

# Potential Economic Impacts of Regulations to Rein-In the External Costs of the American Oil and Natural Gas Production Industry

## A Critique of Recent Reports

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ECONorthwest specializes in the economic and financial analysis of public policy. ECO has analyzed the economics of resource-management, land-use development, and growth-management issues for municipalities, state and federal agencies, and private clients for more than 30 years.

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## I. Summary

The American oil and natural gas industry is an essential component of the national economy but many of its activities create serious costs that are not borne by either producers or consumers. These costs—called external costs by economists—materialize, for example, when exploration and production activities leave wildlife habitat degraded or produce airborne pollutants that are harmful to the health of humans, livestock, and wildlife. Over the years, there have been several proposals aimed at reining-in the external costs of the exploration and production sectors of the industry. The proposed legislation and regulations would require:

- Public disclosure of the use of chemicals that may pose a risk to local families and communities.
- Greater oversight and control over the injection of materials into wells, during a process called hydraulic fracturing, to break-up the rock formations that contain oil or gas deposits.
- Safe and transparent management of toxic waste products from exploration and production activities under the Resource Conservation and Recovery Act.
- Permits governing the management of storm water associated with exploration and production activities.
- Safe and transparent management of potential and actual spills of hazardous materials.

In response, three reports have been recently commissioned that describe the alleged potential economic consequences of the proposed regulations.<sup>1</sup> These reports generally communicate this message: the regulations would impose such high economic costs on the industry and the overall economy that they should not be implemented. The Natural Resources Defense Council (NRDC) asked ECONorthwest to review the reports and assess their reliability and accuracy from an economic perspective. We find that they consistently contain these three major errors:

- ***The reports exaggerate the economic costs of the proposed regulations.*** Each of the reports embodies this important, but faulty assumption: *Without the regulations, the industry would use land, labor, capital and other resources to produce economic benefits, such as fossil fuels and jobs, but, with the regulations, these resources would produce nothing. Hence, the regulations would generate economic costs equal to the total loss of the productivity of these resources.*

This assumption has no conceptual or empirical basis, and it violates one of the most fundamental characteristics of the U.S. economy: resources

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<sup>1</sup> Advanced Resources International, Inc. 2009. *Potential Economic and Energy Supply Impacts of Proposals to Modify Federal Environmental Laws Applicable to the U.S. Oil and Gas Exploration and Production Industry*. U.S. Department of Energy. January; Advanced Resources International, Inc. 2009. *Bringing Real Information on Energy Forward, Economic Considerations Associated with Regulating the American Oil and Natural Gas Industry*. Independent Petroleum Association of America (IPAA), and The Liaison Committee of Cooperating Oil and Gas Associations. April 24; IHS Global Insight. 2009. *Measuring the Economic and Energy Impacts of Proposals to Regulate Hydraulic Fracturing*. American Petroleum Institute.

unable to produce one set of goods or services, such as oil and natural gas, will, instead, produce another set, so that the net effect is the difference between the two. Land, labor, and capital not used to produce oil or gas might be used to produce wind energy or wildlife habitat, for example, and benefit the economy in multiple ways. By failing to account for these alternative uses of the affected resources, the reports grossly overstate the economic costs of the proposed regulations. In addition, two of the reports, prepared by Advanced Resources International, Inc. (ARI), cite costs that seem suspect, insofar as they come from the industry without verification by disinterested third parties.

- *The reports ignore the economic benefits of the proposed regulations.* Substantial evidence demonstrates that the proposed regulations likely would yield considerable economic benefits, which would offset costs. For example, restrictions on air pollution from oil and natural gas exploration and production likely would increase the productivity of workers that otherwise would be exposed to the pollution's ill effects, and enable families to avoid the health-care expenses the pollution otherwise would impose on them. The three reports disregard these and other economic benefits of the proposed regulations.
- *The reports do not consider the wide range of alternatives for implementing and responding to the proposed regulations in ways that could reduce costs and increase benefits.* Perhaps the greatest strengths of the U.S. economy are its innovativeness and adaptability. If regulations are adopted, businesses, workers, and communities will adapt to them in an effort to minimize costs and maximize benefits, perhaps finding ways so that the benefits are equal to or even greater than the costs. The three reports assume away this important point. In effect, they assume away the essential character of the American economy.

