About the Multi-State Shale Research Collaborative

The Multi-State Shale Research Collaborative (MSSRC) brings together independent, nonpartisan research and policy organizations in New York, Ohio, Pennsylvania, Virginia, and West Virginia to monitor employment trends, tax policy, economic development, and the community impacts of energy extraction in the Marcellus and Utica Shale. As part of this effort, the Collaborative conducts in-depth research and interviews in order to produce trend analyses, policy recommendations, and other resources that will help local officials and community leaders respond to the local impacts of drilling. Member organizations include the Fiscal Policy Institute (FPI) (New York), Policy Matters Ohio (PMO), Keystone Research Center/Pennsylvania Budget and Policy Center (KRC/PBPC), The Commonwealth Institute (TCI) for Fiscal Analysis (Virginia), and West Virginia Center on Budget and Policy (WVCBP).

Acknowledgments

This project was supported by grants from the Heinz Endowments and Stoneman Family Foundation. The Heinz Endowments supports efforts to make southwestern Pennsylvania a premier place to live and work, a center for learning and educational excellence, and a region that embraces diversity and inclusion. Jan Jarrett, consultant to KRC, managed the team effort required to produce this report card. Ted Boettner of WVCBP, Stephen Herzenberg of KRC, Jan Jarrett, Sean O’Leary of WVCBP, Diana Polson, consultant to KRC, and Amanda Woodrum of PMO each wrote sections. Thanks to KRC’s multi-skilled graphic artist Stephanie Frank for laying out the report card and PBPC Communications Director John Neurohr for editing the report.
Executive Summary

This report card evaluates the current policies of Ohio, Pennsylvania, and West Virginia in a range of policy areas informed by the research of the Multi-State Shale Research Collaborative (MSSRC). It compares policies across the three states that address the social and economic issues that unconventional drilling delivers to the communities in which it occurs. The Scorecard thus informs policy-makers about the strengths and weaknesses of their respective policies. The three states can enhance their overall prosperity, and that of shale gas communities, by improving their grades – adopting policies that better mitigate the unanticipated negative impacts of unconventional gas drilling and that take better advantage of new economic activity and revenue generated by natural gas extraction.

This report card’s grading of state policies is limited to areas in which MSSRC has expertise. For example, we do not address environmental policies and, except for policies related to tracking health impacts, we do not address public health issues.

The table below shows the grades. In two of the nine policy areas, severance and property taxes, West Virginia earns an A: Ohio and Pennsylvania could score higher by emulating West Virginia policies. In four other areas at least one state receives a B. In three areas no state receives more than a C. All three states receive at least one F. These grades mean that all three states could achieve a solid report card if they adopted the policies of the state with the highest grade in each area. A report good enough to make the honor roll would require lifting grades in some areas above the current grade of any of the three states.

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<thead>
<tr>
<th>Policy</th>
<th>Pennsylvania</th>
<th>Ohio</th>
<th>West Virginia</th>
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<tr>
<td>Effective Severance Taxes</td>
<td>D</td>
<td>D</td>
<td>A</td>
</tr>
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<td>Effective Natural Gas Property Taxes</td>
<td>F</td>
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<td>Managing Road Damage</td>
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<td>Adequate Funds for Housing and to Manage Other Social Impacts</td>
<td>B</td>
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<td>Tracking Health Impacts</td>
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<td>F</td>
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<tr>
<td>Effective Local Government Regulation</td>
<td>INCOMPLETE</td>
<td>INCOMPLETE</td>
<td>C</td>
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In October 2015, the governors of these three states signed an “Agreement to Enhance Regional Cooperation and Job Growth Through the Continued Development of Shale Gas in the Appalachian Basin.” As the conclusion to this report elaborates further, that agreement provides a framework for improving state policies and practices across the board, including in the nine areas examined here.
Introduction

Range Resources first drilled into Pennsylvania’s rich Marcellus Shale deposit only a dozen years ago, in 2004, using a new drilling technology – hydrofracking. State and local governments were unprepared to deal with the influx of migrant oil and gas workers, the traffic and the environmental impacts that the tsunami of unconventional gas drilling swept into the state. As hydrofracking, or fracking as it commonly came to be called, also opened up Marcellus and then Utica shale deposits in West Virginia and Ohio, the state governments and communities in all three states found themselves trying to devise policies to deal with drilling’s unanticipated impacts. Each state has grappled with how to address taxation, damage to roads and bridges, public health impacts, inadequate housing, economic and workforce development. They all crafted policy responses in these areas.

In October 2015, the governors of Ohio, West Virginia and Pennsylvania signed a regional cooperation agreement aimed at promoting shale gas development that “optimizes added economic value to the Tri-State Region in a safe and environmentally responsible manner.” The agreement calls for the creation of a cooperative action plan to achieve these goals in areas such as marketing and promotion, workforce development, transportation infrastructure, and research that helps capitalize on shale gas opportunities. While framed too narrowly, this agreement creates a framework for tri-state cooperation and policies within each state guided by what serves the public good. How do we maximize economic benefits and minimize any negative impacts, including to the environment, communities, and public health, of shale development?

As another step in the effort to reorient these three states towards policies that maximize benefits but minimize costs of shale development, this report card evaluates the current policies of Ohio, Pennsylvania, and West Virginia in a range of policy areas informed by the research of the Multi-State Shale Research Collaborative (MSSRC). For the past three years, the MSSRC has been chronicling the social and economic impacts of gas drilling on the communities in the gas patch. The research focused on the economic and jobs impact of drilling in each state; case studies of four counties in West Virginia, Ohio and Pennsylvania; and the human and social service impacts across these three states. In light of the recent interest in inter-state cooperation among the three states, the MSSRC undertook

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2 Pennsylvania Budget and Policy Center, West Virginia Center for Budget and Policy, Ohio Matters, Fiscal Policy New York, The Commonwealth Institute Virginia
4 These case studies on Greene and Tioga Counties Pennsylvania, Carroll County, Ohio, and Wetzel County, West Virginia, can be found at http://www.multistateshale.org/case-studies.
5 Mark Price et al., The Shale Tipping Point: The Relationship of Drilling to Crime, Traffic Fatalities, STDs, and Rents in Pennsylvania, West Virginia, and Ohio, Multi-State Shale Research Collaborative, December 2014; http://www.multistateshale.org/shale-tipping-point
an evaluation of the status of state and local policies in the three states that address the fiscal, socio-economic and public health impacts of shale gas drilling.

This report card’s grading of state policies is limited to areas in which the MSSRC has expertise. For example, we do not address environmental policies and, except for policies related to tracking health impacts, we do not address public health issues. A future report card produced with additional partners that have expertise in other areas could be more comprehensive.

In the topic areas included, this report card compares policies across the three states to help inform policymakers about the strengths and weaknesses of their respective policies. The states can enhance their overall prosperity, and that of shale gas communities, by adopting policies that better mitigate negative impacts and increase the in-state economic benefits of unconventional gas drilling.

