

Critique of PPI Study on Shale Gas Job Creation
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Supporters of shale gas drilling in New York State frequently reference a report issued by The Public Policy Institute of New York State, Inc. (PPI) titled “Drilling for Jobs: What the Marcellus Shale Could Mean for New York,” July 2011.

As with the other industry-funded studies on this subject, this PPI report is one-sided and self-evidently crafted with the sole purpose of supporting the gas industry.

Independent academic research not funded by the gas industry reaches vastly different conclusions than do these industry-funded studies. The PPI report does not mention the independent research. Some examples of conclusions made by independent researchers are that areas that once had thriving extractive industries end up suffering the highest rates of long-term poverty (Freudenburg and Wilson); and counties that have focused on energy development underperform economically compared to peer counties with little or no energy development (Headwaters Economics). Independently researched studies include the following:

- “Fossil Fuel Extraction as a County Economic Development Strategy: Are Energy-focusing Counties Benefiting?”, Headwaters Economics, September 2008 (Revised 7/11/09).
- “Mining the Data: Analyzing the Economic Implications of Mining for Nonmetropolitan Regions,” William R. Freudenberg and Lisa J. Wilson, Sociological Inquiry, Vol. 72, Fall 2002, 549-75.
- “The Economic Impact of Shale Gas Extraction: A Review of Existing Studies,” Thomas C. Kinnaman, Ecological Economics, 70 (2011) 1243-1249.
- “Hydrofracking a Boom-Bust Endeavor,” Susan Christopherson, August 14, 2011.
- “The Local Economic Impacts of Natural Gas Development in the Valle Vidal, New Mexico,” Thomas Michael Power, January 2005.
- “The Economic Value of Shale Natural Gas in Ohio,” Amanda L. Weinstein and Mark D. Partridge, December 2011.
- “Booms and Busts: The Impact of West Virginia’s Energy Economy,” Sean O’Leary and Ted Boettner, West Virginia Center on Budget and Policy, July 2011.

There are falsehoods and glaring omissions throughout the PPI report, beginning with the introductory paragraph. The PPI report states, “[in] Pennsylvania, where 48,000 private sector jobs were created in 2010.” It is shocking that PPI stated this in their report that was issued in July 2011, *after* Keystone Research Center had

discredited the claim of 48,000 jobs in their report "Job Figures Disputed." The Keystone Research Center report states,

"Between the fourth quarter of 2007 and the fourth quarter of 2010, according to the latest report from the state Department of Labor and Industry's Center for Workforce Information and Analysis, all Marcellus Shale-related industries added 5,669 jobs."

In other words, **less than 6,000 net jobs were created in three years, not the 48,000 in one year as disingenuously asserted by the PPI report.**

Job creation is mentioned throughout the PPI report, but PPI does not address the fact that many of the gas workers are hired from out of state, travelling to the Marcellus region on a part-time basis and sending a significant portion of their wages to their families in their home states, to be spent there and not in New York.

The PPI report claims that counties in Pennsylvania, such as Bradford County, with relatively large numbers of shale gas wells, have lower unemployment rates than other counties. However, independent research makes it clear that an extractive industry creates a boom and bust cycle. Bradford County is now experiencing the short-term boom associated with natural gas drilling. The responsible long-term stewardship of counties and the entire state, whether it is Pennsylvania or New York, must consider the long-term consequences. A long-term bust will devastate counties in upstate New York.

I reported in early 2010 that a comparison of the top 10 gas producing counties in New York State with 5 neighboring counties that did not have gas drilling demonstrated that the gas-intensive counties are not better off when the number of families below poverty level, median household income, or unemployment rates are considered. (See "Unanswered Questions About the Economic Impact of Gas Drilling in the Marcellus Shale: Don't Jump to Conclusions," Jannette M. Barth, March 27, 2010.) A study of West Virginia counties reached a similar conclusion. ("Booms and Busts: The Impact of West Virginia's Energy Economy," Sean O'Leary and Ted Boettner, West Virginia Center on Budget and Policy, July 2011)

The PPI study does not address the different phases of natural gas development and the implications for job creation during the different phases. An explanation of this appears in work by Professor Thomas Michael Power of the University of Montana in his paper, "The Local Economic Impacts of Natural Gas Development in Valle Vidal, New Mexico," January 2005. The author states,

"The employment and payroll associated with natural gas development are associated with two distinct phases of that development: The first phase involves the actual drilling and development of the wells, including the development of the road system and other infrastructure and the necessary pipeline system to collect the gas and dispose of the water."