These errors are serious enough to render the reports' findings untenable from an economic perspective. The findings, i.e., of the number of jobs that would be lost if the proposed regulations were implemented, are neither reliable nor accurate.

## II. The Three Reports

Earlier this year Advanced Resources International, Inc. (ARI) produced two reports intended to describe the economic consequences likely to materialize if potential regulations were to restrict the costs that exploration and production activities impose on others by emitting hazardous pollutants, degrading wildlife habitat, etc.<sup>2</sup> The potential regulations would aim to increase regulation of the oil and natural gas industry under provisions of environmental laws intended to protect human health and the environment, from which they are currently exempt.<sup>3</sup>

ARI prepared one report for the Department of Energy (DOE), and the other for industry groups. The report for DOE is a summary of the overall effect of the proposed regulations on the United States oil and natural gas industry and the technical effects they would have on the industry's compliance efforts. The report for industry groups takes a targeted look at the effect of proposed regulations on economies of states where oil and natural gas operations are significant. Although ARI prepared two separate reports, they closely resemble each other and express similar conclusions.

The report for DOE states:

*The U.S. oil and [natural] gas industry is quite concerned that this set of regulatory proposals, if implemented, could have adverse impacts on the economics of domestic oil and [natural] gas E&P operations, and thus on domestic oil and [natural] gas supplies, prices, and other economic considerations.*<sup>4</sup>

The report for industry groups states:

*The American oil and natural gas industry is quite concerned that a considerably more stringent set of regulatory proposals, if implemented, could have adverse impacts on the economics of U.S. oil and natural gas E&P operations, and thus on U.S. oil and natural gas supplies, prices, and other economic considerations.*<sup>5</sup>

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<sup>2</sup> Advanced Resources International, Inc. 2009. *Potential Economic and Energy Supply Impacts of Proposals to Modify Federal Environmental Laws Applicable to the U.S. Oil and Gas Exploration and Production Industry*. U.S. Department of Energy. January; Advanced Resources International, Inc. 2009. *Bringing Real Information on Energy Forward, Economic Considerations Associated with Regulating the American Oil and Natural Gas Industry*. Independent Petroleum Association of America (IPAA), and The Liaison Committee of Cooperating Oil and Gas Associations. April 24.

<sup>3</sup> For an explanation of environmental laws from which the oil and natural gas industry is currently exempt, see Natural Resources Defense Council. 2007. *Drilling Down: Protecting Western Communities from the Health and Environmental Effects of Oil and Gas Production*. October.

<sup>4</sup> Advanced Resources International, Inc. 2009. *Potential Economic and Energy Supply Impacts of Proposals to Modify Federal Environmental Laws Applicable to the U.S. Oil and Gas Exploration and Production Industry*. U.S. Department of Energy. January. Pg. 2.

<sup>5</sup> Advanced Resources International, Inc. 2009. *Bringing Real Information on Energy Forward, Economic Considerations Associated with Regulating the American Oil and Natural Gas Industry*.

Also this year, the American Petroleum Institute commissioned a report, by another consulting firm, IHS Global Insight, with a similar intent. This report incorporates the findings from the two reports by ARI and expresses similar conclusions:

*The results show that the effects of any policy will be substantial in the short-term and will increase in the long-term due to the increasing importance of unconventional plays in natural gas production. These effects will generally be negative, particularly for natural gas, with the potential for higher prices, more imports and negative economic impacts from reduced domestic drilling.<sup>6</sup>*

In its “UIC Compliance” scenario, the scenario that incorporates ARI’s findings, IHS Global Insight concludes that:

*Implementation of these regulations on oil and [natural] gas drilling would result in a 20.5% reduction of new wells drilled over a five year period and a 10% loss of natural gas production within five years. Given the tenuous balance between supply and demand, a loss of 2.1 tcf (6 bcf/day) would result in more imports of pipeline natural gas and LNG.<sup>7</sup>*

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Independent Petroleum Association of America (IPAA), and The Liaison Committee of Cooperating Oil and Gas Associations. April 24. Pg. 1.

