

**Testimony prepared for NYS Assembly Committee on Environmental Conservation  
Hearing on Revised Draft SGEIS governing natural gas drilling**

**Re: Economic Assessment**

**Date: October 6, 2011**

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*My name is Jannette Barth. I am a Ph.D. economist, and I have been conducting economic analyses and developing economic models for 35 years.*

The Economic Assessment conducted by Ecology and Environment, Inc. (E&E) is inadequate. Economic benefits, including employment, income and tax revenue, are exaggerated and significant economic costs are ignored.

The acceptance and use of such an incomplete assessment of economic impact is not only unfair to the people of New York State, it also exhibits, at the least, poor judgment on the part of our political decision makers. And it may be asking for failure and major economic losses to New York State and its people. I am sure that each gas company investing in the Marcellus Shale has carefully quantified both the private benefits and the costs to its own company, management and shareholders. It is equally the responsibility of the DEC and our leaders in Albany to ensure that all of the benefits and costs to New York State, the Marcellus region, and its residents are incorporated into the economic assessment prior to making any decisions regarding hydraulic fracturing in New York. All economic costs and benefits must be estimated and analyzed in a comprehensive study conducted by qualified, unbiased, experienced professionals. It is irresponsible for our leaders to rely on an incomplete assessment that uses industry-provided assumptions and data without adequate verification. Unless the economic assessment conducted for the SGEIS is comprehensive, unbiased and transparent, it cannot be respected. The economic assessment conducted by E&E is inadequate on all counts.

The paragraphs below provide a summary list and brief explanation of a few of the omissions, exaggerations and flaws in the economic assessment conducted by E&E. Several critical questions are also asked.

A thorough research effort normally begins with a review of the relevant literature, yet it is clear from the list of references in Section 5 that a literature review was not conducted. There is extensive independent and academic literature that has been written and published on the subject of economic impact of extractive industries, and these research findings have been ignored. Did E&E fail to conduct a thorough literature review? Or did they simply omit the results of that review? Is it because the unbiased research concludes that areas with extractive industries are economically worse off in the long run? For just a few examples of unbiased research, see “***References To Unbiased Research on the Economic Impact of Gas Drilling and Extractive Industries (including selected quotes)***,” attached at the end of this written testimony.

A major concern, as evidenced by extensive public comments, is the likelihood that various existing industries that are vital to the region may be severely and negatively

impacted. Such industries include agriculture, organic farming, tourism, hunting, fishing, wine making, etc. Why was this concern not treated seriously? While it might require a greater research effort, there are ways to estimate and project the extent of negative impacts on such industries. The assessment report itself states that agriculture and tourism are important industries in all three of the regions studied, yet the potential costs associated with declines in these industries are not properly addressed.

The impacts on agriculture that are mentioned in the assessment report are the increased cost of land as a factor of production and the fact that some land will be taken out of production, but no estimate is made. Major food coops have stated that they will not buy produce from areas that have hydraulic fracturing; and there will be a high cost if our agricultural lands and nearby water become contaminated with toxic or radioactive substances. Why was the potential negative impact to agriculture of water and land contamination risk ignored? Why were the major purchasers of our agricultural products not interviewed and surveyed on whether they would continue to purchase our agricultural products?

Potential negative impacts on the tourism industry were dismissed by simply stating that two counties, Cattaraugus and Chautauqua, with a history of vertical gas drilling in New York State, have a strong tourism industry. This is not a thorough economic analysis of the impact that gas drilling will have on the tourism industry. The assessment report itself indicates that the Catskill Mountains and the Finger Lakes are two of New York State's most important tourist regions. These regions, and others, should be carefully evaluated for potential negative impacts. Increasing second homeownership is very important to these areas as well, and the impact on that trend should be studied.

Not only are there various ways to attempt to evaluate the negative impacts due to potential declines in other industries, there are also existing studies that E&E could have referenced. For example, one study calculated that the net present value (NPV), using a discount rate of 3% over 100 years, of natural goods and services from ecosystems in the New York State portion of the Delaware River Basin is \$113.6 billion. (“Socioeconomic Value of the Delaware River Basin in Delaware, New Jersey, New York and Pennsylvania: The Delaware River Basin, an Economic Engine for Over 400 Years”, Gerald J. Kauffman, University of Delaware, Water Resources Agency, May 25, 2011.) **That is \$113.6 billion in just the New York State portion of the Delaware River Basin.** Such estimates should be done for all industries that could be negatively impacted in the entire New York State portion of the Marcellus Shale region. And the probability and extent of declines should also be evaluated. It is both shocking and suspect that E&E did not reference or consider results of relevant existing studies, such as the one cited above and others.

