

Two Approaches to Addressing Fracking in New York State

Hydraulic fracturing, or “fracking,” is the process of injecting fluid into rock below Earth’s surface at high pressure to crack rock and extract oil or natural gas. Supporters of the practice argue that it can be done safely and has the potential for promoting energy independence, lowering prices, improving local economies, and producing less air pollution than other energy sources, such as coal. Opponents raise concerns about possible negative effects of fracking, including contaminated drinking water, well blowouts, methane leaks, increased number of earthquakes, and diminished quality of life for those living near drilling rigs. The controversy over fracking has been heating up since around 2008, when technological advances made the practice more common. (For more details on this issue, see www.yaleclimateconnections.org/2015/05/pros-and-cons-of-fracking-5-key-issues.)

We asked two museums—both located in Ithaca, New York, atop the natural gas-rich Marcellus Shale formation—to tell us about their approaches to engaging their communities in conversation about this controversial issue. (Note: Although a ban on high-volume fracking (using more than 300,000 gallons (1,135,624 liters) of water to fracture a well) officially went into effect in New York State last year, fracking of conventional wells remains legal and fairly common in the state. According to the Energy Information Administration (www.eia.gov/state), New York State gets more energy from natural gas than any other source, and an increasing quantity of that gas comes from fracked wells in Pennsylvania.)

In New York State and around the United States, public interest in fracking—especially slick-water, high-volume hydraulic fracturing—escalated rapidly beginning in about 2008 as the practice became more frequent. Suddenly, people were very interested in where their energy came from and in the environmental and economic impacts of their energy use.

Parts of New York, Pennsylvania, Ohio, and West Virginia sit atop the Marcellus Shale, a relatively thin layer of black shale that holds huge amounts of natural gas. Fracking in association with horizontal drilling along the layer can be used to release that gas, also releasing a torrent of environmental concerns. While our community’s interest was focused on this one form of energy production, our

team at the Paleontological Research Institution and its Museum of the Earth in Ithaca, New York, recognized the opportunity to engage the public in learning about the energy system and, through that, Earth system science more broadly. We identified fracking as a gateway drug for energy literacy.

We also recognized the need to offer educational programming and materials that do not advocate for or against drilling. A fundamental goal of our work was and is to provide evidence-based information and to build understanding of the science related to the shale, the extraction techniques employed in gas recovery from the shale, and associated environmental impacts. Unlike evolution and climate change, there is no strong consensus on the net environmental impacts of fracking. While it is clear that fracking

does environmental harm, it is a more complex question whether it does more or less harm than many other status quo methods for generating energy on a large scale. Further, we must use the infrastructure we have to build the infrastructure we need; an instant transformation of our energy system is impossible. While we will not advocate for or against fracking, we do advocate for using substantially less energy.

Our programming, funded by the National Science Foundation, included working with educators in two communities in the Southern Tier of New York State (Elmira and Binghamton), including K-12 teachers, nature center and museum educators, and faculty from community colleges, a private college, and a university. We hoped that by working across different educational contexts, we could build collaboration and foster consistency of approach within the two communities. The workshops we held focused upon increasing energy literacy, understanding fracking from an Earth systems perspective, and talking about controversial topics in ways

that foster respectful, informed discussion. (Many educators work with groups that include members both for and opposed to fracking.) We also took both groups to visit a well pad in northern Pennsylvania. We have published an associated book called *The Marcellus Shale: The Science Beneath the Surface* that includes a section on teaching about energy. We have presented scores of public programs on this topic. Our related conference presentations have been standing room only, and our online presentation, *There's No Such Thing as a Free Megawatt: Hydrofracking as a Gateway Drug to Energy Literacy*, has been viewed 31,000 times (bit.ly/MarcellusGateway). Some of our other resources on the Marcellus Shale are available at www.priweb.org/outreach.php?page=Edu_Prog/92387.

Don Duggan-Haas, director of teacher programming, and **Robert M. Ross**, associate director for outreach (education and exhibits), the Paleontological Research Institution and its Museum of the Earth, Ithaca, New York

Duggan-Haas (left) and Ross stand in front of a systems diagram of the impacts of Marcellus drilling, part of an activity they conducted with participants in the Best Practices in Marcellus Shale Education conference they led in March 2013. Photo by Emily Newton





Civic Ensemble leads a theater workshop on gas drilling. Photo by Christina-Marie Brewington

With funding from the Institute of Museum and Library Services, the Sciencenter in Ithaca, New York (sciencenter.org), embarked on an integrated approach that combined exhibits with in-museum programming focused around the topic of gas drilling in the Marcellus Shale. Our exhibits illustrated the engineering process used to extract energy through fracking and encouraged visitors to consider its environmental, economic, and social impacts. As a complement to the exhibits, programming engaged audiences in discussions and critical thinking on the topic.

The Sciencenter worked closely with Civic Ensemble, a local theater company focused on issues of civic importance (civicensemble.org). Together we developed an interactive, educational theater workshop entitled *To Frack or Not to Frack*, with the goal of teaching children ages 5-11 to ask questions and think critically about the controversial topic of gas drilling through fracking. The resulting participatory theater piece focused on a family that is approached by a gas company to drill for natural gas on their land. Audience members were invited to actively participate, using movement to explore the science behind gas drilling. In the piece, some children took on the role of parts of the gas well, others were cows in the field, and still others were water for fracking

or the gas itself. Then, through the eyes of a young child, the audience looked at the potential environmental impacts and economic benefits of fracking.

At the conclusion of the theater piece, audience members (both children and adults) responded to the question, "What would you do if you were the family in the play?" They then took their place in a line along the spectrum from "I would allow drilling on my land" to "I wouldn't support drilling." Each person was asked to support their position based on what they just learned from the theater piece, with the actors facilitating discussion.

The program was delivered seven times to a total of 300 people at the Sciencenter during our popular weekend *Showtime!* presentations and at our summer camp, plus at a community center for youth from disadvantaged backgrounds. The interactive format proved to be highly engaging, and 85% of participants noted that they learned something new from the play. Most importantly, we have found an effective way to address controversial topics with family audiences that converts strong opinions into science learning.

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