<sup>6</sup> IHS Global Insight. 2009. *Measuring the Economic and Energy Impacts of Proposals to Regulate Hydraulic Fracturing*. American Petroleum Institute. Pg. 2.

<sup>7</sup> IHS Global Insight. 2009. *Measuring the Economic and Energy Impacts of Proposals to Regulate Hydraulic Fracturing*. American Petroleum Institute. Pg. 2.

### III. The Reports Exaggerate the Potential Economic Costs of the Proposed Regulations

The two reports prepared by ARI assume that, if the proposed regulations would induce the industry to forgo developing a new well or shut down an existing well, the associated land, labor, capital, and other resources would be economically useless, contributing nothing at all to economic well-being, jobs, or incomes. This unfounded assumption—at odds with both economic theory and empirical evidence—exaggerates the economic costs of the proposed regulations. The report by IHS Global Insight commits the same error by incorporating ARI’s analytical findings without correction. Similarly, all three reports compound the exaggeration by using estimates produced by members of the industry without independent verification.

The most widely accepted approach for assessing the socioeconomic impacts of a resource-management decision, such as a decision to impose regulations to reduce the external costs of exploration and production activities, is known as the with-versus-without approach. The Environmental Protection Agency (EPA), in its Guidelines for Preparing Economic Analyses, for example, states, “An economic analysis of a policy or regulation compares ‘the world with the policy or regulation’ (the policy scenario) with ‘the world absent the policy or regulation’ (the baseline scenario).”<sup>8</sup> Applying this approach in this case would require clearly defining a socioeconomic baseline, describing how all relevant economic indicators of the public interest likely would evolve in the future absent the regulations, clearly demonstrating how these indicators would evolve if the regulations were implemented, and measuring the differences between these two scenarios.

Economists also widely recognize that the American economy is dynamic and highly adaptable and will respond to a resource-management action, such as the adoption of new regulations, to attenuate the costs and take advantage of new opportunities that arise. The EPA also states, for example, that “It is impossible to measure an environmental policy’s costs and benefits without a clear characterization of actions taken in response to the policy.”<sup>9</sup> Thus, as one conducts a with-versus-without analysis to ascertain the unique economic costs attributable to the new regulations, one must account for actions that landowners, workers, investors, and others would take in response to the regulations. Analyses that fail to account for such responses are said to embody the “dumb person” assumption.<sup>10</sup> The findings of the two reports prepared by ARI depend heavily on this assumption. So, too, do the findings of the report by IHS Global Insight, insofar as it rests atop the work by ARI. That is, they assume

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<sup>8</sup> U.S. Environmental Protection Agency. 2000. *Guidelines for Preparing Economic Analyses*. September. Pg. 21. Retrieved August 12, 2009, from [http://yosemite.epa.gov/ee/epa/eed.nsf/webpages/Guidelines.html/\\$file/Guidelines.pdf](http://yosemite.epa.gov/ee/epa/eed.nsf/webpages/Guidelines.html/$file/Guidelines.pdf)

<sup>9</sup> U.S. Environmental Protection Agency. 2000. *Guidelines for Preparing Economic Analyses*. September. Pg. 26. Retrieved August 12, 2009, from [http://yosemite.epa.gov/ee/epa/eed.nsf/webpages/Guidelines.html/\\$file/Guidelines.pdf](http://yosemite.epa.gov/ee/epa/eed.nsf/webpages/Guidelines.html/$file/Guidelines.pdf)

<sup>10</sup> See, for example, Mendelsohn, R., W.D. Nordhaus, and D. Shaw. 1994. “The Impact of Global Warming on Agriculture: A Ricardian Analysis.” *The American Economic Review* 84 (4): 753-771.

that individuals, families, businesses, and communities are too dumb to take actions that would minimize whatever costs they might incur because of the new regulations.