One final introductory note: this report distills recommendations from a rich body of research (including the MSSRC sources cited in footnotes three to five) but aims for a high level of accessibility. We hope it will interest a broad audience that includes state and local policymakers, members of the media, natural gas industry stakeholders, advocates and members of the general public with an interest in fracking. For that reason, the report card itself does not include extensive references to academic and other research sources. More extensive references can be found in the MSSRC reports and, on some topics (e.g., severance taxes, property taxes, and the value of natural resource trust funds in mitigating boom-bust) on the web sites of the MSSRC groups in Ohio, Pennsylvania, and West Virginia.
Severance Taxes

**Grades:**
Pennsylvania – D
Ohio – D
West Virginia – A

<table>
<thead>
<tr>
<th>Report Card on Severance Tax Policy</th>
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<tbody>
<tr>
<td><strong>5 Criteria Used to Determine Grades</strong></td>
</tr>
<tr>
<td>1. Does the state levy a severance tax at an effective rate high enough to be comparable to other gas-producing states?</td>
</tr>
<tr>
<td>2. Does the state limit drilling incentives and other exemptions that lower the effective rate during the early, productive stages of the drilling cycle?</td>
</tr>
<tr>
<td>3. Does the state distribute severance tax revenue back to the local communities where the drilling occurs, or does the state allow local governments to levy their own severance tax?</td>
</tr>
<tr>
<td>4. Does the state allocate a portion of its severance tax revenue for infrastructure improvements?</td>
</tr>
<tr>
<td>5. Does the state save a portion of its severance tax revenue in a permanent trust fund?</td>
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</tbody>
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<table>
<thead>
<tr>
<th>State Status on the five criteria</th>
<th>Grade</th>
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<tbody>
<tr>
<td>Yes on all five</td>
<td>A</td>
</tr>
<tr>
<td>Yes on 4</td>
<td>B</td>
</tr>
<tr>
<td>Yes on 3</td>
<td>C</td>
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<tr>
<td>Yes on 1</td>
<td>D</td>
</tr>
<tr>
<td>Yes on none</td>
<td>F</td>
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</table>

Unconventional gas drilling in the Marcellus and Utica Shale plays has produced both positive and negative impacts. State and local tax policy is a key strategy policymakers can use to increase positive and mitigate negative impacts. Sound fiscal policies that allow the state or local governments to collect adequate revenue in a timely manner and distribute it to impacted communities, while allowing for investments in a secure economic future, allows states and communities to maximize the value of their natural resources. While the oil and gas industry tells policymakers and the public that higher taxes will drive drilling out of their states, studies show that low taxes and tax incentives are ineffective at spurring production, and a race to the bottom among the states to lower taxes simply results in lost revenue opportunities.

Gas and oil-producing states have developed different approaches to taxing oil and natural gas activity including using severance taxes.
Thirty eight states have some type of production tax, mostly imposed on coal, natural gas, and oil. These taxes are usually structured to tax either the gross value of the resource after it is extracted and/or the volume of production. While most states have a statewide production tax, tax structures vary greatly and range from Virginia’s optional local tax to taxes at both the statewide and local levels in both Wyoming and Colorado.

State and local governments levy different types of production taxes, at different rates, and offer several types of exemptions, deductions, and incentives. After accounting for various incentives and credits in each state’s tax code, the amount the industries actually pay is the effective tax rate. Higher effective rates yield more revenue for states to address the impact of the oil and gas industry, and for investing in long-term economic development, public education and environmental protection.

Severance taxes should be levied at the state level with adequate revenues returned to communities where drilling occurs to give them resources to maintain and repair infrastructure and respond to increased demand for services and housing. Some states, like Colorado and Wyoming, allow local governments to levy their own production taxes. This allows those local governments to retain more of the revenue, keeping it directly in the community where drilling is taking place. Local property taxes are also an important source of revenue, but can be inadequate compared to what can be produced with a local production tax.

Table 1 in the Appendix lists the natural gas and oil production taxes levied by states with significant unconventional oil and gas production, including those in the Marcellus and Utica Shale regions, and the effective tax rates.

**Pennsylvania** assesses a 15-year declining per well “impact fee” of $5,000 to $60,000 depending on the price of natural gas and the age of the well. Sixty percent of the revenue from the impact fee is returned to county and municipal governments and the Pennsylvania Housing Finance Agency. Local governments may use the revenue for a wide variety of purposes including local infrastructure rehabilitation and improvements, sewer and water projects, affordable housing projects, building capital reserves and reducing local taxes. The rest of the revenue, 40%, is distributed to various state agencies and the Marcellus Legacy Fund, part of which is further distributed to environmental conservation and restoration grant programs.

**Ohio** has a severance tax, but it is unreasonably low, especially considering that the state does not allow local governments to levy their own locally-based severance taxes. Also, unlike some states, Ohio does not have a tangible personal property tax on shale-related equipment. Ohio’s severance tax is used exclusively to fund industry oversight through the Ohio Department of Natural Resources. There are inadequate resources to fund anything else, such as costs to local governments, infrastructure investments, value-added job development, or a permanent fund to stabilize revenue and help alleviate the inevitable boom-bust cycle.
**West Virginia** assesses a 5% severance tax on the gross value of the gas. In addition to natural gas, West Virginia also imposes severance taxes on the extraction of other natural resources including timber and coal. Most of the revenue is deposited into the General Revenue Fund and about 10% is distributed to local governments. West Virginia has recently established a permanent severance tax trust fund, but it is not currently active (because the conditions under which revenues are deposited in the fund have not yet been satisfied).
Effective Natural Gas Property Taxes

Grades:
Pennsylvania – F
Ohio – C
West Virginia – A

Report Card on Severance Tax Policy

<table>
<thead>
<tr>
<th>Three Criteria Used to Determine Grades</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Does the state levy a statewide local property tax on producing natural gas property?</td>
<td></td>
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<tr>
<td>2. Does the state levy a statewide local property tax on machinery and equipment associated with natural gas production?</td>
<td></td>
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<tr>
<td>3. Does the state include royalty income or income generated from leases in its valuation of natural gas property for property tax purposes?</td>
<td></td>
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<tr>
<th>State Status on the three criteria</th>
<th>Grade</th>
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<tbody>
<tr>
<td>Yes on all three</td>
<td>A</td>
</tr>
<tr>
<td>Yes on 1 and 2</td>
<td>B</td>
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<tr>
<td>Yes on 1</td>
<td>C</td>
</tr>
<tr>
<td>No on all three</td>
<td>F</td>
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The increase in infrastructure and service costs that accompany the oil and gas industry can quickly exceed the revenue they create, leaving communities struggling with budget gaps and declining services. Most of the significant costs and challenges that come with drilling for oil and gas are experienced at the local level. Local governments need resources to maintain infrastructure and services to mitigate these impacts.

Among the options for generating revenue from natural gas drilling are for states to impose property taxes on the value of natural gas or on drilling equipment or to allow local governments to impose such property taxes.

Almost every state with natural gas levies property taxes at the state and/or local level, but what is taxed varies. In particular, the value of commercial equipment owned by drillers (or by manufacturers) may – or may not – be taxed as property. Typically, the assessment level and tax rates are the same as for land and buildings. Equipment property value is usually determined from cost manuals produced by state property tax offices, national organizations, or local jurisdictions.

