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Lessons learned about unconventional energy: Cases from around the world

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Why has shale gas and coal bed methane development taken off in some countries but not in others? Comparing experiences in the US, China, Australia, and Indonesia, Geopolitics of Energy Fellow Holly Morrow argued that there is not one "cookie cutter" policy configuration that leads to success or failure. Rather, Morrow argued, a series of conditions need to be satisfied to make successful development of these resources possible.

Morrow began by sketching some of the common characteristics of the two forms of unconventional gas she is studying, shale gas and coal bed methane (CBM). Both are resources that produce gas from "low permeability" rocks. By definition, unconventional energy is harder to extract than conventional energy. Typically, it requires that many more wells be drilled. And in the case of both shale gas and coal bed methane, experimentation and adjustment may be needed to adapt the technologies to the variables of specific sites.

The successful deployment of shale gas or coal bed methane production depends on many factors beyond the bare technical knowledge of how to extract the gas. The shale gas extraction technique of hydraulic fracturing, or "fracking," Morrow pointed out, was a well-known technique in the United States for many years before it resulted in significant increases in natural gas production. However, in the case of coal bed methane, despite widespread knowledge of the basic engineering principles at work, Australia, China, and Indonesia have all had very different experiences in trying to develop this industry—ranging from enormous success in Australia to disappointing results in China and Indonesia.

What is important to the success or failure of the development of these technologies? The key factors Morrow discussed have to do with having conditions that allow for the kind of persistent on the ground experimentation that may be needed to make unconventional gas extraction work.

These conditions include getting the prices and the players right. Attractive natural gas prices can help get the ball rolling, as they did in the US with the deregulation of the natural gas industry or in Australia with exposure to international LNG markets. It may also help to give smaller, independent players a chance to engage—the independents played a key role in the US development of shale gas, for example. In contrast, in China, the dominant position of large oil and coal companies for which coal bed methane gas extraction is a distraction from their core business may be an important factor in the slow development of CBM in China.

Overall, Morrow emphasized the importance of recognizing that although the basic technology may be well understood, the application of these unconventional technologies to specific geographies is an ongoing innovation challenge, and one that may face special difficulties for first movers. Government policy thus needs to focus on overcoming the initial hurdle of proving the resource can work, after which the herd dynamic of the industry will take over and build momentum.

Holly Morrow is a Fellow at the Belfer Center for Science and International Affairs. She spoke as part of the Kennedy School's Energy Policy Seminar Series, which is jointly sponsored by the Energy Technology Innovation Policy research group of the Belfer Center and by the Consortium for Energy Policy Research of the Mossavar-Rahmani Center on Business and Government.