

AN INTERVIEW WITH MARK THURBER

Coal in Asia and the Impact of the Shale Gas Revolution

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This April, NBR and the Asia Pacific Foundation of Canada will co-host the 2013 Pacific Energy Summit in Vancouver, Canada, on “Forging Trans-Pacific Cooperation for a New Energy Era.” The Summit will explore the role that deeper trade and investment ties between Asia and North America could play in helping Asia meet its energy demand while safeguarding the environment. In advance of the Summit, NBR talked to Mark Thurber, Associate Director of the Program on Energy and Sustainable Development at Stanford University and an Advisor for the Pacific Energy Summit, on his research regarding the future of coal use in Asia and implications for coal given the development of North American unconventional gas production. Coal has been one of the main energy resources in the United States during the past 30 years because of its abundance and low cost. However, the surge in domestic unconventional gas production has significantly lowered the price of gas, causing natural gas to displace coal in many power-generation plants. As a result, U.S. coal companies are increasingly looking globally—especially to Asia—for a market.

How has the shale gas revolution affected coal use in the United States?

Cheap domestic gas—the result of the revolution in techniques for extracting gas from shale—has led to the displacement of huge amounts of coal in the U.S. power sector. From 1990 through 2010, coal plants supplied 50% of U.S. electricity generation on average. Figures from the Energy Information Administration show that coal’s share of generation has fallen into a tie with natural gas as of April 2012, at 32%. (Tighter EPA rules on mercury and air toxics are further reducing

the attractiveness of coal consumption in the United States.) This stunning rise of gas at the expense of coal is a major cause of the 7.7% reduction in U.S. greenhouse gas emissions observed since 2006—more than any other country achieved in that period according to the International Energy Agency.

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What does this trend mean for U.S. coal production and infrastructure, especially in the Powder River Basin?

If the United States is the “Saudi Arabia of coal,” the Powder River Basin (PRB) is its Ghawar Field—a massive source of cheap supply. With the depletion and associated cost escalation of traditional resources in Appalachia, PRB coal has extended its reach throughout the United States, helped along by railroad deregulation and sulfur restrictions (since PRB coal is very low in sulfur). PRB coal now dominates the U.S. market for steam coal (coal that is used in power plants). But the declining competitiveness of coal as a fuel for electricity generation in the United States leaves PRB coal looking for a more robust market. Asia, especially China and India, could fit the bill.

What are the implications of exports of PRB coal for the global coal market in general and Asia in particular?

The United States has long exported appreciable quantities of coking coal (high-energy value coal used in metallurgical applications) from Appalachia, but large-scale exports of steam coal from the PRB would be a new development. China’s power producers seek low-cost coal imports that can help keep power prices down, and projections show India running a widening coal deficit in the future, which it will need to plug with imports. Indonesia, Australia, and South Africa are the largest exporters to Asia at present. Modeling work at Stanford University’s Program on Energy and Sustainable Development suggests that if port constraints are removed and demand from Asia continues to grow, PRB exports to Asia can surpass those of South Africa (though still remaining shy of export totals from Indonesia and Australia).

Are there any potentially limiting factors to the future volume of coal exports from the United States?

The most significant factor standing in the way of PRB exports at present is the absence of port capacity to ship this coal from the West Coast to Asia. Multiple terminals in the Pacific Northwest are on the drawing board, the most significant being proposed sites in Longview and Cherry Point in Washington State. Environmental groups are seeking to block these projects because of the greenhouse gas emissions that would result from burning this coal in Asia as well as possible local environmental impacts of coal transport by rail.

What are the environmental impacts of U.S. coal exports? What will be the tipping point for making coal “cleaner” as a matter of practice?

The environmental impacts of U.S. exports of PRB coal are actually far from clear. To environmental groups like the Sierra Club that are opposed to fossil fuels, blocking coal exports seems like a straightforward way to reduce the total amount of coal burned around the globe. However, if coal is exported to China, and China’s demand is inelastic because of the country’s rapid growth and limited available substitutes, exporting PRB coal could actually lead to a net reduction in greenhouse gases. China would simply be substituting imports for domestic coal and burning the same quantity of coal, while the increased coal price in the United States from higher PRB exports would lead to even more U.S. coal-to-gas switching. This logic probably holds to the extent that exports go to China and the mere existence of available PRB coal does not encourage China to build more coal power plants. If U.S. exports increase available coal supply to countries with more elastic demand, such as India, or if such exports engender confidence that cheap coal will always be available on the international market, the net climate impacts could be negative.

Ultimately, addressing climate change is impossible without either constraining coal consumption or reducing carbon emissions from burning coal—for example, through increased efficiency or carbon capture and storage (CCS). For the most part, the countries that produce, export, and consume coal recognize this fact, and yet there has been little meaningful movement toward reducing coal's contribution to climate change. In fact, the low cost and ready availability of coal in major emerging markets like China has made coal the fastest-growing source of energy in absolute terms over the last decade—notably fueling China's breathtaking rise out of poverty. Coal is now the fuel with the largest total contribution to greenhouse gases. It remains unclear what might push the world in the direction of “cleaner” coal or less coal. What is evident is that, for both coal and other fossil fuels, the new position of North America as a major potential exporter to Asia will have a considerable impact on patterns of global energy use and, with them, carbon emissions.

At the 2013 Pacific Energy Summit in Vancouver, we will be discussing the close energy relationship between the United States and Canada in the context of increasing trans-Pacific energy ties. What are the key aspects of this relationship, and what is its effect on the coal market?

The energy systems of the United States and Canada are indeed highly interconnected. Canada has historically exported significant quantities of oil and natural gas to the United States. As both nations develop major new fossil-fuel resources—including oil sands in Canada and shale oil and gas in both countries (though on a particularly large scale in the United States)—

there is continued mutual dependence and a need for transporting energy in both directions.

Production of oil and gas from unconventional sources has grown so rapidly that transportation infrastructure to bring these fuels to market has not been able to keep pace. The full Keystone XL pipeline project would bring supply from the oil sands in Alberta to the U.S. Gulf Coast for refining and onward shipment to customers; a segment of the project already under construction will help relieve crude-oil overcapacity in Oklahoma by adding pipeline capacity to the Gulf of Mexico. The Canadian government has stressed the importance of the Keystone XL project to the U.S.-Canadian energy relationship, while the U.S. government has faced conflicting pressures from oil producers to proceed with the pipeline and from environmentalists to block it.

More generally, Canada and the United States can serve as substitute departure points for a North American energy resource that faces shipping constraints in one country or the other. For example, the proposed Gateway pipeline to British Columbia could substitute for Keystone XL in transporting oil for export. Similarly, PRB coal could leave from Vancouver (or the Gulf of Mexico) instead of Longview or Cherry Point. The interconnectedness of the U.S. and Canadian energy transport networks thereby makes it difficult to “shut in” a resource like coal or oil sands when the economic drivers for export are strong—even if environmental groups wish the situation to be otherwise. ∞

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