This faulty assumption is not just theoretically unsound, it also has strong practical implications. For example, the ARI reports state that the proposed regulations would lead to the loss of 667,642 jobs. There are good reasons to doubt the accuracy of this number: it comes from assertions about the costs of the regulations produced by the industry without third-party verification,<sup>11</sup> and it incorporates many jobs only remotely connected to the exploration and production of oil and natural gas. For example, it includes many thousands of jobs in retail and wholesale businesses that would continue to exist even if the industry's most adverse scenario were to unfold, i.e., the proposed regulations would curtail oil and natural gas from within the U.S., to be replaced by supplies from Canada or elsewhere.

More important, ARI's use of the number implies that these workers would forever be unemployed so that they and their families would forever lose their earnings, and the economy as a whole would forever lose the product of their labor. The reality is much different. The industry already has shed thousands of jobs since the recession began, so, if the regulations were imposed now, any impact would be much smaller than ARI indicates. If the regulations were imposed once the economy has returned to full health, workers may—or may not—be affected. Affected workers, if any, likely would quickly find replacement jobs, either in other sectors or in other parts of the energy industry.

The ARI reports make similar assumptions regarding the proposed regulations' impacts on investment capital, land, and other economic resources. Thus, they assume that, absent the regulations, investors would earn returns on their capital resources by investing them in exploration and production activities, but, with the regulations they would let the funds sit idle. They also assume that, absent the regulations, landowners would dedicate their lands to the exploration for and production of oil and natural gas and use the land productively, but, with the regulations, they would let the land sit idle. These assumptions are not consistent with economic reality. Investors, landowners, and others would not let their resources sit idle if regulations (or other factors) reduced their opportunities to allocate the resources to the oil and natural gas industry. Instead, they would seek and take advantage of alternative opportunities, and make other productive contributions to the local and national economies.

Because of these errors, it is impossible to derive from the three reports what the actual economic costs might be if the proposed regulations were implemented. Determining the actual costs would require a whole new investigation that would correct the errors. Reviews of industry-based reports that made similar errors regarding potential regulations of other industries indicate, however, that the actual costs may be a small fraction of the costs indicated by ARI and IHS Global Insight. In his book, *The Trade-Off Myth*, a leading scholar, Dr. Eban Goodstein, looked across all available data for industrial sectors of the economy.

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<sup>11</sup> Haefele, Michelle. 2009. *Comments on Potential Economic and Energy Supply Impacts of Proposals to Modify Federal Environmental Laws Applicable to the U.S. Oil and Gas Exploration and Production Industry*. The Wilderness Society. January.

He concluded “the data show, both in absolute and relative terms, that environmentally related shutdowns are uncommon.” In his review of the oil refinery industry, where “environmental compliance costs are, in absolute terms, quite large,” he examines claims by members of the American Petroleum Institute that they “have often found it less costly to close down polluting refineries and shift operations overseas rather than comply with environmental regulations.”<sup>12</sup> In contrast, Goodstein’s review of the evidence found that regulations have not been followed by a “massive or even measureable shutdown of U.S. petroleum refining capacity.”<sup>13</sup>

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<sup>12</sup> Goodstein, E. 1999. *The Trade-Off Myth*. Washington, D.C.: Island Press. Pg. 51.

<sup>13</sup> Goodstein, E. 1999. *The Trade-Off Myth*. Washington, D.C.: Island Press. Pg. 51-52.

## IV. The Reports Ignore the Potential Economic Benefits of the Proposed Regulations

The proposed regulations to reduce the environmental effects of oil and natural gas industry's exploration and production activities have an economic aim: to reduce the costs that individuals, families, businesses, and communities bear when the industry's activities emit harmful pollutants, destroy natural habitat, or cause other deleterious effects. Substantial evidence demonstrates that the proposed regulations likely would yield multiple economically important benefits. Foremost among these are reductions in health risks. Such benefits include increased productivity of workers that would otherwise be exposed to the pollution's ill effects, and avoided health-care expenses the pollution otherwise would impose on families. The three reports ignore these and other economic benefits of the proposed regulations.