Since there have been many concerns voiced about the costs to communities, why was there no attempt to estimate such costs? Costs associated with the increased demand for community social services, police and fire departments, first responders, local hospitals, etc. should be estimated, not simply mentioned and then ignored. The final

paragraph of the assessment report simply lists a few of the costs to communities, but there is no effort to estimate any of the costs.

It is possible to estimate potential truck traffic and the related wear and tear on roads, and these costs are not all paid for by the gas industry in other states. Indeed, a confidential New York State Department of Transportation Memorandum, which was leaked, provided data concerning truck traffic and costs. Why were road repair and maintenance costs not estimated, incorporated and analyzed? Was this by design?

Why was there no attempt to measure public health costs? There is much research on the negative health impacts of shale gas drilling, and the public has repeatedly voiced such concerns. The costs associated with these impacts should be set forth.

It is well known that extractive industries create a boom and bust cycle for communities. Why are the costs of a long-term bust not estimated in this assessment?

Why was some research regarding the impact on property values summarized, without mention of the fact that there have been reports that banks may not issue mortgages on properties with or near a gas well? Why were timely data not collected on this issue?

Another important economic impact on the region that is completely ignored in this assessment is the loss of future economic development potential after a spider web of pipelines are built, preventing further building on or near these pipelines. Why is this cost ignored?

A thorough economic assessment would include detailed recommendations regarding action steps to help maximize benefits and minimize costs. Why are such recommendations not made? The pace and scale of drilling can significantly affect long-term economic impacts, and the various alternatives regarding pace and scale should be carefully analyzed. Tax policy recommendations should be made to be sure that funding is available to communities for their increased costs and also for environmental mitigation. A long-term, detailed economic development plan for the entire region must be in place that will help to minimize the negative effects of a potential economic bust. These are just a few examples of the areas for which an economic assessment should provide recommendations.

It is clear that E&E focused only on benefits, and the estimated benefits are exaggerated. All of the employment, income, population and tax revenue projections in the Economic Assessment are dependent on the natural gas production assumptions. If production assumptions are exaggerated, then employment, income, population and tax revenue projections will all be exaggerated as well. It appears that assumptions regarding both the amount of recoverable shale gas and the production amounts are exaggerated. The assumptions on recoverable gas that were used by E&E were provided by the Energy Information Administration (EIA), but just before this E&E report was released, the US Geological Survey (USGS) issued their revised estimates of recoverable gas. While the new USGS estimate of technically recoverable natural gas in the Marcellus Shale (84

trillion cubic feet) is higher than prior USGS estimates, it is far lower than the EIA estimate. The EIA has publicly stated that they defer to the USGS and that the USGS numbers should be used. There is some controversy regarding the various reserve and recoverable gas estimates, and how much gas can be “technically” and/or “profitably” extracted. E&E should have investigated the differences and explained the controversy in detail. The economic assessment must be improved and must reflect the recently updated USGS estimates, which have been accepted by EIA.

E&E has taken production assumptions from the industry, specifically from IOGA-NY. Why were the production numbers provided by IOGA-NY for the analysis not questioned and reviewed in light of the fact that there are indications that the industry may not be entirely truthful about production estimates? I would expect an independent consulting firm to verify such production assumptions and go to great lengths to explain how industry-provided assumptions were verified, if only to protect the consultant’s reputation as a reliable, impartial expert.

In another exaggeration, on page 4-7, the report states, “each newly constructed well is assumed to have an average productive life of 30 years.” Why was this assumption used when there are findings that the average life of a shale gas well is far shorter than 30 years? It has been reported that horizontal wells in other shale plays, such as the Barnett and Fayetteville shales, experience an average commercial life of only 7.5 years, with a mode of only four years. E&E should have investigated the research of Arthur Berman and others, and should have provided detailed data analysis of production in other shale plays.

E&E has made unsupported assumptions about transient workers. The report states that 77% of the Marcellus workforce in year 1 would be transient and that by year 30, 90% of all workers could be hired locally. They do not clearly explain the basis for such assumptions. E&E makes this “transient worker” assumption for the purpose of estimating changes in population, and therefore, the population projections appear to be based on a weak underlying analysis. Perhaps a more important flaw is the fact that E&E does not adjust the income projections for a transient workforce. It is obvious that a transient workforce will not be spending all of their wages in the region, and the report does not explain if and how an appropriate adjustment has been made.

