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Comments on IHS Global Insight's study, "The Economic and Employment Contributions of Shale Gas in the United States," December 2011.

Given the strong reputation of IHS Global Insight and its US macro model, it is disappointing that (i) a number of the assumptions used in this study are not realistic; and (ii) many significant economic consequences have not been addressed. The study was prepared for – and presumably funded by - America's Natural Gas Alliance (ANGA) which, according to its website, "represents 30 of North America's largest independent natural gas exploration and production companies and the leading developers of the shale plays"; so it is possible that IHS Global Insight was encouraged to publish only results that favor the industry's position and to omit substantial pieces of economic analysis that are counter to the gas industry's biased and highly publicized story. Adding insult to injury, it appears that President Obama may have based his recent comments regarding natural gas supply and its economic impact on the questionable conclusions in this IHS Global Insight study.

Some of the errors and omissions in this study are summarized below.

Selected Errors:

1. IHS Global Insight has exaggerated natural gas reserve assumptions. Inflated gas reserve assumptions result in inflated estimates of economic impact, including the GDP and job contributions as well as the tax and federal royalty revenues projected by IHS Global Insight. The U.S. Energy Information Administration (EIA) in its recently released "Annual Energy Outlook 2012, Early Release Overview" estimates that there are 482 trillion cubic feet of unproved technically recoverable resource (TRR) of shale gas in the United States, down from their prior estimate of 827 trillion cubic feet. The EIA estimate is substantially lower than the 1,100 trillion cubic feet assumed by IHS Global Insight, casting doubt on the economic projections in their report.
2. The IHS Global Insight report does not sufficiently address natural gas exports or related price changes. The EIA recently released a report titled, "Effect of Increased Natural Gas Exports on Domestic Energy Markets," which states "EIA projects that U.S. natural gas prices are projected to rise over the long run, even before considering the possibility of additional exports. The projected price increase varies considerably, depending on the assumptions one makes about future gas supplies and economic growth. Under the Reference case, domestic wellhead prices rise by about 57 percent between 2010 and 2035...under the more optimistic resource assumption prices actually fall at first and rise by only 36 percent by 2035. In Contrast, under the more pessimistic resource assumptions... prices nearly double by 2035." (Page 6). Note that the Reference case refers to the EIA's 2011 TRR estimate

of 827 trillion cubic feet, which has now been adjusted downward as explained above. With increased exports and lower TRR, higher prices are reasonably anticipated, and this consideration is not addressed in the IHS Global Insight study. Substantial U.S. shale gas assets are owned by foreign corporations, and both foreign and domestic corporations are gearing up to export shale gas from the U.S. IHS Global Insight, on the other hand, assumes that “from 2011 through 2035...the price will average \$4.79 MMBtu (constant 2010 dollars)...and gas prices are low and stable.” (p.4) Later in the report, they briefly mention a “counterfactual scenario” with higher gas prices, and they conclude that with the higher prices, “the direct and indirect effects of the industry described earlier do not benefit the economy.” More analysis is required at varying price levels based on current estimates as recently adjusted downward.

3. IHS Global Insight makes various other questionable claims associated with their price level assumptions. For example the report states, “the lower natural gas prices achieved with shale gas production will result in an average reduction of 10% in electricity costs nationwide over the forecast period,” and “Savings from lower gas prices will add an annual average of \$926 per year in disposable household income between 2012 and 2015. In 2035, this would increase to just over \$2,000 per household.” This statement is entirely inconsistent with the EIA report, which states “Natural gas bills paid by end use consumers in the residential, commercial and industrial sectors combined increase 3 to 9 percent over a comparable baseline case with no exports... while increases in electricity bills paid by end-use customers range from 1 to 3 percent.” Clearly, exports will have an impact on price levels to all customers and IHS Global Insight has not addressed this, again inflating their estimated impacts with an unwarranted positive bias.
4. IHS Global Insight has not considered recent and well-publicized market and industry activity. The industry is reacting to the current low gas prices in at least two known ways. Gas companies are submitting applications to convert former LNG import terminals into export terminals as the gas industry can get higher prices for gas abroad. And, as recently reported, major gas producers have announced that they are curtailing production significantly due to low prices. Market Watch reported that “Chesapeake Energy Corp., the second-largest U.S. producer of natural gas...said it plans to slash dry gas-drilling capital expenditures to \$900 million this year, from \$3.1 billion last year; curtail roughly half a billion cubic feet per day, or 8% of its gross gas production because of low prices for natural gas; and possibly even double that output reduction if conditions warrant.” (see “Natural-gas output cuts grow as prices languish: But Producer Cuts May be just what the market needs to lift prices,” Myra P. Saefong, MarketWatch, January 27, 2012, <http://www.marketwatch.com/Story/story/print?guid=4BB9CB1E-484A-11E1-8F6F-002128040CF6>)
5. IHS Global Insight has used questionable assumptions on capital expenditures. As indicated above, Chesapeake Energy Corp. plans to cut capital expenditures by over 70% in 2012, but IHS Global Insight shows

