GRAHAM SUSTAINABILITY INSTITUTE
UNIVERSITY OF MICHIGAN

November 2013

Hydraulic Fracturing in Michigan Integrated Assessment

Discussion Points

1. What is being done?

A holistic evaluation of the impacts of hydraulic fracturing in Michigan through a research-based partnership of University of Michigan (U-M) institutes, centers, and faculty.

Hydraulic fracturing has the potential to touch issues that all Michigan residents care about - drinking water, air quality, Great Lakes health, water supply, local land use, energy security, economic growth, tourism, and natural resource protection. This project's technical analysis, stakeholder engagement, and proposed approaches to minimize negative impacts will be important outcomes that guide future decision making on this issue and will help state leaders avoid some of the pitfalls encountered in other states. The project recognizes that natural gas extraction pressures are increasing in Michigan due to a desire for job creation, economic strength, energy independence, and decreased usage of coal.

2. Who developed the idea for the project?

The idea for conducting an Integrated Assessment on hydraulic fracturing was developed by the Graham Institute over a one year time frame (June 2011-June 2012) and involved conversations with Graham's External Advisory Board, U-M faculty, researchers at other institutions, regulatory entities, industry contacts, and a wide range of non-governmental organizations.

The Graham Institute addresses real-world sustainability problems through several mechanisms, including student programs, sustainability centers, and Integrated Assessment projects (IA). The IA Program objective is, "*To carry out the Graham Institute's mission of sustainability problem solving by using Integrated Assessment as a methodology for connecting academics, decision makers, and stakeholders."* Integrated Assessment begins with a structured dialog among scientists and policy makers to establish a key policy *question* around which the assessment is to be developed. Researchers applying this methodology then gather and assess both natural and social science information to help policy makers *answer* that question. The Graham Institutes identifies IA projects through a variety of mechanisms including input from its External Advisory Board and Executive Committee; U-M faculty, stakeholders and decision makers; and by using project selection criteria. For a one-page information sheet about the IA Research Framework, please visit: http://graham.umich.edu/media/files/ia-research.pdf.

3. How will the project unfold?

Phase 1: Technical Reports -the first phase of the project involved the preparation of technical reports on key topics related to hydraulic fracturing.

An effective IA in this context first requires compiling technical reports to provide a solid foundation of information for decision-makers and stakeholders, and upon which the policy

analysis can be built. These reports cover key issues within several topics related to hydraulic fracturing, and conclude with Michigan-specific questions/issues for later analysis in Phase 2. Lead authors for the technical reports include:

- **Human health**: Nil Basu, School of Public Health
- **Environment/ecology:** Allen Burton, School of Natural Resources & Environment ; Knute Nadelhoffer, Department of Ecology and Evolutionary Biology
- **Economics:** Roland Zullo, Institute for Research on Labor, Employment, & the Economy
- **Technology:** Johannes Schwank, Chemical Engineering; John Wilson, Energy Institute
- **Social/public perception:** Andy Hoffman and Kim Wolske, Erb Institute for Global Sustainable Enterprise
- **Policy/law:** Sara Gosman, Law School
- **Geology/hydrodynamics:** Brian Ellis, Civil and Environmental Engineering

Following a peer-review process conducted by subject experts the reports were made available in September 2013. They can be found at: http://graham.umich.edu/knowledge/ia/hydraulic-fracturing.

Phase 2: Integrated Assessment - the IA will build from the technical reports, focusing on an analysis of strategic policy options regarding hydraulic fracturing in Michigan.

The IA will likely be formed around topics identified in the technical reports and from public input received following the release of the technical reports. Key aspects of the IA that will distinguish it from the technical reports include:

- focus on the identification of key strategies and policy options,
- collaboration and coordination across research teams to identify common themes and strategies,
- regular engagement with decision makers, and
- robust stakeholder engagement process to gauge public concerns and perceptions.

