CURRENT STATUS of TURKISH LIGNITE SECTOR

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UNECE Ad Hoc Meeting of Experts on Coal in Sustainable Development
17-18 November 2003, Geneva
CONTENT

- Turkish Energy Sector
- Turkish Coal Sector
- Overview of Restructuring of TKI
- Conclusion
TURKISH ENERGY SECTOR-
Primary Energy Reserves

- Hardcoal (Bt) : 1.1
- Lignite (Bt) : 8.3
- Asphaltite (Mt) : 82
- Bituminous (Bt) : 1.6
- Hydaulic (MW/y) : 35539
- Crude Oil (Mt) : 39
- Natural Gas (Bm3) : 10.2
- Nuclear(t)
  - Uranium : 9,129
  - Thorium : 380,000
- Geothermal (MW/y)
  - Electricity : 4500
  - Thermal : 31100
- Solar (Mtoe)
  - Electricity : 8.8
  - Heat : 26.4

Source: WEC/TNC
TURKISH ENERGY SECTOR - Primary Energy Production

- Major energy source: Lignite
- In 2002
  - 47.4% coal
  - 12.2% hyd & geoth.
  - 11.8% Fuel oil & N.gas
  - 4.3% other renewables
  - 24.3% noncommercial fuels

Source: WEC/TNC
1990-2002
Avr.increase rate: 3.3%
Economic crises in 2001
in 2002
- 39.3% fuel oil
- 20.6% N.gas
- **13.5% lignite**
- **11.3% hardcoal**
- 7.6% noncommercials
- 3.7% hydraulic

Source: WEC/TNC
TURKISH ENERGY SECTOR-
Rate of Domestic Supply in Energy Consumption - Import

NET IMPORT:
1990-2002
(28.5 Mtoe → 53.9 Mtoe)

in 2002:
- Hardcoal+coke : 9.6 Mtoe (16.5%)
- Crude oil & products : 32.6 Mtoe (56%)
- Natural gas : 15.8 Mtoe (27%)
- Electricity : 0.3 Mtoe (0.5%)

Source: WEC/TNC
TURKISH ENERGY SECTOR - Energy Demand

- **Dependency on Imported Energy**
  - 2010: 73%
  - 2020: 78%

Source: MENR
**TURKISH COAL SECTOR - Lignite Exploration-Reserve**

- **Exploration By Drilling**
  - 1960-2002: 1,667,673 m  
    (after 1990: 183,673 m)

- **Lignite reserve**:
  - Determined: 9.3 Bt
  - Mined out: 1 Bt
  - Remaining: 8.3 Bt

*Most abundant energy resource in Turkey (spread in 37 cities)*
TURKISH COAL SECTOR - Hardcoal Reserve

- Hardcoal reserve: 1.1 Bt
- Owned by Turkish Hardcoal Enterprises (TTK)
- Mainly at Zonguldak Coal Basin
TURKISH COAL SECTOR - Production

- Hardcoal: Public Sector (TTK)
- Lignite: Public (TKI & EUAS) + Private Sector

In 2002:
Hardcoal: 2,245 Mt
Lignite: 51 Mt

Share in total lignite Prod.
60% : TKI
32% : EUAS
8% : Private Sector

Source: WEC/TNC
TURKISH COAL SECTOR - Production-Import-Consumption

- Imported lignite: Minor amount
- 30% of Imported hardcoal: iron-steel industry

Source: WEC/TNC
TURKISH COAL SECTOR -
Hardcoal Consumption

*Consumption of hardcoal mainly for industry

Source: WEC/TNC
TURKISH COAL SECTOR - Lignite Quality

- 68% low quality (Elbistan: 3.4 Bt – 1100kcal/kg)

Source: WEC/TNC
TURKISH COAL SECTOR-
Lignite Consumption

in 2002

*Consumption of lignite mainly for electricity generation

Source: WEC/TNC
TURKISH COAL SECTOR-
Lignite Projects to Feed Power Plants

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Consumption Capacity (x1000 t/y)</th>
<th>Installed Capacity (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afsin-Elbistan</td>
<td>18.000</td>
<td>1.360</td>
</tr>
<tr>
<td>Ankara-Cayirhan</td>
<td>4.300</td>
<td>620</td>
</tr>
<tr>
<td>Bursa-Orhaneli</td>
<td>1.500</td>
<td>210</td>
</tr>
<tr>
<td>Canakkale-Can</td>
<td>1.800</td>
<td>320</td>
</tr>
<tr>
<td>Kütahya-Seyitomer</td>
<td>7.100</td>
<td>600</td>
</tr>
<tr>
<td>Kutahya- Tuncbilek</td>
<td>2.450</td>
<td>429</td>
</tr>
<tr>
<td>Manisa-Soma</td>
<td>8.000</td>
<td>1.034</td>
</tr>
<tr>
<td>Mugla-Husamlar</td>
<td>5.000</td>
<td>630</td>
</tr>
<tr>
<td>Mugla-Milas-Sekkoy</td>
<td>3.750</td>
<td>420</td>
</tr>
<tr>
<td>Mugla-Yatagan</td>
<td>5.350</td>
<td>630</td>
</tr>
<tr>
<td>Sivas-Kangal</td>
<td>5.400</td>
<td>450</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>62.650</strong></td>
<td><strong>6.703</strong></td>
</tr>
</tbody>
</table>
TURKISH COAL SECTOR-
Lignite Projects to Feed Power Plants

- **in 2004**

- Elbistan- B Power Plant having 4x350 MW electricity generation capacity will start to operate

- **total installed capacity** (lignite fired) **8,120 MW**
TURKISH COAL SECTOR - Share of Lignite Fired Power Plants