capital expenditures steadily and dramatically increasing year by year. Curtailing of production and capital expenditures by the gas industry will significantly influence future economic impacts in the U.S. These impacts must be addressed in an economic impact study of the gas industry.

6. The outsized job creation claims made by IHS Global Insight are misleading as they include direct, indirect and induced jobs. This approach does not result in an accurate estimate of newly created jobs by shale gas development. Mark Muro, policy director of the Metropolitan Policy Program at the Brookings Institution explained the problem by stating “our preference is to stick to direct jobs...once one gets into indirect and induced, it becomes very hard to sort out truly new from reconfiguration of existing jobs.” (“Obama’s 600,000 Fracking-Job Forecast Includes Lawyers, Realtors,” Jim Efstathiou, Jr, Bloomberg, Jan 26, 2012, <http://www.bloomberg.com/news/print/2012-01-26/obama-s-600-000-fracking-job-forecast-includes-lawyers-realtors.html>) Parenthetically, the Bureau of Labor Statistics, Current Employment Statistics Survey, preliminarily reports that in 2011, there were 174,900 jobs in the U.S. in the oil & gas extraction industry, and the BLS job forecast for 2018 in the same industry is only 135,800. Many of us have been pointing out for years that the oil & gas industry is a highly capital intensive industry and a capital-intensive industry is not a major job creator. Chief U.S. economist at JP Morgan Chase, Michael Feroli, has recently confirmed this by stating, “because oil and gas extraction is so capital intensive....it probably won’t be a major driver of employment.” (“Obama’s 600,000 Fracking-Job Forecast Includes Lawyers, Realtors,” Jim Efstathiou, Jr, Bloomberg, Jan 26, 2012)

Selected Omissions:

1. A thorough analysis of long-term economic impacts is omitted. While there are certainly some short-term economic benefits to communities with gas drilling and other communities proximately located, direct and consequential costs are entirely ignored. The long-term stewardship of the health, environment and economic welfare of the American people is the responsibility of our leaders, and this study by IHS Global Insight omits discussion of many of the long-term economic consequences.
2. Local and regional impacts, which may vary significantly among regions and from national impacts, are equally omitted by IHS Global Insight. Any credible study of the economic impact of shale gas drilling in the U.S. must consider the economic consequences for the regions where shale gas development will take place. It is well known that rural areas that have experienced short-term booms due to extractive industries end up experiencing long-term busts, leaving them economically worse off in the long run. These areas are left with reduced economic diversity, higher unemployment rates, wider income disparities, and smaller populations. IHS Global Insight has omitted consideration of these impacts. A number of

research studies that have not been funded by the gas industry have concluded that areas with extractive industries are worse off. IHS Global Insight omitted these studies from its bibliography. Examples of such research include “Fossil Fuel Extraction as a County Economic Development Strategy: Are Energy---focusing Counties Benefiting?”, *Headwaters Economics*, September 2008 (Revised 7/11/09); and “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. Also omitted are several recent academic studies not funded by the gas industry, such as “The Economic Impact of Shale Gas Extraction: A Review of Existing Studies,” Thomas C. Kinnaman, *Ecological Economics*, 70 (2011) 1243---1249; and “The Economic Value of Shale Natural Gas in Ohio,” Amanda L. Weinstein and Mark D. Partridge, December 2011.