Similarly the value of natural gas itself may be subject to a property tax. When it is taxed, there are several methods used to determine value of natural gas real property. Tax rates applied to the assessed value are usually determined at the local level.
Making equipment and the value of natural gas subject to the property tax satisfies the well-known tax principle of “the broader the base, the lower the rate.” It makes it possible to collect any given amount of revenue with a lower tax rate on residential and commercial land and buildings. It also provides additional revenue when natural gas development, with its attendant costs, intensifies.

**West Virginia** taxes producing and reserve natural gas property. Property is assessed at 60 percent of the appraised value.6 West Virginia also taxes natural gas equipment as commercial and industrial property.7

**Ohio** taxes producing natural gas property at the county level. Ohio does not tax nonproducing natural gas, nor is any value added to surface property due to income generated through a lease or purchase of mineral rights.8 The local property tax rate is applied to the appraised value.

Ohio does not tax commercial and industrial equipment as property.

Local governments in **Pennsylvania** can tax producing natural gas property, but the state does not assess such property taxes at a statewide level, nor are there guidelines for how natural gas property should be valued. The procedures for determining the value of natural gas property is determined at the county level.

For example, Bradford and Susquehanna counties, two of Pennsylvania’s largest natural gas producers, do not assess natural gas real property. Land where a natural gas well site is located is not assessed any appreciation in value for property tax purposes.

As with land and buildings, the levying of the equipment property tax is done at the county level in Pennsylvania. Pennsylvania does not levy a state commercial and industrial equipment property tax. In addition, the state’s constitutional “uniformity clause” might make it impossible to impose a property tax only on natural gas equipment as opposed to all commercial and industrial equipment. At the local level, neither Bradford nor Susquehanna counties levy a property tax on equipment and machinery associated with natural gas production.

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6 Producing property is valued through a yield capitalization model on net receipts for the working interest and a yield capitalization model on gross royalty payments for the royalty interest. The value of nonproducing natural gas property is determined by taking the sum of the projected annual income stream from delay rental during the lease term discounted in each year by a capitalization rate.

7 Drilling equipment is appraised using an estimated value of the property and the amount of accrued depreciation. Once appraised, the property is assessed at 60 percent and then the local tax rate is

8 The value of producing property is determined through a discounted cash flow analysis with guidelines set by the state. Ohio allows an exemption of 42.5 percent of the total production in figuring the tax valuation, during the first year of production, and a 50 percent deduction after the first year.
Growing the In-State Share of Shale Jobs

Grades:
Pennsylvania – C
Ohio – C
West Virginia – C

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<thead>
<tr>
<th>Report Card on Growing the In-state Share of Shale Jobs</th>
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<tbody>
<tr>
<td><strong>Two Criteria Used to Determine Grades</strong></td>
</tr>
<tr>
<td>1. Does the state support training and job matching for workers that increases the share of jobs going to in-state workers?</td>
</tr>
<tr>
<td>2. Does the state implement policies beyond training and job matching to grow the share of jobs going to in-state workers?</td>
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<tr>
<th>State Status on the 2 criteria</th>
<th>Grade</th>
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<tbody>
<tr>
<td>Yes on 2</td>
<td>A</td>
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<tr>
<td>Yes on 1</td>
<td>C</td>
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<tr>
<td>No on both</td>
<td>F</td>
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Good-paying, high-skill jobs are essential to the shale industry. States can help increase the number of their residents filling those jobs through training and job matching initiatives, and by encouraging formal agreements that give qualified in-state workers first shot at available opportunities. For example, drilling companies could agree to use trade union referral systems to access workers in particular crafts within part or all of a state or region. Pennsylvania, Ohio and West Virginia all have some training and job matching programs in place aimed at growing the in-state share of shale jobs. None of the three states have encouraged drilling companies to formally commit themselves to use in-state workers or, at least, in-state referral systems, and such agreements remain uncommon.

**Pennsylvania** has established and supported training and job-matching initiatives to help in-state workers obtain some shale jobs. Pennsylvania invested in ShaleNET®, an industry-linked training and credentialing project that provides entry-level training programs for high-demand occupations such as roustabout, welder’s helper, truck driver via training leading to a Commercial Driver’s License or CDL, floor hand and production technician. As of the March 2015 ShaleNET® newsletter, the project reported 6,416 participants from July 1, 2010 to December 2014 and 3,677 placements. In addition, Pennsylvania has a nationally-recognized program that channels training funds through sector-specific “Industry Partnerships,” including at one point three oil and gas industry partnerships. Throughout most of the fracking boom, these partnerships helped train additional workers for shale jobs, sometimes working in conjunction with ShaleNet®.

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9 This could be done through drilling companies recognizing trades unions within PA, OH, and WV – such as pipefitters and operating engineers – with those unions then supplying qualified local workers through their referral systems. Alternatively, without recognizing unions, drilling companies could become signatory to Project Labor Agreements (PLAs) that cover drilling activity within all or part of a state or multi-state region.
Ohio also has training and job-matching initiatives to help some in-state workers obtain shale jobs. ShaleNet® now serves shale-intensive Workforce Development Board areas in Ohio and also includes Stark State College in Canton, Ohio as a partner. More generally, publicly-funded community colleges in the shale region of Ohio have added skill development for some shale jobs into their curricula. Local workforce development boards have also supported local residents in getting certified to drive commercial trucks for the shale industry, although these jobs tend not to pay as well as the most specialized jobs associated with drilling itself. Ohio has seen some protests by labor and community organizers demanding jobs for local residents, but it has not yet resulted in a systematic public effort to require hiring of local workers.

West Virginia has training and job-matching initiatives to help some in-state workers obtain shale jobs. ShaleNet® now serves shale-intensive Workforce Development Board areas in West Virginia. West Virginia's Let's Train WV, funded by the federal Job-Driven National Dislocated Worker Grant program, provides training and job matching services in fields including natural gas drilling for unemployed workers.

In 2013, two community and technical colleges in West Virginia began offering a Marcellus Shale educating program leading to a one-year certificate or a two-year associates of science degree in petroleum technology. In 2015 Alderson Broaddus University announced a new degree program in petroleum management in conjunction with the existing program at Pierpont Community College.
Estimating In-State Shale Employment

Grades:
Pennsylvania – B
Ohio – D
West Virginia – C

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<thead>
<tr>
<th>Report Card on Estimating In-State Shale Employment</th>
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<tbody>
<tr>
<td><strong>Five Criteria Used to Determine Grades</strong></td>
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<tr>
<td>1. Does the state accurately measure direct jobs impacts?</td>
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<tr>
<td>2. Does the state estimate indirect jobs in a sound way?</td>
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<tr>
<td>3. Does the state systematically track jobs going to in-state workers?</td>
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<tr>
<td><strong>State Status on the 5 criteria</strong></td>
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<tr>
<td>Yes on all 3</td>
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<tr>
<td>Yes on 2 of 3 plus no publication of misleading information on indirect and total jobs impacts</td>
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<tr>
<td>Yes on 1 of 3 plus no publication of misleading information on indirect and total jobs impacts</td>
</tr>
<tr>
<td>Yes on 1 of 3 plus publication of misleading information on indirect and total jobs impacts</td>
</tr>
<tr>
<td>Yes to no criteria</td>
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Estimating Overall Jobs Impacts. Shale drilling in Ohio, Pennsylvania, and West Virginia has been accompanied by claims of large job benefits, as many 200,000 to 300,000 jobs in Pennsylvania. These claims have been used by industry and state and local officials to advocate for tax and regulatory policies that benefit the industry. Independent academic studies have generated more modest estimates of the job impacts of drilling, in the neighborhood of 30,000 jobs in drilling industries in the three states. This number grows to roughly twice as many by adding supply chain jobs and jobs in consumer industries supported by the purchasing power of workers, business owners and royalty recipients in the shale industry and its supply chain.