The second phase involves the operation and maintenance of the wells and the collection system once they are in place.

The drilling and development largely employ specialized skilled workers who move from one drilling site to another. Other construction workers are needed for the roads and pipeline infrastructure.

If the employment associated with these activities over the year is divided by the number of wells developed there is about one job associated with the development of each well.

The operation and maintenance of the gas field once it is producing is less labor intensive. The employment level per operating well appears to vary considerably among the different areas, possibly depending on the density of the wells. In the Colorado portion of the Raton Basin, employment in oil and gas production is quite low compared to the number of wells (0.12 jobs per well). In the Colfax County portion of the Basin, the number of jobs per well appears much higher, 0.46 jobs per well. In La Plata County, Colorado, employment per well is in between these two values, 0.33 jobs per well."

The PPI report does not address the anticipated declines in employment in other industries vital to the upstate New York economy as a result of gas drilling. These industries include tourism, agriculture, organic farming, wine making, beer brewing, hunting, fishing, outdoor recreation, and others.

Food purchasers and major coops in the New York City metropolitan region have stated that they will not purchase produce or meat from areas with hydraulic fracturing. Shale gas development upstate is likely to drive out some of our important food related industries. For example, a major beer producer has voiced serious concerns associated with the risk of contamination due to shale gas development, as have many wineries.

Tourists will no longer be interested in visiting some of New York State's most treasured destinations when the region's landscape and character are transformed into an industrial area. The well publicized risk of water, land and air contamination and the related risk of serious negative health impacts will further drive both tourists and nature based businesses away from the area. According to the firm, Tourism Economics (An Oxford Economics Company), "tourism is most important to the Adirondacks and Catskills, generating 17% and 15% of total employment, respectively." ("The Economic Impact of Tourism in New York, 2010 Calendar Year")

Another potential loss to the local economies that is not addressed involves second home owners. Certain areas of the Marcellus Shale region have benefitted from an influx of relatively high spending second home owners, and they are likely to disappear if the character of the area becomes industrial.

Another cost rarely addressed is the devastation to the sport fishing industry. Trout fishing is a major attraction in much of the Marcellus Shale region, and trout streams have been negatively impacted in Pennsylvania near gas drilling. The Pennsylvania Fish and Boat Commission has reported that based on their inspections of 175 drilling sites within 1/8 mile of a watercourse between November 2009 and February 2010, “water quality related problems were recorded at approximately 30% of the sites.” The commission states that it is “unfair to ask anglers and boaters to bear the burden.”(See NYS Senator Greg Ball’s summary of presentation by Pennsylvania Fish and Boat Commission, www.NYsenate.gov/press-release/fracking-power-point-presentation)

In addition to the declines in other industries stemming from the replacement of an unspoiled environment with an industrial landscape and the risk of contamination, there is another reason that other industries are likely to decline in the Marcellus Shale region. Many businesses are “crowded out” of a region when an industry that offers short-term, higher paying jobs comes in. In Pennsylvania, for example, the natural gas industry has attracted workers by offering relatively higher wages, causing some workers to leave their jobs with existing businesses who cannot afford to compete with the wages offered by the gas industry. These smaller businesses close and leave the area, and when the short-term boom created by the gas industry ends, the communities may become almost ghost towns with empty buildings and high levels of poverty and unemployment. As noted earlier, extractive industries are known for their boom and bust cycles, and one needs only look as far as nearby Appalachia to see what they leave in their wakes.

Of course, during the short-term boom, there will be short-term jobs for truck drivers and some workers in related heavy industrial and business service sectors; there will be some other local businesses who benefit in the short-term boom as well, such as hotels and restaurants. Note that hotels will benefit in the short-term due to the transient workforce that comes in from other states. But when the gas is gone and the short-term boom is over, the region is likely to be left like many areas that have suffered the “resource curse.”

There are many costs associated with shale gas development and production that are not reflected in the gas industry’s decision-making process. Economists call these externalities. And these externalities are entirely omitted from the PPI report, a telling omission for a report which should be comprehensive and unbiased.