3. IHS Global Insight has not addressed the temporary and transient nature of jobs in the gas drilling industry. In some states, local residents get few of the gas drilling jobs. Many of the workers are from states such as Texas and Oklahoma, where more workers have the required skills. The workers come to work only for several weeks per month, sending a large portion of their wages to their families in their home states. On a national basis, the job counts reflect the gas drilling jobs, but workers from Texas and Oklahoma may benefit inordinately at the expense of residents in other gas drilling states.
4. Another regional consequence that is omitted from the analysis is the negative impact on existing local industries that are vital to the affected region. Industries that are not compatible with an industrial landscape and possible water contamination may be severely and negatively impacted. Such industries include agriculture, organic farming, tourism, hunting, fishing, outdoor recreation, wine making, etc. New York, for example, is the nation’s 3rd largest organic farm producer but more than 1,600 farms may lose their organic certification if gas drilling using high-volume hydraulic fracturing is permitted.
5. Another important economic impact on the drilling region and beyond that is omitted by IHS Global Insight is the loss of future economic development potential after a spider web of gathering and transmission pipelines is built, preventing further building on or near these pipelines.
6. Public health costs have been omitted from the IHS Global Insight study. Given the abundance of research on the negative health impacts of shale gas drilling, it is hard to believe that the omission is innocent. Indeed, the public has repeatedly voiced such concerns. The costs associated with these impacts should be set forth. (See for example, “Impacts of Gas Drilling on Human and Animal Health,” Michelle Bamberger and Robert E. Oswald, *New Solutions: A Journal of Environmental and Occupational Health Policy*, Vol. 22(1) 51-77, 2012; Link at <http://baywood.metapress.com/app/home/contribution.asp?referrer=parent&backto=issue,1,1;journal,1,56;linkingpublicationresults,1:300327,1>)

7. Any economic impact analysis should include an analysis of the impact on property values. This is a contentious issue. Some claim that property values have increased and others claim that property values have declined tremendously on properties with or near gas wells. A reputable economic impact analysis would research this issue. For more on property values and the mortgage market, 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.
8. Any thorough economic impact study would analyze and estimate costs to affected communities, but IHS Global Insight does not mention such costs. The higher costs to gas drilling communities (and nearby communities) include those associated with the increased demand for community social services, police and fire departments, first responders, local hospitals, and costs for road and bridge maintenance and repair due to the damage that is caused by the huge increase in truck traffic.
9. It is surprising that IHS Global Insight did not analyze the economic uncertainties of shale gas development and omitted mention of the concern that investment in shale gas development may significantly reduce and delay investment in renewable energy. (See "The Influence of Shale Gas on U.S. Energy and Environmental Policy," Henry D. Jacoby, Francis M. O'Sullivan, and Sergey Paltsev, Economics of Energy & Environmental Policy, Vol.1, No. 1, 2012.)
10. IHS Global Insight has failed to inform the reader that there are action steps that could be taken to improve the net economic impact of shale gas development. A thorough economic impact study would include detailed analysis regarding alternative actions to help maximize benefits and minimize costs. The pace and scale of drilling can significantly affect long-term economic impacts, and various alternatives regarding pace and scale should be carefully analyzed. Tax policy analysis should be conducted and recommendations should be made to ensure that funding is available to communities for their increased costs and also for environmental mitigation. A long-term, detailed economic development plan for the affected regions must be in place in order to help minimize the negative effects of a potential economic bust. These are just a few examples of the areas that should be addressed in a comprehensive economic impact study.

This attempt by IHS Global Insight to estimate the economic and employment contributions of shale gas in the United States contains many errors and omissions, rendering the analysis and conclusions inaccurate and unrealistic. A balanced, competent economic impact study must attempt to accurately estimate any and all positive economic impacts, but it must likewise attempt to accurately estimate any and all negative economic impacts. IHS Global Insight has neglected this vital task. See the attached "A Balance Sheet for New York State: What is New York State's Net Equity from Shale Gas Development?" for another way to view the comparison of costs and benefits.

