What You Need to Know About Fracking Today: Engineering, Jobs, and Community Response

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**Issue:** High volume, horizontal hydraulic fracturing, also known as “fracking,” is the next great wave of unconventional gas exploration in 33 states and our neighbors to the north and south. Advocates of the highly controversial process extracting gas from deep shale deposits promise economic growth while others express concern about the landscape’s environmental degradation and climate change implications. Separating fact from fiction to understand the risks and realities of hydraulic fracturing is complicated given the charged atmosphere and extreme claims on all sides.

Two Cornell professors, Tony Ingraffea and Susan Christopherson, experts in engineering and the potential economic implications of regional industrial development, bring science to bear on the controversial issue.

**Background:** Fracking involves the injection of highly pressurized and large volumes of water, sand and chemicals into production wells to fracture or re-fracture geological formations to stimulate extraction of natural gas. First bored vertically at depths of thousands of feet, wells are then drilled horizontally up to two miles from the wellbore. As many as eight horizontal wells, and potentially more, can be drilled from a single well pad to tap the same reservoir.

**Environmental Impacts:** Shale gas drilling is exempt from provisions in environmental laws, including the Safe Drinking Water, Clean Water and Clean Air Acts. Local and state regulations differ widely from one jurisdiction to another, in part because of differences in geology, industry practice and environmental and community impacts.

A single gas production well may be fractured many times, using from 500,000 gallons to more than 8 million gallons of water each time, along with added chemical compounds to increase well productivity. Once drilling is completed, fracturing fluid—known as flowback—returns to the surface and is then disposed via deep well injection or into surface waters following treatment. In 2011, only 38 percent of flowback waste was recycled or reused in the Marcellus play in Pennsylvania notwithstanding industry claims of nearly 100 percent.

The process emits methane, a greenhouse gas 105 times more potent than carbon dioxide over a 20-year time frame. Violations for wellbore integrity were 7.2 percent the first two months of 2012, up from 6.2 percent for all of 2011.
**Jobs:** In a down economy, job growth in any industry is highly valued. In Pennsylvania, about 9,300 local jobs were created since the shale boom began in 2007. This is well below initial projections due to inaccurate assumptions about where expenditures connected to shale gas development would occur. The largest local expenditure made by the oil and gas industry goes to land owners; unless the land owners spend their earnings locally, few new jobs are created. When drilling crews come from out-of-state, another source of revenue leaks from the local economy.

**Community Response:** More than 140 government jurisdictions in the Marcellus Shale region in Pennsylvania, West Virginia, New York and Ohio have taken legislative or regulatory actions—many instituting moratoria—in response to shale gas development. The costs of shale gas extraction fall to a large extent on county and local governments required to address environmental, administrative and public safety concerns. One explanation for opposition—New York and Pennsylvania residents live in areas that may be negatively affected by regional industrial activities connected to shale gas drilling but in locations where few residents will benefit.

**2012 Empire State Poll Results:** More upstate New York respondents—51 percent compared to 42 percent in down state—predict the quality of life will decrease in communities where shale gas drilling occurs. Over 50% of respondents across the state indicated that they thought the risk of water contamination outweighed any possible revenues from gas drilling.

**Resources:**
- [www.greenchoices.cornell.edu](http://www.greenchoices.cornell.edu)
- [http://cce.cornell.edu/EnergyClimateChange/NaturalGasDev/](http://cce.cornell.edu/EnergyClimateChange/NaturalGasDev/)