The development of good public policy should be based on accurate information, so state statistical agencies should provide elected officials and the public with sound estimates of shale-related jobs. Estimating jobs in the shale industry should not be difficult or controversial because there is agreement about which of the North American Industry Classification System (NAICS) codes are part of oil and gas extraction. The main complication is that NAICS codes do not separate fracking from conventional oil and gas extraction. However, during the shale boom from 2005 to 2012, statistical agencies could reasonably assume that fracking accounted for all job growth in these codes. Estimating the total jobs impact of shale drilling, including supply chain and consumption-related jobs created as a result of shale extraction, is more difficult. These estimates require making assumptions for which available evidence is sparse. For example, there is little to no information about the share of supply chain jobs satisfied by out-of-state companies, nor about the time frame over which royalty
payments will be spent, whether it is a year or a lifetime. State agencies can and should nonetheless summarize the range of plausible total shale job impacts, making transparent their assumptions and including an annotated bibliography on other estimates and the assumptions that explain differences among estimates.

**Estimating Jobs for In-State Workers.** A second critical shale jobs issue for drilling states is how many of the jobs go to in-state workers. Anecdotal information points to significant reliance on workers from out of state, with restaurant and drilling-site parking areas full of out-of-state license plates. State employment and Department of Revenue databases provide information from which better estimates of in-state employment impacts could be derived, but these have not been mined systematically for this purpose.11

**Pennsylvania** now accurately measures direct jobs impact and credibly estimates total jobs impact. In 2015, the commonwealth stopped publishing a report called *Marcellus Shale Fast Facts* that had, over a roughly five-year period, included two types of data repeatedly misinterpreted to fan inflated estimates of total jobs impact. The most important of these misleading types of data added up every job in 29 industries in which, usually, a tiny share of jobs serve the fracking industry (for example, trucking) to create a total number of ALL jobs in shale “ancillary industries” – a meaningless total that in Pennsylvania exceeded 200,000 at the peak of the boom. Pennsylvania now counts direct shale jobs as the increase in jobs in “Marcellus Core” industries since shale began to accelerate in 2007. The latest estimate puts this direct jobs figure in Pennsylvania at 19,909 jobs.12 To go from this “Marcellus core” job number to the total jobs impact of fracking, Pennsylvania now estimates additional supply-chain and consumption jobs using a standard economic method called input-output analysis. Using the IMPLAN® input-output model, Pennsylvania estimates an additional 27,485 jobs for a total jobs impact of 47,394. Pennsylvania’s multiplier rate of 1.38 supply chain plus consumption jobs for each direct job is on the high end of credible academic estimates, but still leaves a total jobs impact of less than one quarter the earlier, and preposterous, claims of over 200,000.

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10 See, for example, http://www.wtae.com/news/more-local-gas-industry-jobs-going-to-outofstate-workers/36057140

11 For example, the Quarterly Census of Employment and Wages (QCEW) data base indicates (based on the first two digits of the Social Security number) the state from which employees received their Social Security number; while individual workers frequently live and work in states different from the one in which they received their Social Security number, in the aggregate, the share of Social Security numbers in Pennsylvania (or OH or WV) industries which come from different states can be used to make reliable inferences about the share of in-state workers in the industry. Other data bases (e.g., the New Hire data base) that include Social Security numbers could be used in similar ways as part of an effort to “triangulate” in-state worker estimates using multiple sources. In Pennsylvania, in addition, Department of Revenue data has been used to show that increases in county-resident employment are less than half total county shale employment increases based on other sources (from the Bureau of Labor Statistics and Bureau of Economic Analysis) that include out-of-county residents. See Douglas H. Wrenn, Timothy W. Kelsey, and Edward C. Jaenicke, “Resident vs. Nonresident Employment Associated with Marcellus Shale Development,” *Agricultural and Resource Economics Review*, 44/2 (August 2015) 1–19; http://ageconsearch.umn.edu/bitstream/207743/2/ARER2015%2044x2%2001Kelsey.pdf.

12 This figure is the increase in Marcellus Core employment from the second quarter of 2007 to the second quarter of 2015. Online at https://assets.documentcloud.org/documents/2775825/Marcellus-Shale-Update-Feb-2016-2nd-Qtr-2015-Data.pdf
Pennsylvania makes no systematic effort to distinguish how many shale-related jobs are held by Pennsylvania residents as opposed to migrant out-of-state oil and gas workers.

**Ohio** accurately measures direct jobs impact but also reports “ancillary job” totals that fuel misperceptions about the total jobs impact of drilling. The state of Ohio specifically tracks jobs related to shale development.\(^\text{13}\) It tracks both direct jobs in core industries and jobs in ancillary industries like highway and bridge construction, comparing job numbers to 2011, which the state sets as the beginning of the shale boom in Ohio. As in Pennsylvania, comparisons of employment numbers in core industries to 2011 numbers is a fair approach to identifying shale-related jobs; but counting all job additions in ancillary industries and attributing them to shale development is nonsense. For instance, not all new highway construction jobs in Ohio are shale-related. While Ohio’s shale jobs report includes a paragraph noting this limitation, communications regarding the numbers of shale jobs usually do not mention it. Therefore, the public often receives information that inflates the number of shale jobs.

Ohio makes no systematic effort to distinguish how many shale-related jobs are held by Ohio residents as opposed to migrant out-of-state oil and gas workers.

**West Virginia** does not regularly track the number of shale jobs. [Workforce West Virginia](http://lmi.workforcewv.org/LaborMarketStudies/MarcellusShaleNov2012.html) tracks labor market information, including employment by NAICS codes, which can be used to make estimates, but the state does not create an official estimate.

West Virginia did publish a report in November 2012 that measures the change in jobs in the core shale industries from 2008 to 2011.\(^\text{14}\) This may underestimate shale jobs in the state because the drilling boom began about 2004. This one-time 2012 publication put the state on record for establishing a credible method and initial job-growth number. West Virginia has not published estimates of the number of supply chain jobs or consumption-related jobs; nor has it fueled inflated misperceptions of shale’s total jobs impact with misleading statistics.

West Virginia has not published estimates of the number of shale-related jobs held by in-state residents.

