US Foundry Coke Supply

…and Factors that Drive the Market

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Agenda

• US Foundry Coke Supply
• Foreign Coke Supply & Coke Alternatives
• Understanding the Market
• Blast Furnace vs. Foundry Coke
• What Drives the Market
US Foundry Coke Supply
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• ABC Coke, AL (Drummond)
  – Capacity: 500,000 tpy
• Walter Coke, AL (Walter Energy)
  – Capacity: 285,000 tpy
• Erie Coke Corporation, PA
  – Capacity: 160,000 tpy*
• Tonawanda Coke Corporation, NY
  – Capacity: 190,000 tpy
US Foundry Coke Supply

Production is not limited to cupola foundries

- 4"+ material usually ends up in iron or lead making cupolas
  - About 70% of total coke output
- Undersized material is used for other industrial applications
  - mineral wool
  - lime kiln fuel for sugar beet manufacturers
  - carbon raiser
  - binder for foundry coke production
- Foundry Coke producers may also make BFC
Foreign Coke Supply & Coke Alternatives
Foreign Supply

• Columbian Coke
  – Lower Carbon content

• European Coke
  – Poland
  – Italy

• Chinese Coke
  – 40% self imposed export tax keeping exports to a minimum, mainly to India
  – US duties still imposed
Alternatives

• Carbonite Form Coke, VA
  – Made from coal, 50,000 tpy
  – Potential for additional capacity
• Excess BFC from Steel mills or other merchant BFC producers
  – When coke stocks are surplus to mill demand
  – When integrated mills shut down the blast furnace, the coke batteries continue to operate
• Broken, crushed anodes
• Anthracite Coal
Understanding the Market
Understanding the Market

We must not only look to the supply/demand equation, but also the outside factors that may influence the marketplace

• Metallurgical coal prices
• Global demand for steel
• Blast Furnace coke demand
• Global demand for coal, both met and steam
Recent Headlines for Coal/Coke…

- *China’s demand for coke in 2015 to reach 380 Mt*, by Shi Lili, Steel Times International, March 2012

- *Chinese coke output set to rise to 450 Mt*, China Metals, Steel Times International, March 2012

- *Coal exports surge to highest level since 1991*, by Matthew Brown, Associated Press, April 10, 2012 7:36pm

- *China to see slow growth in Q2 coal demand*, by Yamei Wang, Xinhua News, April 8, 2012, 9:19 pm

- *Utilities Give Coal the Heave Ho*, by Rebecca Smith, WSJ, May 1, 2012

- *Thermal Coal Prices drop to lowest levels in 18 months*, by Emiko Terazono, Financial Times, May 2, 2012

- *China buyers defer raw material cargoes*, by Javier Blas and Jack Farchy, Financial Times, May 19, 2012
Recent Headlines for Steel

- *China’s steel market is warming up*, by Shi Lili, Steel Times International, April, 2012
- *Steelmakers Confront Oversupply Worries*, by John W. Miller, WSJ, April 30, 2012
- *Industry Picks up the Pace*, by Conor Dougherty, WSJ, May 2, 2012
- *Arcelor Mittal returns to profit, sees global demand up 4-4.5%*, Platts, May 10, 2012
- *World apparent steel use revised downward in April 2012 Short Range Outlook*, by Jessica Wagner, NerdsofSteel.com
- *Analysis: China’s Towering metal stockpiles cast economic shadow*, by Fayen Wong and Jane Lee, Reuters, May 18, 2012
Coking Coal Market

- Hard Coking coal prices are down from record highs last year
- Quarterly contract prices for hard coking coals lowered significantly but have recently turned up again for 3rd Quarter contracts
- Prices could weaken again due to the situation in Europe
- High demand for thermal and met coals in Asia could rebound the market later this year
Metallurgical Coal Qualities

- Thermal Coals
  - Mainly used in power generation
  - Least expensive, widely available
  - Lowest ranking bituminous coal

- Low Vol, Mid Vol, High Vol coking coals
  - “Hard coking coals”
  - Used primarily for coke making
  - Tend to be higher quality for stronger coke properties
  - Low availability, have become difficult to extract.
Appalachian Met Coal Production
Blast Furnace vs. Foundry Coke
BFC vs. FC

Blast Furnace Cokes (BFC) and Foundry Cokes (FC) are made by blending metallurgical coals to provide the desired properties:

- Blast Furnaces produce hot metal via a reducing atmosphere where Oxygen is removed from the Iron Ore.
- Cupolas produce iron via a melting process of cast iron scrap, pig iron and/or steel.
Blast Furnace Coke

Blast Furnace Coke is designed to support a significantly higher burden in the furnace than in a traditional iron cupola

- CRI – Coke Reactivity Index
- CSR – Coke Strength after Reaction
- Steel makers are also interested in coke porosity and fissure formation
  - Usually sized 1” x 3”
  - Typical oven time is 18 hours
Foundry Coke

Cupola operators are interested in larger sized material, but do not usually specify strength or reactivity requirements

- Coals are blended to achieve larger piece formation
- Blend requires a higher concentration of Low Vol coals ($$$$
- Sized at 4” x 6” for smaller diameter cupolas
- Sized 4” x 9” for larger diameter cupolas
- Typical oven time is 28 hours
BFC v. FC

Blast Furnace Coke

Foundry Coke
What Drives the Market
Global Demand for Coal

• In late 2008 before the financial crisis, the US became a swing supplier to the global coal trade due to continuing issues with coal production in Australia.

• US coal exports continue today as China continues to import coal even as the demand for steel and coal has slowly dwindled since the beginning of 2012.

• Hard coking coal prices remain strong due to low supply and high extraction costs.
Global Demand for Coal

- Low NG prices in the US have tempered domestic demand, causing some production to be shuttered, maintaining some price support
- Coal will continue to be a significant energy source for the rest of the developing world
- Continued mining issues in Australia will help support US coal export trade
Other Issues with Coking Coal

- Coals are more expensive to mine
  - Digging deeper, smaller seams
  - Increased regulatory burden from entities such as MSHA, EPA, etc
  - Mine startups require large capital expenditure
- Decreased availability of higher quality coals causing steel makers to turn to thermal grades
- Political pressures
Conclusions

Domestic and global factors will affect coal and coke markets going forward:
• Limited number of Foundry Coke Producers and alternative materials
• Coal export market
  – Energy demand
  – Steel demand
• Environmental pressure on coal mining and coal use for electricity
• Increased costs of mined coals
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