Shale Energy and Environmental Laboratory (SEEL)

A Field Laboratory for Testing the Impact and Developing Best Management Practices of Hydraulic Fracturing

The Fundamental Goal

At the Shale Energy and Environmental Laboratory (SEEL), The Ohio State University will develop a world-class facility for unbiased and objective research aimed at safe, efficient and environmentally responsible development of shale energy resources.

The Development of Shale Energy in Ohio

Thanks to advances in hydraulic fracturing, directional drilling, and other technologies, vast energy resources contained in shale formations deep underground are accessible in Ohio, throughout the U.S., and in other countries. The United States currently produces more natural gas than any other country, and is forecast to become the world's top oil producer by 2015. There are currently 836 producing horizontal wells and an additional 1259 wells have been permitted.

The development of shale energy creates substantial economic benefits. The U.S. is on track to becoming energy-independent by 2035 due to shale gas development. In the last year alone, our net energy imports have decreased by 20%. For our country, development of previously untapped energy sources means the creation of hundreds of thousands of jobs, reduced gas prices, and revival of industries such as steel and petrochemicals.

There are environmental gains as well. Methane (dry natural gas) is an efficient fuel for electricity generation, and produces about half the carbon dioxide and fewer particulates and other atmospheric pollutants than the combustion of oil derivatives or coal. Cheap, locally sourced natural gas produced by hydraulic fracturing is displacing coal-fired power plants and their environmental impacts. However, methane itself is a greenhouse gas that is more potent than carbon dioxide, so reducing emission of methane, and preventing its leakage from wells and distribution systems, is vital. Responsible environmental management in the production of energy by hydraulic fracturing must consider and control the environmental and health impacts of 1) methane release; 2) hydraulic fracturing fluids and water that flows from the subsurface; 3) increased truck traffic around well pads; and 4) pipeline construction.

Stewardship through science is needed. Along with the entire university community, we believe that shale energy resource development in Ohio and elsewhere will increase at a rapid rate over the course of this century, and that this production must occur with the least possible impact on air, water, land, and people. Like the majority of our colleagues, we are firmly committed to achieving prosperity for future generations while reducing our dependence on fossil fuels. To achieve these goals, the SEEL will be dedicated entirely to research: research in geological, environmental, engineering, natural and social sciences needed to identify and implement the best possible practices for responsible and efficient energy production from shale resources.

The SEEL will be operating at the intersection of energy and environment. As academic researchers, it is our role to act as fair and objective brokers of information and knowledge, articulate the benefits and the risks, predict and prevent problems, and assist citizens in making informed decisions.

Why Ohio State?

As a land-grant university, the Ohio State University's mission is to serve the people of Ohio by conducting research, teaching, and outreach on problems and issues that directly affect the state's citizens. Unlike almost all of our peer institutions, OSU owns land and subsurface property rights in an area undergoing intensive shale development; we intend to leverage these assets to create the first comprehensive working shale development laboratory, the SEEL. This facility's principal value lies in its ability to collect and disseminate information rarely shared by private industry, yet essential for the objective investigation of the critical environmental, economic and social issues surrounding hydraulic fracturing and directional drilling. By providing world-class researchers at Ohio State and its partner institutions with the ability to analyze subsurface samples of rock and fluids, as well as air, water, soil, and other ecological data, the SEEL will be the gold standard for energy-related environmental research, for the United States and the world.

In keeping with Ohio State's land grant mission and taking full advantage of the unique opportunity available at the Eastern Agricultural Research Station (EARS), located in Noble County and managed by the Ohio Agricultural Research and Development Center (OARDC), all research and education undertaken at SEEL will be conducted in an unbiased and transparent manner, with continuous input provided by faculty and citizens. Building on the university's existing strengths in the hydrologic and earth sciences, scientists will focus basic and applied research on primary environmental goals: diminishing the surface and ecological footprint of shale energy development; reducing air emissions, water contamination and other health risks; and minimizing the fresh water required for fossil fuel extraction. Their findings will be of high value to governmental institutions, private industry, and the general public.

Developing Internal and External Partnerships through SEEL

The Ohio State University is well positioned to meet the multifaceted challenges of shale energy development through research, education, and outreach. The depth and breadth of expertise in relevant core disciplines along with the overarching guidance of OSU's Subsurface Energy Resource Center, Environmental Science Network, and Shale Work Group provide SEEL with the opportunity to achieve preeminence in the arena of shale energy research. To fulfill its land-grant mission, Ohio State must vigorously seek to establish scientifically valid data to 1) improve the efficiency of energy recovery; 2) identify and minimize the environmental impacts of drilling and hydraulic fracturing procedures; and 3) work with the public and address concerns.

To advance the innovative technologies necessary for enhancing shale energy development in environmentally sound ways, it is necessary to apply a consortium approach, involving multiple

institutions including environmental and industry NGO's, government labs, other universities, and exploration and production companies. Discussions are underway with the Environmentally Friendly Drilling Program, West Virginia University, and other non-profit groups regarding the formation of a shale energy consortium to conduct research at the SEEL. As hydraulic fracturing expands at the global level, Ohio State and its collaborators at the SEEL will be uniquely situated at the center of accelerating shale development, to provide research, training and collaboration opportunities for students and scientists across the globe.

Implementation and Guiding Principles of SEEL

The Ohio State University has a unique opportunity to create a research, education, and outreach facility focused on optimizing the efficiency and safety of shale energy development. The SEEL will be established at the Ohio State EARS site to benefit students, faculty, and the broader community. This facility will serve as a national and international field laboratory for research, education, and outreach related to shale energy development. The Ohio State University welcomes and will foster transparency, discussion, and inclusion of interested parties as it considers energy exploration technology development. Furthermore, the laboratory will be developed with strict adherence to the following principles:

1. New land-based shale oil and gas research, education, and extension programs should not impede, interfere with, or alter existing experiments, education, and extension projects on the SEEL-EARS field site.

2. Research and education outcomes of any development must add value for students, faculty, and the public.

3. Innovative contracting and/or drilling arrangements will promote and prioritize long-term teaching, research, and outreach goals over short-term profitability.

4. The university should adopt a consortium approach with participation of multiple institutions (Environmental and Industry NGO's, government labs, other universities, and/or companies willing to share data).

5. Ohio State will strive for research preeminence by building on our existing strengths in engineering, energy, environmental, and social research. Establishing a preeminent field research facility in shale energy will provide our students with unparalleled educational opportunities in energy and environment and attract ongoing industry, government, and NGO involvement and support for Ohio State students and faculty.