The gas industry (and other polluting industries) benefit greatly by passing many of the significant costs onto municipalities and the general public. Economic decisions that impact human health, the environment and local economies must reflect the true and complete set of costs. A few of the many costs to the general public and local communities that have not been adequately accounted for in the various discussions of shale gas development in New York State are summarized below.

The PPI report, along with the other industry-funded studies, does not account for costs to communities due to the increased demand on hospitals, police, fire departments and emergency health services. A presentation by a hospital administrator in Bradford County, Pennsylvania, where hydrofracking is proceeding intensively, summarizes many costly negative community impacts, including for example, increased industry-related injuries and exposures to dangerous frack fluids, increased traffic and related traffic accidents, and increased reports of illegal drug use. ("Local Experiences Related to the Marcellus Shale Industry," Staci Covey, President, Troy Community Hospital, May 10, 2011)

Another cost consideration that is utterly neglected in the PPI report, and the other industry-funded studies, is that small towns are much more exposed to the economic risk. Small towns have small budgets, a small taxpayer base, and little diversity. The state should be working to protect and strengthen these communities, not impose on them substantial additional costs and risks.

Likewise ignored is the fact that communities with the actual well pads are not the only communities that will be negatively affected. Nearby communities without gas wells will have related industrial development such as water treatment facilities, staging areas, man camps, and pipelines. These communities will also have costs associated with heavy industrial development, heavy pass through truck traffic, and a long-term bust, even if there is no drilling going on there.

The economic impact of pipelines must be addressed, but is ignored in the PPI report and in most studies. With hydrofracking we will see the building of a vast network of pipelines, gas company gathering lines and transmission lines. I observed this spider web of pipelines when I visited Bradford County. It has been pointed out that in both Texas and in Bradford County, PA, the potential of future development is often lost in many communities because building cannot take place on top of, or too close to, pipelines. Large, winding spider webs of gas lines from drilling pads to transmission lines may very well prevent our communities from building and reaching their full economic potential in the future. This opportunity cost must be analyzed and included in any economic assessment.

Experts on real estate and the mortgage industry have expressed serious concerns regarding the impact of gas leases on residential property values. The PPI report does not address this significant economic cost. It is important to be cognizant of the obvious conclusion that when property values decline, so do property tax revenues. Property values are likely to decline as banks refuse to issue mortgages on lands with gas leases, and the mortgage market itself is likely to be hurt as gas leases violate existing mortgage agreements and forestall the issuance of new financing on affected and adjacent property. (See "Homeowners and Gas Drilling Leases: Boon or Bust?", Elisabeth N. Radow, NYS Bar Association Journal, November/December 2011; and Gregory May's testimony to the NYS Assembly on October 6, 2011)

Costs connected with degradation of human health and the impacts on domestic, agricultural and game animals are not mentioned in the PPI report. Many scientists and health professionals have voiced concerns regarding the potential negative health impacts and have called for a complete health impact assessment. The costs of conducting such an assessment, the costs of monitoring health impacts over time, the costs of mitigation, and the costs of treating related illnesses will all be significant.

The PPI report and many of the other industry-funded studies use RIMS II (input/output) multipliers to estimate indirect and induced job creation. There are several reasons why the application of input/output multipliers is likely to result in inaccurate estimates of net economic impact of gas drilling in the Marcellus Shale. (See “The Truth About Those Industry Funded Studies,” Jannette M. Barth, March 4, 2011.)

- Input-output analysis doesn't capture the actual costs to communities of environmental degradation, pollution, impacts on public health, damage to roads and bridges, and the negative impacts on other industries such as tourism and agriculture.
- An input-output model assumes that all populations have identical spending patterns. This exaggerates economic impact if new workers are transient and non-permanent, which is often the case with gas exploration and development.
- Input-output analysis assumes “constant returns to scale”. This implies that the gas industry would get no volume discounts on supplies. This is unlikely to be a realistic assumption.
- Input-output models are static in time and aspatial. These are assumptions which imply that coefficients do not change over time and do not fully reflect transportation costs.
- Perhaps the greatest problem with using input-output modeling in this case is that the actual coefficients are unknown. The true coefficient values cannot be determined in a region where the industry does not already operate, as is the case with horizontal drilling and high-volume hydrofracking in upstate New York.
- The production function is held constant, so there is no input substitution or changes in proportions of inputs as technology changes over time.
- And finally, there are no price changes, another unrealistic assumption.