- Total installed capacity: 31,846 MW
- Total lignite Fired Power Plants Capacity: 6,506 MW
- Share of Lignite Fired Power Plants in Total: 20.4%

Source: WEC/TNC
In total electricity generation

Share of domestic lignite (23.3 %)

Imported Natural Gas (34.4 %)
### TURKISH COAL SECTOR - Lignite Fields Suitable for Electricity Generation

<table>
<thead>
<tr>
<th>Project name</th>
<th>Reserve (1000 tonnes)</th>
<th>Lignite Consumption Capacity (t/y)</th>
<th>Installed Capacity (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TKI</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adana-Tufanbeyli</td>
<td>214,000</td>
<td>7,200</td>
<td>600</td>
</tr>
<tr>
<td>Bingol-Karliova</td>
<td>88,000</td>
<td>1,115</td>
<td>100</td>
</tr>
<tr>
<td>Bolu-Goynuk</td>
<td>39,000</td>
<td>1,200</td>
<td>150</td>
</tr>
<tr>
<td>Cankiri- Orta</td>
<td>51,000</td>
<td>1,500</td>
<td>100</td>
</tr>
<tr>
<td>Tekirdag-Saray</td>
<td>129,000</td>
<td>2,500</td>
<td>300</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>521,000</strong></td>
<td><strong>13,515</strong></td>
<td><strong>1,250</strong></td>
</tr>
</tbody>
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TURKISH COAL SECTOR - Lignite Fields Suitable for Electricity Generation - Continue

<table>
<thead>
<tr>
<th>Project name</th>
<th>Reserve (1000 tonnes)</th>
<th>Lignite Consumption Cap. (1000 t/y)</th>
<th>Installed Capacity (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EUAS</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Cayirhan 5-6</td>
<td>75,000</td>
<td>2,500</td>
<td>320</td>
</tr>
<tr>
<td>Elbistan</td>
<td>2,818,000</td>
<td>86,400</td>
<td>6,300</td>
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<tr>
<td>Private Sector</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Konya-Ilgın</td>
<td>152,000</td>
<td>3,100</td>
<td>500</td>
</tr>
<tr>
<td>Adıyaman-Golbasi</td>
<td>49,000</td>
<td>1,400</td>
<td>125</td>
</tr>
<tr>
<td>General TOTAL</td>
<td>3,615,000</td>
<td>106,915</td>
<td>8,495</td>
</tr>
</tbody>
</table>
Restructuring of TKI

- Turkish Coal Enterprises (biggest lignite producer of Turkey)

in 2002
- 30% of total lignite reserve
- 60% of total lignite production
Restructuring of TKI
-MINES WHICH STOPPED ACTIVITIES by July 2002

ADL- Corum Mine  OLI- Oltu Mine  TLI- Saray Mine
DLI- Askale Mine  GAL- Silopi Mine  GOLI- Goynuk Mine
Restructuring of TKI

MINES WHICH STOPPED ACTIVITIES by July 2002

- Total Losses since 1988: 445.7 million $
- Avr. OPERATING COST: 46-242 $/ton

- in 2001:
  - Share in total TKI RESERVE: 9.2%
  - Share in total PRODUCTION: 1.79%
  - MARKET: Household + Industry

- # of workforce by May 02: 1669
- SHARE IN TOTAL WORKFORCE: 11.06%
# Latest Status of Mines which Stopped Activities

<table>
<thead>
<tr>
<th>Mine</th>
<th>Reserve (1000 ton)</th>
<th>Duration (year)</th>
<th>Production (t/y)</th>
<th>$/ton</th>
<th>(x1000 $/year)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corum</td>
<td>16797</td>
<td>10</td>
<td>300,000</td>
<td>12.027</td>
<td>3608.1</td>
<td>Leased</td>
</tr>
<tr>
<td>Askale</td>
<td>162</td>
<td>2</td>
<td>20,000</td>
<td>0.88</td>
<td>17.6</td>
<td>Leased</td>
</tr>
<tr>
<td>Oltu</td>
<td>693</td>
<td>10</td>
<td>50,000</td>
<td>5.39</td>
<td>269.5</td>
<td>Leased</td>
</tr>
<tr>
<td>Silopi</td>
<td>49313</td>
<td>10</td>
<td>99,000</td>
<td>2.165</td>
<td>214.3</td>
<td>Leased</td>
</tr>
<tr>
<td>Goynuk</td>
<td>(39000)</td>
<td>10</td>
<td>(700,000)</td>
<td>-</td>
<td>-</td>
<td>Not leased</td>
</tr>
<tr>
<td>Saray</td>
<td>(129000)</td>
<td>10</td>
<td>(700,000)</td>
<td>-</td>
<td>-</td>
<td>Not leased</td>
</tr>
<tr>
<td>Total</td>
<td>235,085</td>
<td></td>
<td></td>
<td></td>
<td>4,109.5</td>
<td></td>
</tr>
</tbody>
</table>
Latest Status of Mines which Stopped Activities

- 1300 workforce was transferred to other Establishments which located at west part of Turkey (relatively high living standards)
  - Been worked at direct & indirect production
  - Reinforced the existing workforce
  - Result decrease in contractors’s jobs
Restructuring of TKI
Near Future Activities

Reorganization

- 8 Establishments → 4 Establishments
  (decentralization)

- 2 more departments at Headquarter
CONCLUSION

- Coal (lignite) is major energy source of Turkey
- Because energy consumption rate is high, share of domestic supply in energy consumption are decreasing by the years
- Share of imported natural gas in total electricity generation is increasing
CONCLUSION

- There are 3.6 billion tonnes lignite reserves to create additional 8495 MW installed capacity for electricity generation.
CURRENT STATUS of TURKISH LIGNITE SECTOR

Thank You For Your Attention

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