Just as far more scientific and health research on shale gas development is required, far more socio-economic research is also required. There is an oversupply of natural gas now, so there is no need for the United States to rush into the uncertain world of shale gas development. It would be prudent to wait for the proper and comprehensive scientific, public health and economic research to be completed in order to make a fully informed decision.

Jannette M. Barth, Ph.D. is president of J.M. Barth & Associates, Inc., an economic consulting firm, and founder of Pepacton Institute LLC, a research organization. Dr. Barth has worked in the fields of economic analysis and econometric modeling and forecasting for over 35 years. She received her B.A. from The Johns Hopkins 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.

Since 1974, Dr. Barth has been estimating regional and local economic impacts. As an example of her work, Dr. Barth was retained to estimate the impact of the 9/11 terrorist attacks on employment and public transit.

Dr. Barth has taught economics at both the graduate and undergraduate levels.

In recent years, Dr. Barth has been able to combine two of her greatest interests, economics and fine art, by becoming a consultant to attorneys and appraisers in art valuation and serving as an expert witness.

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 has testified at public hearings and has been a guest on radio and television programs focused on hydraulic fracturing. Several papers on this subject by Dr. Barth can be found at www.catskillcitizens.org/barth.

A Balance Sheet for New York State: What is New York State's Net Equity from Shale Gas Development?

Prepared by Jannette M. Barth, Ph.D., January 4, 2012

► Assets*

Tax Revenue:	
Direct from the gas industry based on future legislation	
Increased income tax based on	
Royalty income to leaseholders	
Lease income to landowners	
Stimulation of industries based on byproducts of natural gas	
Climate benefits from decreases in green house gases from burning shale gas	
Indirect benefit to NYS from improved Balance of Payments assuming substantial shale gas exports	
Short-term job gains in the gas industry and related industries	
Increased spending by leaseholders in New York State	
Lower cost of energy as long as it lasts	
TOTAL ASSETS	???

*These are not necessarily comprehensive lists of assets and liabilities. They serve only as examples. Note that where an asset or liability is a future stream of income or expense, discounted present value should be used.

► Liabilities*

Tax Revenue Loss:	
Income tax losses by leaseholders who vacate properties and relocate out-of-state	
Income tax losses caused by decreases in tourism and other industries negatively affected by drilling	
Property tax losses caused by negative impact of drilling on property values and financing	
Decreased spending by leaseholders if they move out of state, or buy second homes out of state	
Human health costs associated with:	
Water contamination from frack fluids and wastewater	
Air pollution from compressors, leaks, gas released at well-sites	
Costs due to impacts on animals (domestic, agricultural and game) of water, land and air contamination	
Climate costs associated with increases in greenhouse gases from methane leaks and venting	
Costs associated with declining quality of life due to the creation of an industrial landscape	
Costs associated with declines in tourism industry	
Costs associated with declines in organic farming and other agriculture and food manufacturing	
Costs associated with declines in outdoor recreation	
Costs associated with increased air pollution from increased truck traffic	
Costs associated with declines in fisheries and trout fishing industry	
Infrastructure costs due to use of and damage to roads and bridges from increased truck traffic	
Costs due to declines in numbers of retirees and retirement housing market	
Costs due to declines in numbers of second home owners and second home market	
Costs due to crowding out (loss of jobs to existing businesses and governments)	
Costs to communities due to increased demand for police, fire and first responder services	
Social costs associated with the gas drilling industry	
Costs to the mortgage industry and housing market, and related declines in property values and property tax revenue	
Costs associated with increased homelessness	
Costs associated with the postponement of investment in renewables	
Opportunity costs due to the prevention of future building and economic development	
Costs associated with a long-term bust, characteristic of extractive industries	
TOTAL LIABILITIES	???
NET EQUITY	???

Is the **Discounted Present Value of Total Assets** minus the **Discounted Present Value of Total Liabilities** a positive value?
This question cannot be answered until a comprehensive risk assessment and economic analysis has been conducted.