The PPI report touts an economic impact study of the Barnett Shale in Texas. This study was done by the Perryman Group and has been criticized in the past, although the PPI report ignores such criticism. Some of the most glaring problems with the Perryman Group study are that it doesn't clearly state the data sources, the model structure is not divulged to the reader, and there is no effort to test for model accuracy. (See "Gas Drilling in the Marcellus Shale: Don't Jump to Conclusions," Jannette M. Barth, March 27, 2010).

Even if the State of Texas has experienced a significant net positive economic impact from gas drilling in the Barnett Shale—and this is by no means clear--this does not mean that New York State will benefit from shale gas extraction. Comparing the economic impact of gas drilling in the Marcellus Shale to gas drilling in the Barnett Shale is like comparing apples to oranges. The labor force in Texas has the requisite skill set due to its long history of oil and gas drilling. Rural counties in upstate New York will have to import much of this labor. We have seen that, in Pennsylvania, the gas industry has imported as much as 70% of its labor force from other states. Texas has a huge support industry network for oil & gas industry activities; it has all the requisite machinery and equipment, much of which is distributed, contracted for, repaired and serviced in Texas. New York State is not home to gas company headquarters as is Texas. The Barnett Shale is in the Dallas-Ft. Worth Metroplex, a dynamic urban region with all the positively affected industries ensconced there. This is very different than rural New York State. For all of these reasons, much of the revenue from shale gas extraction in the Barnett Shale remains in Texas, helping to improve the economy there. But it is likely that much of the revenue from shale gas extraction in New York State will leave New York State.

Perhaps most relevant to New York State is the fact that public costs have not been reflected in the Perryman Study. We increasingly see reports of serious concerns in the Barnett Shale regarding illnesses associated with air contamination and agricultural problems associated with water issues. Upstate New York is likely to bear many costs without experiencing significant benefits.

The PPI report states that "New York has a great opportunity to continue its long history of exploration and development of natural gas resources", but the report does not point out the vast differences between historic, conventional gas drilling as has taken place in New York State for years and the newer combined technology of horizontal drilling and hydraulic slickwater fracturing. The latter involves many toxic chemicals that can contaminate groundwater, drinking water, the land, and the air we breathe. It requires volumes of water and waste fluid treatment on an unprecedented scale.

The falsehoods and misleading statements continue unabashedly throughout the PPI report. The report states "anywhere from 168 to 516 trillion cubic feet of natural gas exists in the Marcellus Shale." This appears to be a gross exaggeration, as the US Geological Survey (USGS) has estimated that only 84 trillion cubic feet are

available, and the Energy Information Administration has accepted the USGS estimate.

A further exaggeration involves production and life expectancy of wells. The PPI report states that wells “continue to produce for 30-50 years, some even longer.” Independent analysts have shown that wells are likely to produce for only 4 to 7.5 years and that the vast majority of production per well is in the first year or two. Based on this well life-expectancy assumption, it is clear that all production assumptions used for the economic analysis by PPI are highly exaggerated. All economic benefits are likewise highly exaggerated.

The PPI study touts a study done by then Penn State Professor Timothy Considine, which was funded by the gas industry. The Penn State study has been criticized elsewhere. (See, for example, “Economic Impact of Gas Drilling in the Marcellus Shale: Don’t Jump to Conclusions,” Jannette Barth.)

The PPI study indicates that the ad valorem tax will result in generous tax revenue to localities. There are many uncertainties regarding the ad valorem tax as it applies to shale gas development. When one considers the potential costs that may be incurred by local communities, it is far from clear that the ad valorem tax will be sufficient to pay the increased community costs, increased public health costs and mitigation of the environmental impacts. It is clear that the ad valorem tax will not cover costs to communities early in the drilling process as the tax starts to be collected several years after the start of production. There will be substantial costs to communities prior to the collection of the ad valorem tax, and small upstate communities do not have excess cash to cover such costs. It is uncertain whether the discount rates used to calculate the tax are appropriate in the high risk case of horizontal high volume slickwater hydraulic fracturing. The gas industry is not required to take into account the very real and very significant risks and costs to the public. A basic principle that economists often point out, including Nobel Prize winning economist Joseph Stiglitz, is “it is better to tax bad things that generate negative externalities than good things.” (“How to Put America Back to Work,” Joseph E. Stiglitz, *Politico*, September 7, 2011) The major beneficiaries of shale gas drilling (ie., the gas companies and the few landowners who benefit) must be taxed at a high enough rate, and early enough in the process, to pay for the negative externalities inherent in gas development.