\(^{13}\) [http://ohiolmi.com/OhioShale/OhioShale.htm](http://ohiolmi.com/OhioShale/OhioShale.htm)

Mitigating Boom/Bust

Grades:
Pennsylvania – F
Ohio – F
West Virginia – B

<table>
<thead>
<tr>
<th>4 Criteria Used to Determine Grades</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Has the state enacted a trust fund for setting aside a portion of natural gas severance tax or royalty revenue?</td>
</tr>
<tr>
<td>2. Does the state currently have a balance in its fund?</td>
</tr>
<tr>
<td>3. Is the principle of the fund inviolate?</td>
</tr>
<tr>
<td>4. Are proceeds of the fund used for education, infrastructure or other economic diversification efforts?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>State Status on the five criteria</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes on all 4</td>
<td>A</td>
</tr>
<tr>
<td>Yes on 3</td>
<td>B</td>
</tr>
<tr>
<td>Yes on 2</td>
<td>C</td>
</tr>
<tr>
<td>Yes on 1</td>
<td>D</td>
</tr>
<tr>
<td>Yes to none</td>
<td>F</td>
</tr>
</tbody>
</table>

A heavy reliance on natural resource extraction, such as drilling for natural gas, tends to lead to economic boom and bust cycles. Local, state and regional economies expand or contract as production grows and shrinks, energy prices rise and fall, and the resources themselves are depleted over time. This pattern of booms and busts causes volatility in revenue streams, leaving communities vulnerable, underdeveloped, and less economically secure.

One of the simplest and most effective ways for states to address the negative aspects of the boom and bust cycles of natural resource extraction is by establishing a permanent trust fund from production tax revenue or royalties from gas drilling on public land. While a severance tax or royalties can bring in important revenue to states rich in natural resources, the revenue is inherently volatile. States can bring stability to their revenues by investing a portion of their production tax or royalty revenue into a permanent fund that grows and generates a stable stream of revenue over time. Investing revenue generated by gas drilling into a permanent fund not only brings revenue stability, but also creates a lasting source of revenue out of a non-renewable resource.

In addition to creating a permanent and stable source of revenue for a state, returns from permanent funds can be used to bolster a state’s economy through strategic investments in education,
infrastructure, environmental conservation and economic diversification. Using permanent funds to promote economic diversification and development help ensure that the wealth generated by energy booms does not disappear during energy busts. Permanent funds also can boost state credit ratings by building financial assets.

Currently, four energy-producing states – Wyoming, New Mexico, North Dakota, and Utah – have active permanent severance tax funds, turning a volatile and nonrenewable source of revenue into a stable and continuous source of funding for state programs.

**West Virginia** has recently established a severance tax permanent fund. Three percent of total annual severance tax collections are deposited into the fund except in the following circumstances: when the state’s Rainy Day Fund is used to balance the budget, when a mid-year budget cut is made, or when a hiring freeze is implemented. Those conditions have prevented any deposits into the Future Fund to date. Any investment income from West Virginia’s Future Fund cannot be appropriated until fiscal year 2020.

Revenue from **Pennsylvania**’s impact fee is earmarked to a number of agencies and funds, but none are a permanent investment fund. In Ohio, all oil and gas severance tax collections are used by the Ohio Department of Natural Resources for industry oversight, regulation and services.

**Key features of successful permanent funds include:**

- Keeping the principle inviolate, with states spending only the investment returns
- Setting clear objectives for the fund (e.g., saving for future generations; stabilizing the budget; earmarking natural resource revenue for development priorities)
- Establishing fiscal rules for deposit and withdrawal that align with the objectives
Managing Road Damage

Grades:
Pennsylvania – D
Ohio – B
West Virginia – C

<table>
<thead>
<tr>
<th>Report Card on Managing Road Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Five Criteria Used to Determine Grades</strong></td>
</tr>
<tr>
<td>1. Does the state have a program in place to require drillers to pay for repairs and maintenance of roads damaged by drilling-related truck traffic?</td>
</tr>
<tr>
<td>2. Does the state have bonding requirements sufficient to cover the costs of road repair and maintenance?</td>
</tr>
<tr>
<td>3. Does the state require drillers to pro-actively upgrade roads to accommodate heavy truck traffic?</td>
</tr>
<tr>
<td>4. Does the state require road maintenance and use agreements as a condition of obtaining a gas drilling permit?</td>
</tr>
<tr>
<td>5. Does the state require drillers to repair and maintain roads that service pipeline and compressor station construction?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>State Status on the Five Criteria</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes to 5</td>
<td>A</td>
</tr>
<tr>
<td>Yes to 4</td>
<td>B</td>
</tr>
<tr>
<td>Yes to 3</td>
<td>C</td>
</tr>
<tr>
<td>Yes to 1 or 2</td>
<td>D</td>
</tr>
<tr>
<td>Yes to none</td>
<td>F</td>
</tr>
</tbody>
</table>

The most intrusive, disruptive and visible impact of unconventional shale drilling in gas patch communities is the arrival of fleets of heavy trucks that haul the equipment necessary to construct well pads, drill the wells, frack the wells, and stabilize the site. The Pennsylvania Department of Transportation (PennDOT) estimates that each drilling site requires between 6,040 and 7,650 truck trips to bring in equipment, water, sand, stone and other items required for drilling. (This assumes a six-well pad. Some pads have as many as 12 wells.)

Most of the drilling-generated truck traffic travels over roads that were not built to withstand the onslaught of heavy truck traffic, and roads in drilling regions began to rapidly deteriorate as the shale boom took off. A study by the American Society of Civil Engineers estimates that in Pennsylvania the additional heavy truck traffic required to service each well results in between $13,000 to $23,000 of extra costs to repair damaged roads and maintain them.

Unrepaired road damage caused by trucks servicing drilling sites became so severe and widespread in the shale gas regions that state and local governments in Pennsylvania, Ohio and West Virginia...
developed policies requiring drilling companies to either fix the damage themselves or pay the costs of repairs and increased maintenance. Maintaining roadways adequate to accommodate the heavy truck traffic required to service drilling sites is one issue where state and local governments and gas drillers share a common interest. As a result, drillers have generally agreed to foot the bill to keep roads in good repair.

**Ohio** requires drillers to sign Road Use Maintenance Agreements (RUMA) with localities as a condition of receiving a drilling permit from the Ohio Department of Natural Resources (ODNR). A model RUMA was developed through a stakeholder process that included representatives from the Ohio Department of Transportation, ODNR, drilling companies, local governments and others. The model RUMA requires:

- Drillers to maintain and repair roads and bridges to their pre-drilling activity condition;
- Drillers to strengthen and upgrade roads and bridges if drillers and local governments agree that it’s necessary.

Ohio does not set minimum bonding requirements to guarantee that funds will be available to fix roads should drillers not live up to the RUMA. Rather, the state has established a range and allows local governments and drillers to negotiate bonding amounts.