For the employment estimates in the assessment, E&E used the Regional Input-Output Modeling System of the US Bureau of Economic Analysis (RIMS II). As I have explained in my paper, “North American Shale Gas Plays: More Unanswered Questions,” January 17, 2011, while input-output analysis can be a useful tool in many situations, in this case it is lacking for a number of reasons. First, it doesn’t capture the cost of environmental degradation, damage and wear and tear on roads, health effects and pollution, and negative impacts on other industries such as agriculture and tourism. Input-output models assume that all populations have identical spending patterns. This exaggerates economic impact if new workers are transient. Input-output analysis assumes constant returns to scale, so that the gas industry would get no volume discounts on supply. This assumption is unrealistic and also exaggerates the impact. Input-output

models are static in time and are a-spatial, meaning that transportation costs are not fully reflected. Perhaps most importantly, actual input-output coefficients are unknown in a case where the industry does not already exist in a region, like the gas industry in the Marcellus Shale region of New York. The production function is implicitly assumed to remain constant, so there is no substitution or changes in proportions of inputs as technology or prices change over time. Any thorough analysis using input-output modeling techniques for such an important decision should point out the deficiencies in the technique. This is not sufficiently done in the E&E report.

Another area where the E&E assessment is deficient is in its assumption of full-time-equivalent (FTE) workers, taken directly from Pennsylvania's Marcellus Shale Education and Training Center. All assumptions, including this one, should be verified by looking at data from other shale plays and multiple sources. E&E assumes 11.3 FTE workers per well during construction and 0.17 FTE workers to operate a well. They adjust the 11.3 downward for vertical wells. I have seen other estimates. For example, there is at least one researcher who has estimated only **one** FTE job created per well during the drilling and development phase, and anywhere between 0.12 and 0.46 FTE jobs per well during the second phase, which is the operation and maintenance of the well. (Thomas Michael Power, University of Montana, 2005). If innocent, then it is at best irresponsible to take just one source for such assumptions without looking into others. The lack of thoroughness in checking assumptions, whether it regards FTE workers, gas reserves estimates, or years of production, is a major flaw in the Economic Assessment conducted by E&E.

As shown above, E&E has exaggerated economic benefits and ignored economic costs. Where have we seen such flawed economic impact analysis before? The natural gas industry has been conducting such flawed analysis for years. For my critique of the industry-funded studies, see my papers, "Unanswered Questions About the Economic Impact of Gas Drilling in the Marcellus Shale: Don't Jump to Conclusions," March 27, 2010, and "The Truth About Those Industry Funded Studies," March 4, 2011.

The Marcellus Shale Coalition (MSC), a lobbying organization for the gas industry, frequently quotes the Penn State studies (which they funded). The MSC claimed that 88,000 new jobs were created in Pennsylvania in 2010 due to Marcellus Shale drilling. Publicly available Pennsylvania data available at that time clearly showed that **total job creation** in the **entire state** was only 65,600. And half of these jobs were in "education and health" and in "leisure and hospitality." The grandiose job creation claimed by the industry is not at all consistent with data from unbiased, publicly available sources. The primary author of the industry-funded Penn State studies was hired by the Manhattan Institute to write another report, which minimally estimates only some of the costs, and ignores others, but again it exaggerates the economic benefits. More recently, gas industry groups such as the Marcellus Shale Coalition and Energy in Depth have continued to mislead the public by mis-interpreting a report from the Pennsylvania Department of Labor & Industry. The report states that there were 48,000 new hires in core and ancillary Marcellus industries from 4th Quarter 2009 through 1st Quarter 2011. The

industry has been claiming these 48,000 new hires as employment growth. This is less than the 88,000 jobs claimed for 2010 alone, but it's still a highly inaccurate statement. Anyone familiar with the "New Hires" data knows that these data do not accurately reflect employment growth. The gas industry representatives fail to point out that users of "New Hires" data should not draw conclusions about job growth trends based on "New Hires" data. Note that new hires and the actual change in employment may be vastly different when a large number of jobs are added by some employers during the same period that a large number of jobs are eliminated by other employers. Also, a "new Hire" is not necessarily a "new Job". Official employment numbers out of Pennsylvania, as reported by the Keystone Research Center, show that the Marcellus core industries and ancillary industries, taken together, created less than 6,000 net jobs between 4th Quarter 2007 and 4th Quarter 2010. **That's less than 6,000 net new jobs in three years.**

The gas industry has an incentive to mislead the public in order to gain public support for gas drilling. The DEC should insist on accurate analysis of all impacts that may result from gas drilling, including environmental, health and economic impacts.

Why did the DEC not insist on a thorough economic assessment including a proper estimate of all costs? If a proper economic assessment taking into account and doing the hard work of estimating costs was beyond the capability of a firm like Ecology and Environment, why were academic economists not enlisted in the study? Is it because the results would be harder for DEC to control?

A proper economic assessment would be an expensive research endeavor and it would require a team of qualified experts, each with specific expertise. The people of New York State and our future generations, including our health, our environment, our economy and our quality of life, should be worth the price it takes to do a proper, fair and comprehensive economic assessment. If our political leaders do not insist on this, then they have failed all of us.