The exploration and production of oil and natural gas pose a significant health risk to the public. These operations "can be sources of dangerous pollution that can have serious impacts on the region's air, water, and land—and on people's health [and] the negative health effects associated with [the toxic substances found in oil and [natural] gas or the chemical additives used to produce them] range from eye and skin irritation to respiratory illness such as emphysema, thyroid disorders, tumors, and birth defects."<sup>14</sup> According to recent research:

- *Substantial economic costs are likely to occur if air quality in the areas surrounding BLM [Bureau of Land Management] lands continues to deteriorate as the result of proposed actions and developments such as increased oil and [natural] gas exploration and production.*<sup>15</sup>
- *Increased oil and natural gas exploration and extraction appears to have strongly contributed to ozone precursors and their elevated levels are likely to have contributed to the recently observed increases in ozone levels in Sublette County, Wyoming.*<sup>16</sup>
- *Proposals to increase oil and [natural] gas drilling on other BLM lands can also be expected to increase the risk of ozone concentrations exceeding the National Ambient Air Quality Standards (NAAQS).*<sup>17</sup>
- *Oil and [natural] gas development activities proposed in other areas are also likely to result in increased emissions of NOX and VOC.*<sup>18</sup>

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<sup>14</sup> Natural Resources Defense Council. 2007. *Drilling Down: Protecting Western Communities from the Health and Environmental Effects of Oil and Gas Production*. October.

<sup>15</sup> Haefele, Michelle. 2009. *Comments on Potential Economic and Energy Supply Impacts of Proposals to Modify Federal Environmental Laws Applicable to the U.S. Oil and Gas Exploration and Production Industry*. The Wilderness Society. January. Pg. 3.

<sup>16</sup> Haefele, Michelle. 2009. Pg. 4.

<sup>17</sup> Haefele, Michelle. 2009. Pg. 4.

<sup>18</sup> Haefele, Michelle. 2009. Pg. 4.

- *[I]t is likely that deteriorating air quality resulting from accelerated oil and [natural] gas development and other pollution-generating activities will result in substantive economic costs.<sup>19</sup>*
- *Exploratory wellbores may provide a path for surface contaminants to come into contact with groundwater or for waters from subsurface formations to commingle. They may also decrease pressure in water wells and affect their quality.<sup>20</sup>*
- *These operations have caused detrimental impacts to soils, surface and ground waters, and ecosystems in the 36 producing states in the USA and throughout the world [...] These impacts have arisen primarily from the improper disposal of some of the large volumes (present total estimated at 3.2 billion m or 20 billion bbl/a) of saline water produced with oil and gas, from accidental hydrocarbon and produced water releases, and from abandoned oil wells that were 'orphaned' or not correctly plugged.<sup>21</sup>*

The three reports ignore the economic importance of the significant health benefits likely to result from the proposed regulations on oil and natural gas exploration and production operations.

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<sup>19</sup> Haefele, Michelle. 2009. Pg. 5.

<sup>20</sup> U.S. Department of the Interior, Office of Indian Energy and Economic Development, Tribal Energy and Environmental Information Clearinghouse. No Date. *Oil and Gas Exploration Impacts*. Retrieved August 20, 2009, from <http://teeic.anl.gov/er/oilgas/impact/explore/index.cfm>

<sup>21</sup> Kharakaa, Yousif K. and Ottonb, James K. 2007. *Environmental Issues Related to Oil and Gas Exploration and Production*. Applied Geochemistry. October. Pg. 1.

## V. Conclusions

The errors contained in the three reports are serious enough to render their findings untenable from an economic perspective. In calculating the costs and benefits of the proposed regulations, the reports make fundamentally erroneous assumptions that exaggerate the costs of the proposed regulations and ignore their benefits. Further investigation, with these errors corrected, might show that the costs are a small fraction of the amounts expressed in the three reports, and that the economic benefits of the proposed regulations outweigh the costs.