**West Virginia** developed an **Oil and Gas Road Policy** that requires drillers to obtain a permit from the West Virginia Department of Transportation’s Division of Highways (DOH). The policy was amended in 2012 to extend to pipeline and compressor station operations as well as drilling sites. To obtain the permit, drillers and the DOH negotiate an agreement that details the responsibilities of both parties and includes:

- A requirement for drillers to provide written notice to the DOH of intent to conduct drilling operations;
- Identification of any major road improvements needed before, during and after fracking;
- Posting bonds in the amounts of:
  - $100,000 per paved road mile;
  - $35,000 per tar and chipped mile;
  - $25,000 per graveled mile.
- Drillers who produce more than 5,000 barrels of liquids can choose to post a $250,000 blanket bond covering all their operations in a DOH district or a $1,000,000 bond covering all of their operations statewide.
- DOH can impose additional restrictions including requirements for pilot cars, limits on hours of operation and others as needed to protect the public.

**Pennsylvania** addresses road damage caused by gas drilling in three ways: requiring bonding and excess maintenance agreements on posted weight-restricted state roads; allowing municipalities to implement posting and bonding programs on municipal roads; and, allowing municipalities that receive gas-drilling impact-fee revenue to use it to repair local roads and bridges.
Pennsylvania’s **posted and bonded road program** is 30 years old and applies to vehicles weighing between 10 to 20 tons that use weight-restricted roads. The goals of the program are to prevent deterioration of weight-restricted roads, to implement a process to maintain safe and passable roads, and to recover costs from over-weight haulers for excess maintenance costs.

The program requires overweight haulers that plan to use weight-restricted roads to obtain a permit from PennDOT that is implemented through an **Excess Maintenance Agreement**. The agreement requires haulers to maintain roads to the existing condition of the road at the time of inspection. It specifically does not require haulers to upgrade roads without the haulers’ consent. Maintenance can be done either by haulers’ subcontractors or by PennDOT’s contractors to be reimbursed by haulers. The haulers also must post bonds in these amounts:

- $6,000 per linear mile for unpaved roadways;
- $12,500 per linear mile for paved roadways;
- $50,000 per linear mile for a paved roadway that PennDOT allows to revert back to an unpaved roadway (must be approved by District Executive); and,
- Haulers who occasionally travel over many different posted roadways in one county or municipality may provide $10,000 security for each county or municipality.

Pennsylvania local governments are responsible for maintaining non-state maintained roads located within their borders – a statewide total of 78,000 linear miles. Local governments are authorized to develop their own posting and bonding programs and enter into Excess Maintenance Agreements with over-weight haulers using weight-restricted roads. The local program mirrors the state program, and local governments must follow procedures laid out in a manual, **Posting and Bonding Procedures for Municipal Highways** to develop a program.

Act 13, passed by the legislature in 2012, updated gas drilling regulations and imposed a per-well 15-year impact fee based on the average annual price of natural gas. 60% of the revenue collected is returned to counties and municipalities with gas drilling. Local governments receiving impact fee revenue may use it for a range of needs, including construction of public infrastructure, most of which goes to road and bridge upgrades, repair and maintenance.

**In 2014**, impact fee revenue totaled more than $98.6 million. Local governments spent $24.7 million on public infrastructure, but no exact figures are available for how much of that went to road repair, maintenance or construction.
Adequate Funds for Housing and to Manage Other Local Impacts

Grades:
Pennsylvania – B
Ohio – D
West Virginia – C

<table>
<thead>
<tr>
<th>Report Card on Affordable Housing and Management of Other Local Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Four Criteria Used to Determine Grades</td>
</tr>
<tr>
<td>1. Does the state tax natural gas production at a rate that generates enough revenue to address the industry’s social and economic costs?</td>
</tr>
<tr>
<td>2. Does the state return a significant portion of gas drilling revenue to local governments to address the local impacts of gas drilling?</td>
</tr>
<tr>
<td>3. Does the state have programs that promote access to affordable housing?</td>
</tr>
<tr>
<td>4. Does the state target affordable housing programs to communities where gas drilling has created an affordable housing shortage?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>State Status on the Four Criteria</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes to 4</td>
<td>A</td>
</tr>
<tr>
<td>Yes to 3</td>
<td>B</td>
</tr>
<tr>
<td>Yes to 2</td>
<td>C</td>
</tr>
<tr>
<td>Yes to 1</td>
<td>D</td>
</tr>
<tr>
<td>Yes to none</td>
<td>F</td>
</tr>
</tbody>
</table>

Gas booms bring an influx of workers to rural communities – landmen, construction workers, truckers and drillers. These workers often have more money in hand than many locals since many drilling companies pay housing per diems.

Studies of drilling-generated housing impacts from the Dakotas to rural Pennsylvania have documented that in regions where drilling activity is intense, the influx of workers places significant strains on local housing markets. Rents rise. Housing shortages worsen. Hotels fill up, sometimes for a full year in advance. The owner-occupied housing market gets tighter. Some landlords kick out current tenants, increase prices and rent single-family homes or apartments to multiple workers. Campgrounds and trailer parks make room for more tenants.

Housing shortages and rising prices can hit low-income, the elderly and other vulnerable populations especially hard. Housing crunches can lead to a rise in homelessness and create needs for temporary shelter and affordable housing assistance.

Drilling-related affordable housing shortages have been most acute in intensely drilled areas, especially in Pennsylvania, but shortages have also developed in Ohio and West Virginia.
In Pennsylvania most of the impact fee revenue is returned to the counties and municipalities that have shale drilling within their borders. Pennsylvania has also developed a comprehensive program to increase the stock of affordable housing in communities where drilling is occurring using revenue from an impact fee that the state levies on each well. Each year, the Pennsylvania Housing Affordability and Rehabilitation Enhancement Fund (PHARE) receives $5 million from the impact fee. Impact fee payments to municipalities are capped, and PHARE also receives any funding that exceeds the cap.

PHARE funding can be used for:

- Increasing the availability of affordable housing for low- and moderate-income families, people with disabilities, and the elderly; and,
- Assistance with rent for families below the area median income.

The program includes incentives for county and local governments to leverage other public and private resources, address long-term housing affordability, meet the greatest needs, develop long-term local partnerships, and deploy funds in an efficient and transparent manner.

PHARE funding projects have included new construction of affordable developments, emergency shelter and rent assistance for victims of domestic violence, people suffering from mental illness and those transitioning from incarceration, rehab of properties, repairs, eviction prevention and other projects.

Ohio’s severance tax has an effective rate of less than half a percent and does not generate enough revenue to adequately address the added infrastructure, human service, housing, environmental or administrative costs that unconventional gas drilling imposes on state and local governments. The Ohio Housing Finance Agency and the Ohio Housing Trust Fund run a variety of programs to improve the stock of and access to housing for low and moderate income families, disabled people and the elderly, but none are targeted to areas where gas drilling has caused affordable housing shortages.

