Changes in Coal Industry Structure and Trading

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Changes in steam coal market structure

• **Decrease in market power** from traditional mining company

• Emergence of **new countries** and **new suppliers** as major exporters

• Physical steam coal becomes a **commodity**

• **New physical traders** enter the market

• Robust growth in **coal derivatives** volumes

• **Barriers to entry** reduce

• **Increased complexity**: freight, emissions, gas interaction
## Emergence of new exporters

### Steam Coal Exports by Major Exporters, 2000 – 2004

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</thead>
<tbody>
<tr>
<td>Australia</td>
<td>80</td>
<td>87</td>
<td>98</td>
<td>104</td>
<td>108</td>
<td>35.0%</td>
</tr>
<tr>
<td>Indonesia</td>
<td>58</td>
<td>67</td>
<td>75</td>
<td>93</td>
<td>103</td>
<td>77.6%</td>
</tr>
<tr>
<td>China (net exp.)</td>
<td>41</td>
<td>70</td>
<td>62</td>
<td>61</td>
<td>68</td>
<td>65.9%</td>
</tr>
<tr>
<td>South Africa</td>
<td>69</td>
<td>67</td>
<td>71</td>
<td>72</td>
<td>67</td>
<td>-2.9%</td>
</tr>
<tr>
<td>Colombia</td>
<td>35</td>
<td>39</td>
<td>35</td>
<td>46</td>
<td>54</td>
<td>54.3%</td>
</tr>
<tr>
<td>Russia</td>
<td>30</td>
<td>29</td>
<td>29</td>
<td>40</td>
<td>51</td>
<td>70.0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>313</strong></td>
<td><strong>359</strong></td>
<td><strong>370</strong></td>
<td><strong>416</strong></td>
<td><strong>451</strong></td>
<td><strong>44.1%</strong></td>
</tr>
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</table>

*Source: EIA / Global Insight / Verein der Kohlenimporteure / industry sources / Prospex Research*
Steam Coal: major exporters

• Australia (stable /up)

• Indonesia (up +)

• South Africa (stable)

• Columbia

• Russia (recent up)

• China wild card: until recently exporter but may become import
New Suppliers bring more diversity

• **Russia**: 3-5 suppliers (SUEK, MIR Trade)

• **Indonesia**: 5-10 companies

• **Steam coal high prices bring new mining projects to the market**
  – Columbia
  – Indonesia
  – Australia
  – Russia
  – Vietnam
Steam Coal flows become more complex
Physical Coal as a Commodity

• **Spot** business
  – Before 2000: 80-90 % long term annual contracts
  – 2005: about 70 % spot business (either front or forward position)

• **Different Ways** of trading
  – Bilateral
  – Global Coal: only platform for physical trading
  – OTC brokers (growing)

• **Why can utility take generic coal?**
  – Flexible boilers
  – Logistic: imports large vessels and blending

• **Who takes generic coal?** Germany, Scandinavia, The Netherlands
Physical Coal as a Commodity

• Traditional mining companies sell coal for trading

• **Utilities** play key role in providing liquidity in physical trading

• Entry of **new traders** in physical market:
  – International Trading Houses: Cargill, Louis Dreyfus
  – Oil & Gas traders
Derivatives volumes: a robust growth

Estimated OTC Volume traded in MT

Source: Prospex Research

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Derivatives Steam Coal Products

• **API2 (ARA)**
  - Assessment for 150 KT of physical standard steam coal delivered into ARA
  - In USD/MT basis 6000 kcal/kg
  - Average of “Mc Closkey” and “Petroleum Argus”

• **API4 (Fob South Africa)**
  - 150 KT of physical coal Free on Board Richards Bay
  - In USD/MT basis 6000 kcal/kg
  - Average of Mc Closkey, Petroleum Argus, S. African Coal Report

• **Fob Newcastle (Australia)**
  - Derivative developed by Global Coal
  - Based on physical trades or bids offers
  - No market assumptions
**Principals**

- **Utilities**: EDF, RWE, NuON, E.ON, Vattenfal, Energy E2
- **Mining companies**: Glencore, BHP Billiton, Rio Tinto
- **Banks**: Morgan Stanley, Barclays Capital, Deutsche Bank
- **Asian players** increasingly involved:
  - Australia (suppliers)
  - Japan (utilities)
  - China (suppliers)
  - Indonesia (suppliers)
- **USA** market still independent, NYMEX
Brokers

