24 - C35</td>
</tr>
<tr>
<td>Hard wax</td>
<td></td>
<td>C35+</td>
</tr>
</tbody>
</table>
Fuels - more than 50% of a Refinery Output

- Diesel: 33%
- Gasoline: 21%
- Jet A1: 8%
- Petrochemicals: 11%
- Bitumen: 5%
- MFO: 5%
- HFO: 7%
- Light Heating Oil: 10%
Important fuel properties for mobility

- High energy content (per volume/per mass)
- Clean combustion properties
- High stability
- Good cold flow properties
- Global available
- Reasonable costs
Additional functions of the fuel

- Airframe system coolant
- Turbine system coolant
- Fuel and associated system hydraulic operating fluid
- Lubricant for fuel system components
- ...

- Compatibility with used materials
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Main Drivers for Alternative Fuels

- **Security of supply**
  - Reduce petroleum dependence in transport sector.
  - How much fossil fuel can be substituted?
  - Is the production of the fuel alternative completely domestic or is import necessary?

- **Environmental impact**
  - Does the fuel offer emission reduction potential?
  - Is CO$_2$ balance better or worse than other alternative fuel options?

- **Supporting the rural economy**
  - Use of alternative resources like biomass.
  - Is the production of the fuel alternative completely domestic or is import necessary?
Main Barriers for Alternative Fuels

- **Infrastructure**
  - Does the fuel require a new infrastructure?
  - Is it possible to blend alternative fuel with conventional fuel?

- **Powertrain**
  - Does the fuel require adapted or a new propulsion technology?
  - Is it possible to use the fuel in the existing car fleet?

- **Sustainability**
  - Economics - Ultimately must be competitive with hydrocarbons
  - Social - Cannot use food crops as a feedstock
  - Environmental – Lowest impact
Biomass derived fuels

- Extraction
- Fermentation
- Gasification
- Fermentation
- Gasification
- Pyrolysis
- Pyrolysis
- Transesterification
- Synthesis

- HTU-Diesel
- Pyrolysis oil
- Veg. oil
- FAME
- EtOH
- ETBE
- Biogas
- BTL
- MTBE
- MeOH
- DME
- H2
- Pyrolysis oil
Alternative JET Fuel Options

Costs

Today

- JET A1
- Crude

5 to 10 Years

- FT-JET
- GTL, CTL

10 Years

- Bio-CH4
- Biooils

> 20 Years

- MeOH
- EtOH
- Hydr.

- FT-JET
- BTL

- Bio H2

Alternative JET Fuel Options

- Biofuels
- MeOH
- EtOH
- FAME

Today

- JET A1
- Crude

5 to 10 Years

- FT-JET
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> 20 Years

- MeOH
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- Bio H2
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Resumes

- There is not really a lack of oil in the next 30-50 years, question of price and technology
- Regional distortion must be balanced globally – challenge for logistic
- Every fuel have special properties – every change require a change
- There are alternative options – but costs will increase
- Blends of kerosene with alternative components with similar properties is the preferred option
Thank You for Your attention

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