West Virginia levies fairly robust severance taxes on natural gas and coal extraction and on producers of other natural resources. Most of the revenue goes into the state’s general fund, and some of it is returned to local governments in coal and gas producing areas. Most of the revenue is used for education, and about 20 percent goes to fund human service programs. While nothing prohibits the state or local governments from using severance tax revenue to improve access to affordable housing, there is no formal program to address shortages caused by gas drilling. West Virginia has two agencies, the West Virginia Affordable Housing Trust Fund and the West Virginia Housing Development Fund, that administer programs that fund affordable housing programs, but neither target funds to areas where gas drilling has created affordable housing shortages.
Tracking Health Impacts

Grades:

Pennsylvania – C
Ohio – F
West Virginia - F

<table>
<thead>
<tr>
<th>Report Card on Tracking Health Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Three Criteria Used to Determine Grades</td>
</tr>
<tr>
<td>1. Does the state log grass-drilling related health complaints, including the company, at least in a confidential (non-public) data base?</td>
</tr>
<tr>
<td>2. Does the state maintain a public, online health registry?</td>
</tr>
<tr>
<td>3. Does the state mandate tracking and reporting by physicians of health problems that they believe may have been caused in part by gas drilling?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>State Status on the Three Criteria</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes to 3</td>
<td>A</td>
</tr>
<tr>
<td>Yes to 2</td>
<td>B</td>
</tr>
<tr>
<td>Yes to 1</td>
<td>C</td>
</tr>
<tr>
<td>Yes to none</td>
<td>F</td>
</tr>
</tbody>
</table>

Environmental and health advocates have called for the establishment of health registries in gas-producing states to allow health officials, researchers and policymakers to track reports of illnesses resulting from exposure to gas-drilling operations. As the shale oil and gas boom took off and drilling rigs, waste pits, truck traffic, and compressor stations blanketed gas field landscapes, reports began to filter out from those areas of people complaining of physical ailments including rashes, sore throats, headaches, dizziness, and nausea.

No major gas-producing state was prepared to respond in any systematic way to these anecdotal accounts of people becoming sick as a result of exposure to gas drilling operations. No state required physicians to report incidences of illnesses that may have been linked to gas drilling; no state kept a database of health complaints; and, no state had the capacity to do epidemiological studies to investigate disease clusters.

Independent researchers have begun to conduct rigorous scientific studies of the potential health impacts of gas drilling on workers involved in drilling and on people living in areas with intense amounts of drilling activity. Two recent peer-reviewed studies in Pennsylvania have raised new concerns. One from the University of Pennsylvania found higher rates of hospitalizations in intensely drilled areas, and another from the University of Pittsburgh found higher incidences of low-birth-weight babies born to women living near gas wells. While these studies demonstrate that there are links between incidences of diseases and other health conditions and living near natural gas
operations, a lack of data that could be gathered by health registries prevents researchers from establishing clear cause and effect.

No gas-producing state maintains a registry to track the health impacts of gas drilling. A survey by State Impact and Inside Energy shows how major gas-producing states are addressing the potential health impacts of gas drilling. Only three states, Pennsylvania, North Dakota and Colorado, are gathering any data. Five states, Ohio, Oklahoma, West Virginia, Texas and Wyoming, are not gathering any data. And two states – Maryland and New York – have banned drilling, in part because of the potential health hazards of gas drilling.

Of the states that are gathering data, only one – Colorado – maintains a searchable online public database. The Colorado database logs all gas-drilling-related complaints. Pennsylvania and North Dakota are logging health complaints in databases that are not available to the public.

The Southwestern Pennsylvania Environmental Health Project has written a white paper, The Case for an Unconventional Natural Gas Development Health Registry, which calls for the creation of a health registry that tracks complaints of illnesses that might be caused by exposure to gas drilling pollution. The paper also lays out alternative ways to track gas-drilling-related health impacts and looks at the considerations that must be made when developing a rigorous registry that would yield useful data.

Ohio does not track gas-drilling-related complaints, does not maintain a public, online health registry, nor mandate reporting or tracking by physicians. Ohio also does not require public disclosure of chemicals contained in fracking-related injection fluids.

The state has no meaningful system in place for liability purposes in case of major drilling-related disasters. Ohio does have bond requirements for shale drillers, but they are too low to address any health and safety issues resulting from drilling incidents.

The development of health registries to track gas-drilling-related illnesses and conditions is a prerequisite to managing the potential public health impacts of drilling. It is an essential tool that health officials need to develop responses and for regulators to require strong safeguards to protect public health and the environment.
Effective Local Government Regulation

Grades:
Pennsylvania – Incomplete
Ohio – Incomplete
West Virginia – C

<table>
<thead>
<tr>
<th>Report Card on Local Government Regulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Three Criteria Used to Determine Grades</td>
</tr>
<tr>
<td>1. Does state law allow local governments to ban drilling?</td>
</tr>
<tr>
<td>2. Does state law give clear guidance on the extent of local power to address drilling impacts?</td>
</tr>
<tr>
<td>3. Is the extent of local power to address drilling settled law?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>State Status on the three criteria</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes on 3</td>
<td>A</td>
</tr>
<tr>
<td>Yes on 2</td>
<td>C</td>
</tr>
<tr>
<td>No on 3</td>
<td>Incomplete</td>
</tr>
</tbody>
</table>

All three of the major Marcellus and Utica gas-producing states, Ohio, West Virginia and Pennsylvania, regulate the technical standards and pollution control aspects of gas drilling at the state level, and those regulations prohibit local governments from imposing their own environmental or technical regulations on drilling. None of these states allow local government to impose drilling bans in their communities. However, local governments do assert some control over the surface impacts of drilling generally through zoning ordinances. In all three states lawsuits challenging local ordinances that either allow or restrict drilling have been brought by both the industry and citizen and environmental organizations. In these cases, the courts are determining the extent of local government power to impose restrictions aimed at managing the surface impacts of drilling to protecting public safety and property values in their communities from the negative impacts of gas drilling.

These questions are being worked on as the drilling industry seeks to remove all ability of local governments to restrict their activities and as some local governments attempt to institute outright bans on drilling in their jurisdictions. In Pennsylvania and Ohio, the state Supreme Courts began to address these issues allowing local governments to use their zoning powers to restrict certain drilling activities, but questions remain about how far the ability of local governments to use their zoning powers extends.

In West Virginia, the legislature passed and the governor signed a law preventing local governments from imposing bans on drilling, but allowing them to regulate drilling activities that occur at the surface including traffic, noise, lighting and emergency response.
Pennsylvania enacted comprehensive drilling legislation, Act 13, in 2012 that allowed drilling in all land use zones, including residential, and prohibited local governments from using their zoning power to restrict drilling. A coalition of environmental organizations and local governments sued and the Pennsylvania Supreme Court, relying on the Environmental Rights Amendment in the state constitution, struck down the provision that removed all local government authority to manage the impacts of drilling in their communities. The court held that local governments have the same duty to ensure their citizens’ rights to clean air and clean water as the state government and that exercising their zoning power is the proper way to do it. However, a county court judge recently upheld a local ordinance that specifically allows gas drilling in certain zoning districts if the ordinance was enacted with proper public process. The judge also ruled that, in addition to protecting their citizens’ rights to clean air and water, local governments also have a duty to promote legitimate economic development.