- Derivatives
  - GFI, ICAP, Amerex
  - TFS

- Physical
  - Global Coal (physical + financial)
  - Brokers (growing)

- Clearing
  - No clearing so far although talks
  - May develop in 2006 / 2007
Prices API2, API4

API2

API4

Historical range
Low volatility

Chinese imports iron ore

Mixed signals
Freight down
API4 up
Freight: an increasingly important driver
Freight prices: a brave new world

Richards Bay / Rotterdam Cape, 1989-2005

Source: Baltic Exchange
Freight Derivatives: explosion of volumes

Source: Prospex Research
Freight Derivatives: main product

• Panamax
  – 55 % market
  – Main product 4 TCs (average 4 time charters)

• Capesize
  – 25 % of market
  – Main products:
    • Voyage Richards Bay / Rotterdam
    • Average 4 TCs

• Handymax
  – 20 % market
  – Main product: average 6 TCs
Freight as a Steam Coal Driver

- **Volatility:**
  - Freight: 50 %
  - Steam coal: 30 %

- Utilities shift purchase from **Delivered ARA** to **FOB origin**

- **Separate risk management** of Steam Coal and Freight position

- **Better knowledge** of freight market
  - **Time charter** instead of voyage
  - Usage of **derivatives**

- **Implied freight**
  API2 – API4 = Route 4 (Cape Richards Bay / Rotterdam)
Emissions: a new driver for steam coal
Coal / Gas comparison

- **Coal Power Station**
  1,000 MW  
  Efficiency: 38%  
  Estimated allowance: 2.5 mn tons CO2

- **Potential Revenues**:
  17th Oct.: emission 23.10 € / MT  
  57.7 mn €

- **More potential additional profits** if coal power station doesn’t use all allowances

- **Gas Power Station**
  1,000 MW  
  Efficiency: 55%  
  Estimated allowance: 1.7 mn tons CO2

- **Potential Revenues**
  39.2 mn €
Coal / Gas comparison

- **CO2 release**
  0.34 ton / MWh
  Efficiency 38 %
  A.E: 0.895 ton CO2 / MWh

- **CO2 release**
  0.1874 ton / MWh
  Efficiency 55 %
  A.E: 0.340 ton CO2 / MWh

- Coal plant generates **2.5 times more CO2 per MWh produced**

- **Emission**
  B.E: 23.1 € / ton CO2
  A.E: 20.67 € / MWh

- **Emission**
  B.E: 23.10 € / ton CO2
  A.E: 7.87 € / MWh

- Emission price for gas is 35 to 40 % the one of coal

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Coal / Gas comparison

![Graph showing the comparison between Coal and Gas in terms of emission and additional cost.](image)
Dark spread / Spark spread

• **17th October 2005**
  Base load: 52.40 € / MWh
  Coal API2 54.35 $ / ton
  Emission 23.1 € / ton

• **Steam coal ARA**
  45.29 € / Mt
  B.E: 6.49 € / MWh
  A.E: 17.08 € / MWh (38 %)

• **Dark Spread (without CO2)**
  52.40 – 17.08 = 35.32 € / MWh

• **Dark Spread with CO2**
  35.32 – 20.67 = 14.65 € / MWh

• **17th Oct. 2005**
  Base load: 52.40 € / MWh
  Gas: 19.53 € / MWh
  Emission 23.1 € / ton

• **Gas price**
  Efficiency 55 %
  A. E: 35.51 € / MWh

• **Spark Spread (without CO2)**
  52.40-35.51 = 16.89 € / MWh

• **Spark Spread with CO2**
  16.89 - 7.87 = 9.02 € / MWh
Coal / Gas comparison

- Cost of *electricity* production may rise due to additional allowance cost

- **Utilities** get important extra revenues if they don’t use all allowances

- Cost of allowance for *gas* after efficiency about 35 to 40 % of cost for *coal*

- End consumers pay additional costs ?!
Increased Interaction in Energy Mix

• Increased correlation in energy mix

• If [Gas-Coal] up then demand coal up, allowance price up

• If nuclear and renewable output up, then coal demand down, allowance price down

• Electricity price up, then coal and allowance price up

• Emission become the centre point of the equilibrium?