4. Who is involved?

U-M partners:

- The Graham Sustainability Institute is a boundary organization connecting academics and policy-makers to address challenging sustainability problems.
- The Risk Science Center is an interdisciplinary research and communication center in the School of Public Health that supports science-informed decision making on health risks.
- The Energy Institute seeks to chart the path to a clean, affordable and sustainable energy future through multi-disciplinary research.
- The Erb Institute for Global Sustainable Enterprise is committed to creating a socially and environmentally sustainable society through the power of business.

The following steering committee has been assembled to guide current project efforts:

- Maggie Allan, Integrated Assessment Program Specialist, U-M Graham Sustainability Institute
- Mark Barteau, Director, U-M Energy Institute
- Valerie Brader, Senior Strategy Officer, Office of Strategic Policy, State of Michigan
- John Callewaert, Integrated Assessment Program Director, U-M Graham Sustainability Institute
- James Clift, Policy Director, Michigan Environmental Council
- John De Vries, Attorney, Mika Meyers Beckett & Jones; Michigan Oil and Gas Association
- Hal Fitch, Director of Oil, Gas, and Minerals, Michigan Department of Environmental Quality
- Gregory Fogle, Owner, Old Mission Energy; Michigan Oil and Gas Association
- James Goodheart, Senior Policy Advisor, Michigan Department of Environmental Quality
- Andy Hoffman, Director, U-M Erb Institute for Global Sustainable Enterprise
- Drew Horning, Deputy Director, U-M Graham Sustainability Institute
- Andrew Maynard, Director, U-M Risk Science Center
- Tammy Newcomb, Senior Water Policy Advisor, Michigan Department of Natural Resources
- Don Scavia, Director, U-M Graham Sustainability Institute
- Tracy Swinburn, Managing Director, U-M Risk Science Center
- Grenetta Thomassey, Program Director, Tip of the Mitt Watershed Council
- John Wilson, Consultant, U-M Energy Institute

The role of the steering committee is to provide broad stakeholder input and guidance to the overall IA process and to ensure the scope of study is relevant to key decision makers. Committee members may also provide data and input to research teams throughout the process, but decisions regarding content of project analyses and reports are determined by the researchers.

The IA will be informed by semi-annual meetings of the faculty research teams and steering committee for project updates and discussions. Twice during the IA, these meetings will involve a larger group of decision makers and stakeholders. An online comments/ideas submission site has been established to direct public input to the steering committee and research teams, http://graham.umich.edu/knowledge/ia/hydraulic-fracturing

5. How is the project funded?

At present, the project is entirely funded by the University of Michigan.

The project is expected to cost at least $600,000 with support coming from the University of Michigan's Graham Institute, Energy Institute and Risk Science Center. Current funding sources are limited to the U-M general fund and gift funds, all of which are governed solely by the University of Michigan. As the project develops, the Graham Institute may seek additional funding to expand stakeholder engagement efforts. All funding sources will be publicly disclosed.

6. What steps are being taken to ensure a rigorous, scientific analysis of the topic?

All researchers have completed conflict of interest forms (adapted from National Academy of Sciences materials) indicating no conflict of financial or other interests related to the reports they are preparing. Also, a review process involving subject area experts is being followed to improve the quality and the presentation of the analyses and to identify any misleading or unsupported conclusions.

It is essential that the work used in the development of reports not be compromised by any significant conflict of interest. For this purpose, the term "conflict of interest" means any financial or other interest that conflicts with the service of the individual because it (1) could significantly impair the individual's objectivity or (2) could create an unfair competitive advantage for any person or organization. In order for an Integrated Assessment to be truly effective at guiding policy, the project must be relevant, legitimate/balanced, and scientifically sound. As technical experts on the subject, reviewers will evaluate the scientific credibility, rigor, and integrity of the assessment. The relevancy and legitimacy of an assessment is best evaluated by individuals familiar with the social and political context of an issue. These efforts, and plans to only support researchers with U-M funding, should help avoid problems which have been identified in several other university-sponsored hydraulic fracturing research projects.

7. How Long Will It Take?

Approximately 2 years with a final report available in the second half of 2014.

More information at: http://graham.umich.edu/knowledge/ia/hydraulic-fracturing or contact John Callewaert, Graham Institute Integrated Assessment Program Director, (734) 615-3752, jcallew@umich.edu.

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