



ISSUES & IDEAS

COAL UPGRADING

the importance of coal and therefore lacks coherence, substance and relevance for Asia. Following increasing volatility in oil markets on which the U.S. heavily depends, the government decided a decade or so ago to pursue a policy of energy independence. It started to examine more closely exploitation of internal resources and, in particular, its rich reserves of shale gas using a technique called fracking. A consequence of implementing this policy is a reduction in the use of coal and America, of necessity, has become a natural coal exporter, provided that its transportation logistics permit.

The largest known coal reserve in the world—the Powder River Basin in Wyoming—must not only compete economically in transportation costs, but in coal quality specifications as well, and that means deploying coal upgrading technologies. Why? Because within the next decade Powder River Basin coal will have to compete with upgraded coal in the world's primary coal market, Asia.

COAL UPGRADING: THE COMING ENERGY REVOLUTION

Finding ways to upgrade coal is one of the world's most important energy issues.

BY DAVID BOREN & SCOTT YOUNGER

ASIA LEADS THE WORLD in deploying clean coal technologies, a fact that will become increasingly evident as the world progresses toward the renewable energy goals that have been set for 2015. Asia's predominance is not because of green movements or government commitments to promote renewable energy. Such forces exist in many countries, including China, Japan, and Korea, which together account for 33% of world coal imports and 70% of world coal consumption.

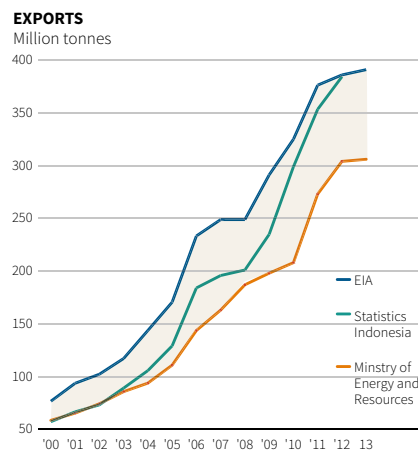
The driving force behind clean coal applications is the commercial reality that exploiting coal resources requires coal upgrading technology.

Given the plentitude of natural gas in U.S. shale deposits, the U.S. has a “sotto voce” role on global coal development, like it or not. Indonesia is the second largest coal exporter after Australia, and its coal companies confront the marketing of low rank coals (LRCs) on a regular basis. With over half of Indonesian coal resources in Sumatra, where deposits are characterized by high moisture and low calorific value, the need for coal upgrading technologies is not subject to intellectual or political debate. This is a commercial imperative.

U.S. political discussion is characterized by disparate views regarding

Indonesia coal flow

Indonesia's coal export figures vary widely depending on the source.



Source: Statistics Indonesia, EIA, Ministry of Energy and Resources.

Reducing emissions through carbon capture and storage, coal gasification, and improved power plant efficiency are worthwhile endeavors, especially for countries whose base load energy requirements have already been fulfilled. Developing existing coal resources, transporting them cost effectively, and controlling the specifications of energy feedstocks is more meaningful still, for every coal-consuming nation, especially those that depend on coal to provide base load energy for their electricity grids. Addressing current and future needs of world coal consumers is about technology and economics, not politics—and that means all of us, but especially China, India, and the rest of Asia.

The future of coal as a viable energy source must be seen in the context of global economic development. Many environmental issues relating to coal consumption are a consequence of the Industrial Revolution that began in the 19th century. The key question is not whether coal is “clean” but whether technological advances can provide economically and environmentally sound solutions to the reality of continued reliance on coal fired power plants.

Diverging views can be expected on such a complex and difficult topic as energy resource development. In Asia, the need for more energy makes coal ever more valuable as an energy source. Renewable energy alternatives are great in theory but in reality the overwhelming need to produce the base load energy production required to maintain power grids largely revolves around the acquisition and development of coal resources.

High moisture, low calorific value coal must be upgraded to be fired in burners throughout Asia, where the environmental considerations are usually secondary to technical and



economic considerations, at least for now. Nevertheless, companies capable of providing advanced coal treatment technologies are poised to excel globally, and this is where developments in the U.S. are most relevant. The critical comparative factor of clean coal technologies is economics, not the environment, though technologies strong in both aspects deserve special attention.


A widely used figure is that \$100 billion has been spent on the development of clean coal technologies in the U.S., much of that on carbon capture and storage technologies and also on gasification. Carbon capture and sequestration have also occupied the attention of European countries but no economically practicable solution

has emerged, and consequently there has been no compatible resonance in Asian economies.

The upgrading of coal is an essential component of Asia's coal resource development. Adding value to coal in Indonesia, as well as in Mongolia and Australia, is a greater priority than deploying emission reduction technologies at coal fired power plants. Companies with upgrading technology capable of producing coal that has reduced moisture, higher calories and greater durability during transportation will receive increased attention going forward.

One of the more interesting upgrading technologies that can be applied both to coal and woody biomass, such as those based on the process of torrefaction.

These technologies, that work with coal as well as renewable energy sources, hold promise as a means of integrating a broader range of energy resources into the existing fuel mix of power plants. They may also offer logistical efficiencies and provide secondary income streams to coal producers, especially those in the tropical and subtropical regions where woody biomass thrives.

Resistance to such a technological convergence can be expected to the extent that this challenges traditional modes of thinking about coal versus renewable energy. Ultimately, however, this convergence will form an important part of the commercial realities driving the technological phase of coal resource development. The potential importance of such a convergence for environmental priorities also must not be ignored. 

**ADDRESSING CURRENT AND
FUTURE NEEDS OF WORLD
COAL CONSUMERS IS
ABOUT TECHNOLOGY AND
ECONOMICS, NOT POLITICS.**

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