***References To Unbiased Research on the Economic Impact of Gas Drilling and Extractive Industries (including selected quotes):***

**Headwaters Economics**

**“Fossil Fuel Extraction as a County Economic Development Strategy: Are Energy-focusing Counties Benefiting?” September 2008 (Revised 7/11/09).**

Quote 1:

“Counties that have focused on energy development are underperforming economically compared to peer counties that have little or no energy development.” (Page 2)

Quote 2:

“EF (Energy-focused) counties over the long term are characterized by:

- Less economic diversity and resilience
- Lower levels of education in the workforce
- A greater gap between high and low income households
- A growing wage disparity between energy-related workers and all other workers
- Less ability to attract investment and retirement dollars”

(Page 4)

**William R. Freudenburg and Lisa J. Wilson**

**“Mining the Data: Analyzing the Economic Implications of Mining for Nonmetropolitan Regions,” Sociological Inquiry, Vol 72, Fall 2002, 549-75.**

Quote 1:

“There appears to be no scientific basis for accepting the widespread ‘obvious’ assumption that mining will lead to economic improvement.” (Page 549).

Quote 2:

“The areas of the United States having the highest levels of long-term poverty, outside of those having a history of racial inequalities, tend to be found in the very places that were once the site of thriving extractive industries—most notably in Appalachia.” (Page 552).

**Thomas C. Kinnaman, Ph.D. (Bucknell University)**

**Taken from “The Economic Impact of Shale Gas Extraction: A review of existing studies,” Ecological Economics 70 (2011) 1243-1249.**

Quote:

“Several reports sponsored by the gas industry have estimated the economic impacts of shale gas extraction on income, employment and tax revenue....Due to questionable assumptions, the economic impacts estimated in these reports are very likely overstated.”

**Simona L. Perry, Ph.D. “Playing for Keeps Along the Susquehanna: A Community-Integrated GIS of Land and Water Uses and Rights in Rural Pennsylvania’s Marcellus Shale Natural Gas Play,” July 27, 2011.**

Quote:

“women and families from rural, agricultural communities being disproportionately burdened by the emotional, social, and health costs from the rapid development of local energy resources in what are known as ‘energy boomtowns.’ Increased rates of violent crimes (including rape and domestic violence), divorce, alcoholism, fatal car crashes, clinical depression, cancer, fatal nervous system disorders, and childhood asthma, are just some of these documented costs.” (Page 18)

**Thomas Michael Power (University of Montana)**

**“The Local Economic Impacts of Natural Gas Development In Valle Vidal, New Mexico,” January 2005.**

Quote 1:

“Natural gas development does not provide substantial jobs and income for local residents, even when it is carried out on a massive scale.”

Quote 2:

“Mineral exploration, development, and extraction have not been sources of economic stability or growth for over a quarter of a century. Instead they have contributed to a downward cycle of boom and bust.”

**Jannette M. Barth, Ph.D., (Pepacton Institute LLC)**

**Testimony at New York State Senator Gregory Ball’s hearing on hydrofracking at Katonah Public Library, August 23, 2011**

Quote:

“The gas industry claims that gas drilling in the Marcellus Shale will bring great economic prosperity to upstate New York. The gas industry is seriously misleading the public and our politicians. They ignore costs and exaggerate benefits.”

**Susan Christopherson, Ph.D. (Cornell University)**

**Albany Times Union, “Hydrofracking a Boom-Bust Endeavor,” August 14, 2011.**

Quote 1:

“Drilling regions may be left worse off than before they boomed.”

Quote 2:

“Evidence from already developed shale plays indicates that shale gas drilling relies mostly on out-of-state workers.”

Quote 3:

“Shale gas jobs are making only a modest contribution to Pennsylvania's economy. We can expect similar results in New York.”

Quote 4:

“Many of the costs of shale gas extraction fall on county and local government, including localities where drilling makes no appreciable contribution to the economy through job creation or tax revenues.”

**Andrew Rumbach (Cornell University), “Natural Gas Drilling in the Marcellus Shale: Potential Impacts on the Tourism Economy of the Southern Tier”**

Quote 1:

“I discuss a number of ways that widespread natural gas drilling might transform the reputation of a region. Individually, they are unlikely to have serious and long-term consequences. Cumulatively, however, they threaten to do serious damage to the tourism sector by degrading visitor experiences and creating an industrial landscape that far outlives the profitability of gas extraction.”

Quote 2:

“All told, the region’s ability to attract tourists could be damaged in the long-term if the perception of the region as an industrial landscape outlasts the employment and monetary benefits of gas drilling.”