



Dupont Summit 2014

..... Science, Technology, and Environmental Policy Issues

December 5, 2014 ♦ Historic Whittemore House, Washington, DC

The Policy Studies Organization

Panel

"Extracting Benefits, Risks and Impacts of Shale Gas Policy"

"The Uncertain Impacts of Shale Gas on Climate Change: An Assessment of the Value of Information from Moratoria"

Zach Wendling – *Indiana University Bloomington*

I – Motivation

A number of states and countries have placed moratoria or bans on hydraulic fracturing, or "fracking," due to the perception of possible risks to human health and the environment. One salient risk is that shale gas might be worse for global climate change than previously thought. Ostensibly, taking a wait-and-see stance through moratoria allows policy-makers to review evolving evidence on risks and then make better-informed decisions at some future point in time. Waiting, however, can be costly (in financial, geopolitical, and environmental terms), especially if the foregone benefits are substantial. My research uses a value of information assessment to determine whether and under which circumstances a moratorium on fracking is efficient.

II – Research Questions

The research questions are as follows:

1. What is the net climate impact of shale gas development, where "net" refers to the possibility of offsetting (favorable and unfavorable) impacts?
2. What are the sources of uncertainty in determining the net climate impacts of shale gas development and which of these sources are largest?
3. How might the uncertainty around net climate impacts change over time and be reduced through targeted research investments?
4. What is the value of waiting for more certainty on net climate impacts from shale gas development?
5. What is the most efficient suite of policies with regard to shale gas development?

III – The Value of Information

These questions can be examined within the context of the United States, which has generated enough data to start evaluating the value of information. These data indicate that that major sources of uncertainty come from assumptions about the methane leakage rate from shale gas development and net greenhouse gas emissions from the national economy at general equilibrium. Regulations may reduce the former with a low burden on industry, but it is much harder to foresee whether more natural gas will lead to fewer greenhouse gas emissions by substitution away from coal or more emissions due to either crowding out low-carbon technologies or increased overall energy consumption. Early modeling work indicates that policy-makers may continue to wait or to develop shale gas in the presence of strong climate and energy policies.



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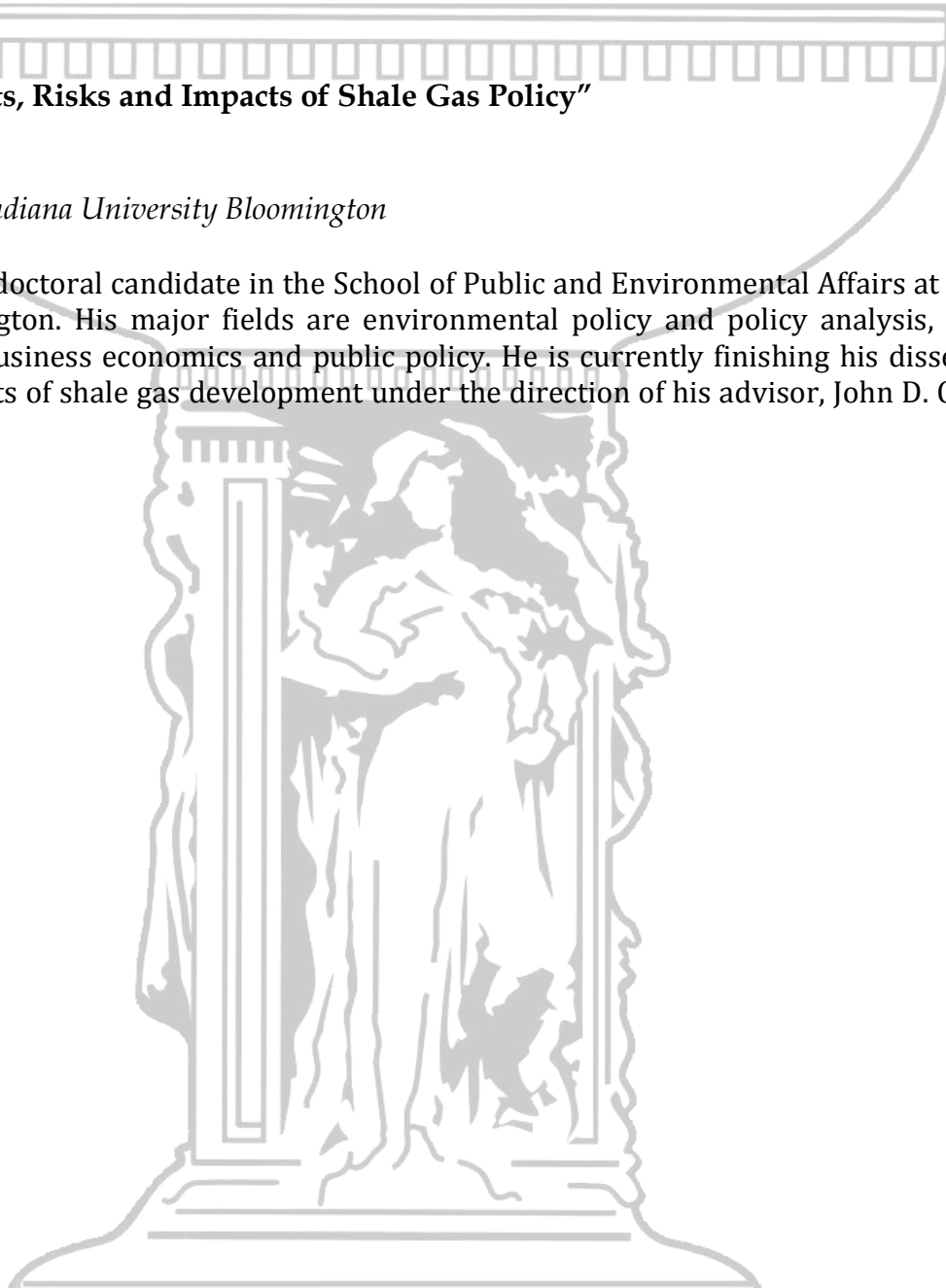
Panel