We know that in 2009, local governments in New York State received on average approximately \$600 in tax revenue from each producing oil and gas well. (“New York State Oil, Gas & Mineral Resources 2009,” NYS DEC Division of Mineral Resources). The costs to communities that will result from horizontal high volume slickwater hydraulic fracturing are likely to far exceed this. Again quoting Joseph Stiglitz, “we are almost giving away our oil and gas.” (WNYC, December 19, 2011)

Prior to permitting shale gas drilling, New York State must take the time to properly analyze tax policy and implement an optimal fee and tax structure in order to insure

that we are not allowing private corporations to take our natural resources without paying sufficient fees and taxes to (at a minimum) cover all costs incurred by the State and its citizens. And mechanisms must be put in place for verification of production levels. It is ludicrous to rely on the industry to self-report production levels for tax purposes.

While the PPI Study is titled “Drilling for Jobs,” it also makes claims about the carbon footprint of shale gas, that natural gas is a clean burning fuel and emits 60 percent less carbon than coal. The PPI report does not mention work by independent scientists (such as Robert Howarth at Cornell University, the Tindall Center for Climate Change at the University of Manchester, and even the US Environmental Protection Agency), which concludes that on a cradle-to-grave basis, shale gas is not a clean fuel. Methane is leaked into the atmosphere through venting and leaks (long before reaching its final burning location) and methane is a far more potent greenhouse gas than is carbon dioxide.

The PPI report states that, “this technology will help reduce our dependence on foreign energy resources.” The facts on the ground have become increasingly hostile to this assertion. More and more foreign corporations are buying our Marcellus Shale assets, and many of the corporations, both foreign and domestic, have plans to export the Marcellus Shale gas overseas where they can get higher prices. (See for example, “Marcellus Shale Gas May Head Overseas, Lou Kilzer and Andrew Conte, Pittsburgh Tribune-Review, April 10, 2011; and “Shale Gas Opens Door to U.S. LNG Exports: Energy Companies Step Up Effort to Ship Surplus Gas Overseas,” Steve Gelsi, Market Watch, December 5, 2011). Any improved U.S. balance of payments that may result from exporting our shale gas abroad will not do much to improve the economies of our upstate New York communities.

All costs and all benefits to New York State and its citizens must be considered (and measured as accurately as possible) before any decisions regarding shale gas development are made for New York State. We must ask ourselves, are we in New York State willing to sacrifice our clean water, our public health, our pristine, rural areas with clean trout streams, beautiful lakes, highly regarded wines, our growing organic farming industry, and our local economies, in order to improve the economy of Texas, enrich the oil & gas industry, create a limited number of short term jobs, and benefit only a few landowners and shareholders? This is a question that must **not** be answered on the basis of incorrect and incomplete information, flawed analysis, and faulty conclusions, such as those provided in the PPI report.

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University and her M.A. and Ph.D. from the University of Maryland. Several of her former positions include Chief Economist, New York Metropolitan Transportation Authority and Consultant and Account Manager, Chase Econometrics/Interactive Data Corporation. Dr. Barth's areas of concentration in graduate school and beyond have been econometrics, public finance and industrial organization. Dr. Barth has evaluated economic decisions using various techniques including econometric modeling, input-output analysis and cost-benefit analysis. She has applied these techniques in various industries and has experience in both the development and evaluation of a wide variety of economic models and analyses. Dr. Barth has taught economics at both the graduate and undergraduate levels.

A supporter of sustainable economic development, Dr. Barth volunteers much of her time applying her knowledge and experience to environmental and economic development issues. As a landowner in Delaware County, New York, in the Marcellus Shale region, Dr. Barth became interested in the economic and environmental impacts of gas drilling using hydraulic fracturing techniques. Dr. Barth writes and lectures frequently on this subject. She also has testified at public hearings and has been a guest on radio and television programs focused on hydraulic fracturing. Several additional papers on this subject by Dr. Barth can be found at www.catskillcitizens.org/barth.