In Ohio, it has been determined that state law effectively preempts local control over oil and gas drilling. The Ohio Supreme Court ruled local ordinances impacting drilling operations are invalid. However, the court left open to question whether traditional zoning laws – *i.e.* compatibility with neighborhood or the community’s long-term development plan, or preservation of property values – may be applied to drilling operations.
Conclusion

In October 2015, the governors of Pennsylvania, Ohio and West Virginia signed an “Agreement to Enhance Regional Cooperation and Job Growth Through the Continuing Development of Shale Gas in the Appalachian Basin.” The agreement provides a framework for the states to cooperate on infrastructure, job training and other areas. This kind of regional cooperation can avoid a bidding war for jobs and investment. The agreement acknowledges that a multi-state strategy will maximize opportunity.

However, the agreement is narrow in its scope and it ignores the negative economic and social costs that are felt on the ground in gas-patch communities. More cooperation among the states on tax policy, community planning and environmental standards would increase the benefits and reduce the costs of the shale revolution for residents of the region generally.

To strengthen the tri-state agreement as a tool for aligning natural gas policies in all three states with what serves the public interest, the Multi-State Shale Research Collaborative recommends the following improvements to the agreement:

- Cooperation on information-sharing on the impact of shale gas extraction;
- The adoption of credible methods for estimating the impact of drilling – on jobs and the economy, taxes, the environment and health and human services;
- The adoption by all three states of a similar fair and adequate severance tax, with proceeds used to pay for sufficient industry oversight, resources for managing community impacts and job training, needed infrastructure, and for state General Funds;
- A commitment to invest a portion of tax revenues in permanent funds to mitigate the boom/bust fossil fuel cycle and to provide ongoing revenue after the eventual depletion of the resource;
- A commitment to more consistent policies on natural gas property taxes in order to provide additional resources for local communities to manage the impacts of drilling;
- A commitment to consistent policies on workforce training and local hiring that increase the jobs benefits for the three states;
- A commitment to helping communities plan for harm caused by drilling;
- Adoption of high environmental standards for the industry.

What is most needed is a change in mindset and for elected officials in all three states to remember who they work for – the people of their states. For too many years, the orientation of state policy in all three of these states has put the best interests of the natural gas industry ahead of sound economic and community development that improves the quality of life for all residents. The Tri-State Regional Cooperation Agreement represents a first step to reorienting state policy towards a different objective: defining policies related to the natural gas industry that best serve the residents of the three states and ensure environmental sustainability. To paraphrase John Kennedy, lawmakers in all three states should “ask not what you can do for your gas industry but ask what responsible management of your state’s natural gas resources can do for your state.”
Achieving the change in mindset needed to align policies with the public good would benefit from a more open implementation process for the tri-state agreement, with opportunities for citizen input and full exploitation of the knowledge of fracking and its impacts that exists among researchers and advocates, including the Multi-state Shale Research Collaborative. With that change in mindset and a more open tri-state engagement process, Ohio, Pennsylvania, and West Virginia could get “straight As” on their Shale report card within a few years.
Appendix

State and Local Natural Gas and Oil Production Taxes, Marcellus Region and Other States

<table>
<thead>
<tr>
<th>State</th>
<th>Natural Gas Production Taxes</th>
<th>Oil Production Taxes</th>
<th>Gas Effective Rate</th>
<th>Oil Effective Rate</th>
<th>Combined Gas/Oil Effective Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ohio</td>
<td>State: $0.025 per Mcf</td>
<td>State: $0.10 per barrel</td>
<td>0.5%</td>
<td>0.1%</td>
<td>0.3%</td>
</tr>
<tr>
<td>Kentucky</td>
<td>State: 4.5% of gross value</td>
<td>State: 4.5% of gross value</td>
<td>4.6%</td>
<td>4.2%</td>
<td>4.5%</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>State: $5,000 - $201,000 per horizontal well based on year of the well and average price of natural gas</td>
<td>Local: capped at 1.5% of gross receipts</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Virginia</td>
<td>Local: capped at 1% of gross receipts</td>
<td>State: 5% of gross value</td>
<td>4.5%</td>
<td>3.6%</td>
<td>4.4%</td>
</tr>
<tr>
<td>West Virginia</td>
<td>State: 5% of gross value</td>
<td>State: 5% of gross value</td>
<td>4.5%</td>
<td>3.6%</td>
<td>4.4%</td>
</tr>
<tr>
<td>Colorado</td>
<td>State: 2-5% of gross income, after local tax deduction</td>
<td>State: 2-5% of gross income, after local tax deduction</td>
<td>-</td>
<td>-</td>
<td>5.0%</td>
</tr>
<tr>
<td>Louisiana</td>
<td>State: $0.163 per Mcf, subject to price index change each year reduced rates for low volume wells</td>
<td>State: 12.5% of gross value, reduced rates for stripper and low volume wells</td>
<td>1.8%</td>
<td>10.4%</td>
<td>5.1%</td>
</tr>
<tr>
<td>Montana</td>
<td>State: 0.5% - 12.5% of gross value based on age and type well</td>
<td>State: 0.5% - 12.5% of gross value based on age and type well</td>
<td>-</td>
<td>-</td>
<td>7.6%</td>
</tr>
<tr>
<td>North Dakota</td>
<td>State: $0.0982 per Mcf, subject to price index change each year,</td>
<td>State production tax: 5% of gross value</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>State: 1% - 7% of gross value, rate determined by price of gas. After 2013, 7% of gross value.</td>
<td>State: 1% - 7% of gross value, rate determined by price of gas. After 2013, 7% of gross value.</td>
<td>-</td>
<td>-</td>
<td>5.5%</td>
</tr>
<tr>
<td>Texas</td>
<td>State: 7.5% of gross value</td>
<td>State: 4.6% of gross value</td>
<td>-</td>
<td>4.0%</td>
<td>4.0%</td>
</tr>
<tr>
<td>Utah</td>
<td>State 3% - 5% of gross value, rate determined by price of gas</td>
<td>State 3% - 5% of gross value, rate determined by price of oil</td>
<td>-</td>
<td>-</td>
<td>1.4%</td>
</tr>
<tr>
<td>Wyoming</td>
<td>State: 6% of gross value</td>
<td>State: 4% - 6% of gross value</td>
<td>8.2%</td>
<td>8/5%</td>
<td>8.3%</td>
</tr>
</tbody>
</table>

15 “The effective tax rates in Table #1 reflect an average over the six-year period from 2008 to 2013 based on state reports of severance tax payments and production volumes and the average price for gas (i.e., the Henry Hub price) and oil (i.e., the WTI Cushing, Oklahoma crude oil spot price) during the year. For Pennsylvania, the state’s per-well impact fee is counted as a severance tax and the average shown is only for the two-year period from 2012-13 in which that tax was in effect; these were years of relatively low prices and therefore of relatively high effective tax rates for Pennsylvania under it’s per well impact fee. For some states which impose severance taxes on both gas and oil, revenues are not reported separately for each and therefore it is only possible to report the effective severance tax rate on extraction of both. In the states which do tax both and report revenues separately, the effective tax rates on each is similar except for the state of Louisiana.”