"Extracting Benefits, Risks and Impacts of Shale Gas Policy"

Biography

Zach Wendling - *Indiana University Bloomington*

Zach Wendling is a doctoral candidate in the School of Public and Environmental Affairs at Indiana University Bloomington. His major fields are environmental policy and policy analysis, and his doctoral minor is business economics and public policy. He is currently finishing his dissertation on the policy impacts of shale gas development under the direction of his advisor, John D. Graham, Ph.D.





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“Extracting Benefits, Risks and Impacts of Shale Gas Policy”

“Perception vs. Reality: Comparing Benefits and Risks of Unconventional Gas Development”

Yu Zhang - *Indiana University Bloomington*

Technological advancement (horizontal drilling and hydraulic fracturing) brings a new era of energy revolution and unconventional gas development in the US and all over the world. Extraction of previously inaccessible shale gas reserves has caused hot debates about the risks and benefits of unconventional gas development (UGD). Supporters argue for the advantages of developing UGD to include enhanced energy security, employment, energy supply, along with lower GHG emissions, cleaner energy compared to coal, and better economics for the nation as a whole. Opponents are concerned with environmental impacts that include detrimental effects to water, land and air along with public health and social impacts to communities. However, there is less than solid evidence to substantiate many of these benefits and risks as being actually advantages and disadvantages. Policy makers in different states are making decisions and regulations on UGD based on their perceptions, their understanding and judgment of basis for the benefit and risk claims, and on public opinions.

Prior studies focus on reviewing potential benefits and risks of UGD and conducting a variety of polls of public opinion and perception of UGD. These two kinds of studies (scientific study and public perception study) on UGD are usually conducted separately in academic research to date. Policy makers may only consider the current scientific claims when making decisions on UGD, thus ignoring the public opinions and perceptions. In other scenarios, policy makers may pay more attention on public opinions and perceptions and lost the scientific support for the policy. Both policymaking processes will harm the credibility of UGD policy. Therefore, it is important for policy makers, the public and the research community to recognize the disconnections between scientific studies and public perceptions of UGD so as to better understand the actual challenges associated with development and to allow the public dialogue on unconventional gas development to be more realistic and productive.

This paper will be the first paper comparing the scientific study with public perception study. Our intent is not to judge the public as being right or wrong in their perceptions. Instead, this paper draws on perception survey and scientific literatures to elucidate the relationships between public perceived benefits and risks with the science behind claims of benefits and risks.

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"Perception vs. Reality: Comparing Benefits and Risks of Unconventional Gas Development" (continued)

This paper also contributes to the existing literatures of UGD research by presenting a comprehensive review of existing benefits and risks research. Particularly, few researches have summarized the potential benefits of UGD thoroughly.

We analyzed data from a recent survey across the six states with mature and new gas development. The survey examines the general public's knowledge, awareness, perception of advantages and disadvantages and support for the regulatory options. All data are captured by weights include gender, age, race, education, household income, and metropolitan?. We first present statistical description of all respondents' knowledge of fracking and UGD and perceptions of benefits and risks. Then we compare respondents' perceptions with the latest scientific understanding of risks and benefits to examine whether people's most/least perceived risks/benefits have supporting scientific evidence. We found that a majority of respondents' perceived benefits and risks actually do not have sufficient scientific evidence to claim any conclusion about those benefits and risks. For example, the most concerned risk of UGD is the use of chemicals contributes to the pollution of drinking water. Yet there is inadequate evidence to claim that the drinking water contamination near UGD could be contributed by the chemicals used in fracking. We propose to explain the relationship between perceptions and reality using a variety of theories. For example, the gaps between perceived benefits and risks and scientific claims likely result from the public's lack of familiarity, communication and/or understanding of science language and research results. It also reflects that people's perceived opinions and perceptions of UGD may be derived more from their concerns about the severity of the risks and their favors of some particular self- benefits (NIMBY theory), which are independent from the empirical results of scientific research.



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Biography

Yu Zhang - *Indiana University Bloomington*

Yu Zhang is a Ph.D. student currently in the Indiana University Bloomington, School of Public and Environmental Affairs. Her main research interest is air pollution policy evaluation, climate change issue, and clean energy and risk analysis. She is working with a group of active scholars in shale gas project in the School of Public and Environmental Affairs. She obtained her master degree in environmental policy and public finance from School of Public Policy University of Maryland College Park and bachelor degree in economics from Peking University.

