THE FUTURE OF COAL

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Coal Becomes World’s Primary Energy Source

Sources: Wood Mackenzie, IEA
BTU-Hungry World

**Developing Economies**
Will account for 80% Global GDP by 2050

**Energy Intensities**
Remain just a fraction of developed economies

**China**
Only part of the story unfolding
Scale and Pace of Developing World Urbanization

- By 2020, developing countries will account for almost 80% of the world’s total urban population.

- The global growth is equal to adding the population of Mumbai every second month or Shanghai every third.

**Total Urban Population in China, India, and Africa (million)**

<table>
<thead>
<tr>
<th>Year</th>
<th>1990</th>
<th>2010</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>+750</td>
<td>650</td>
<td>1,400</td>
<td>2,350</td>
</tr>
</tbody>
</table>

**Total Population in Developed Countries (million)**

<table>
<thead>
<tr>
<th>Region</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU</td>
<td>~500</td>
</tr>
<tr>
<td>US</td>
<td>~370</td>
</tr>
</tbody>
</table>

Source: McKinsey & Company
Large Upside to Steel Intensity Potential Drives Met Coal

- Emerging countries driving met coal demand through greater urbanization and higher steel consumption
- Significant steel increases required to reach levels of developed Asia economies
- Stable stage intensity may take 20-40 years to reach
- Countries will rely on imports for met coal needs

![2011 Steel Consumption Per Capita](source: Peabody Global Energy Analytics)

- ~1.2 billion tons of met coal required to reach stable stage steel intensity of 900 kg/capita

Source: Peabody Global Energy Analytics
Build Out of Coal Generation Drives Growth in Thermal Coal

- New coal-based generation expected to grow 395 GW by 2016
- ~ 1 billion tons of additional coal demand
- Vast majority of growth in China and India, driving higher seaborne demand
- 73 GW of new coal generation in rest of world

Source: Platts Worldwide Power Plant Database and Peabody Energy analysis
# Planned Export Capacity

<table>
<thead>
<tr>
<th>Location</th>
<th>Current</th>
<th>Planned</th>
</tr>
</thead>
<tbody>
<tr>
<td>West Coast</td>
<td>6</td>
<td>50</td>
</tr>
<tr>
<td>Southwest</td>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td>Gulf Coast</td>
<td>36</td>
<td>66</td>
</tr>
<tr>
<td>East Coast</td>
<td>86</td>
<td>100</td>
</tr>
<tr>
<td>Midwest</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Southeast</td>
<td>10</td>
<td>31</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>157</strong></td>
<td><strong>276</strong></td>
</tr>
</tbody>
</table>

Source: UBS, NMA, ACI
Projected Coal Plant Retirements as a Percentage of Total Capacity by Region - 2020

Nationwide Retirements:
68 GW = 20% of capacity
Coal Fleet Size

- Smaller units (<300MW) comprise 75% of the retirements
- Almost 75% of the coal fleet will be larger than 500 MW
Coal Fleet Age

- By 2020—
  - 65% of the existing coal fleet is >40 years old
  - Youngest segment-<30 years—drops by half to 13% of entire fleet
Coal Fleet Heat Rate (MMBtu/MWh)

Emission Profile (#/MWh)

- SO2: -25 %
- NOx: -11 %
- CO2: 0 %
Higher Capacity Factors for Remaining Plants Offset Retirements

U.S. Coal Fleet
(In gigawatts of capacity)

- Capacity at risk of retiring by 2020
- Expected capacity to remain online
- Includes 7 GW New Capacity

U.S. Coal Plant Utilization
(Remaining 277 gigawatts)

- 2010: 66%
- 2012: 57%
- 2020: 76%

2020: ~100 MST recovery from 2012 levels

Source: EVA, NMA
## EPA GHG NSPS for Power Plants

### New Units
- EPA proposed NSPS for new units April, 2012
  - Final rule—April-June 2013
- Creates a new single-source category for “fossil fuel-fired” power plants
  - Proposed standard at 1,000 lb/CO₂ per MWh
  - Can only be met by NGCC plants
- Includes unworkable CCS “rolling average” option for coal plants
- Uncertainty about potential exposure for existing plants that modify/reconstruct to comply with MATS or other regulations

### Existing Units
- Required after a final new unit rule
- EPA does not establish direct regulations
- EPA calls for State plans and issues emissions guidelines, not standards
  - Must include costs, technological feasibility.
- Rarely used provision – Extent of State discretion in submitting plans is uncertain
- EPA publishes final guidance; states submit enforceable plans within nine months
Our Future – The Facts
Coal Generation Capacity and % Change in Generation from 2012

Source: EVA

(www.flyash.org)
The World Needs Coal

Share of people without electricity access for developing countries

Source: WHO

[Map showing the share of people without electricity access for developing countries, with different color codes for different percentages.]