NATURAL GAS - PRESENT

Today, we find ourselves in possession of a strikingly different hand to play with respect to natural gas. The *Combined Cycle Gas Turbine* (CCGT) — the most advanced fossil-fuel turbine to date — is now available for widespread use, and is more than 50% efficient compared to its predecessors (Boyle 13). CCGTs are more 'climate friendly' than older, coal-fired steam turbines, not only for efficiency reasons but also because they burn clean natural gas, which, on combustion, emits about 40% less CO_2 than coal per unit of energy generated (Boyle 13). But the *real* strides that have drastically altered the outlook for natural gas have come in the last 24 months, largely as a result of the budding *shale gas* industry.

Shale gas is a natural gas produced from shale — a fine-grained sedimentary rock composed mostly of clay minerals (CCEI). Shale is characterized by fractures in the thin, gas-storing layers that comprise it, but its gas can also be confined in pore spaces of the sediment (CCEI). Shale has long been known to contain gas, but has, up until recently, been considered unusable because it lacked the permeability necessary for extraction. However, with several cutting edge technological advancements, including horizontal drilling methods through hydraulic fracturing, it is now possible to extract appreciable commercial quantities of this valuable resource.

Shale gas production in the U.S. has already begun to alter the reality of natural gas in North America. Many experts predict that we are at the forefront of a shale gas boom (Cohen), which will almost certainly change the economics of natural gas in North America. In June 2009, the *Potential Gas Committee*, an independent group that biennially assesses American gas resources, raised its estimate of total available resources to more than 2 quadrillion cubic feet (one-third more than its previous estimate) — making gas production at current consumption levels theoretically possible for the next 100 years (FERC 19). This increase comes almost entirely as a result of improvements in our ability to harvest shale gas and send it to markets at a reasonable cost (FERC 20). Now, with production strongly outpacing demand, gas is being diverted into storage; even with newly developed storage capacity, U.S. fields are 98% full (FERC 20).

In November 2009, President Barrack Obama's clean-energy agreement with China included a significant commitment on behalf of both countries to explore Chinese shale gas potential. "Without getting into the whole debate around the United States' relationship with China," we can highlight two important points arising from this agreement: (1) "that natural gas is an important part of the solution to greenhouse gas emissions, rather than simply one more fossil fuel; and (2) that shale gas development is a major, worldwide factor in ensuring the abundance of this clean, low-carbon fuel" (Smead, "2010" 29).

In the signed agreement, one sentence states that "[t]he development of shale gas is expected to significantly increase U.S. energy security and help reduce greenhouse gas pollution" (U.S. Department of Energy). So as we begin to pull ourselves out from the economic recession, the demand engine for natural gas will, with any hope, begin revving up again, alleviating, in turn, the massive glut of U.S. supply while putting development back on track.

There are, however, a few roadblocks that are currently preventing natural gas — and more specifically, shale gas — from becoming North America's fuel of choice. First, by being conceptually tied to oil, natural gas suffers from the same generic resistance faced by oil and oil development (Smead, "Waxman-Markey" 3). Second, because natural gas is not a *zero*-carbon emissions fuel source, some argue that it should not be considered in long-term energy plans. But if we have to wait a couple decades before significant progress is made on cleaner renewables, "that is a couple decades of continued high carbon emissions that could have been mitigated with a switch to natural gas" (Smead, "Waxman-Markey" 4). Finally, much attention has been given to controversies over the quantities and processes of water use in drilling and fracturing for shale gas (Smead, "Abundance" 29).

As a result, “the Department of Energy has commissioned an expert effort to understand the issues and the facts, the various affected states have multiple analyses and investigations going on, and, of course, the Environmental Protection Agency is increasingly interested” (Smead, “Abundance” 29).

Ultimately, though, the political perception of current and future supply capabilities is the curbing force behind slower-than-necessary proceedings. Yet the assumption that the natural gas industry cannot or will not bring forth the kind of deliverability needed to serve new, expanded markets is completely refuted by the remarkable growth of deliverability in the last couple years. Current estimates suggest that shale gas could serve to increase U.S. supplies by some 30 percent — enough to displace either a large share of U.S. vehicle fuel, or permanently retire more than half of the U.S. coal-fired power plant fleet (or, more likely, some more modest combination of both) (Powers 3). Even if we elect to max out the feasible deliverability of natural gas in the next two decades, our currently recoverable resources would still last more than seventy years — although, with ever-improving technology, we can surely expect the quantities of recoverable gas to continue growing (Smead, “Waxman-Markey” 5).

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