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Public Opinion on Fracking: Perspectives from Michigan and Pennsylvania

a report from the National Surveys on Energy and Environment

Introduction

This report presents the views of Michigan and Pennsylvania citizens on issues related to the extraction of natural gas through hydraulic fracturing, which is more commonly known as "fracking." Hydraulic fracturing and new horizontal drilling techniques are creating significant opportunities to expand natural gas production across the United States. The absence of comprehensive federal legislation regarding hydraulic fracturing has placed the regulation of unconventional gas drilling primarily within the purview of state and local governments. This report examines public opinion in Michigan and Pennsylvania on a series of issues concerning the impact of fracking on the economy, environmental protection, and information disclosure. Pennsylvania and Michigan have been selected as the focus of this report because they represent states with varied levels of hydraulic fracturing within their borders. Pennsylvania has emerged as one of the nation's leaders in terms of the number of hydraulic fracturing sites with extensive drilling occurring in the commonwealth, and also has high levels of public debate and policy development related to this issue. Conversely, fracking has just begun to develop on a large scale within Michigan with corresponding public engagement around the matter in its early stages. These differences present a valuable opportunity to examine where the publics in these two states stand on an array of issues related to fracking.

The findings are drawn from an October and November 2012 telephone survey conducted by the Muhlenberg College Institute of Public Opinion (Muhlenberg Institute), in collaboration with the University of Michigan Center for Local, State, and Urban Policy (CLOSUP) as part of the National Surveys on Energy and Environment (NSEE) series. This survey secured responses from 415 Michigan residents and 424 Pennsylvania residents, drawn from all regions of each state and comprising statistically-representative profiles of their respective citizens. It examines general public attitudes on fracking and also considers a series of policy options that have emerged in many state and local governments around the nation. In October 2011, the Muhlenberg Institute and CLOSUP conducted a similar survey of public opinion on hydraulic fracturing in Pennsylvania; where relevant, this report cites results from the 2011 survey to highlight trends or shifts in public opinion. This report reviews the history and trends in the development of fracking in the two states, considers potential risks posed by this process, and examines state and federal policy roles before turning to a detailed review of survey findings. Parallel analysis was also conducted in the Canadian province of Quebec, but findings from that work will be presented in separate publications.

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Key Findings

- 1. Citizens in Pennsylvania and Michigan hold generally positive views about the contributions that fracking for natural gas has provided their states. The majority of citizens in both states respond that fracking has provided and will continue to provide more benefits than problems for their state. Overwhelming majorities in both states believe that hydraulic fracturing is very or somewhat important to their state's economy.
- 2. Respondents in both states appear uncertain about the risks associated with fracking, with a higher percentage of respondents stating that experts are divided on the risks than those responding that expert perception of risk is either low or high.
- 3. The public's perception of risks and benefits appears to reflect their experiences with fracking within their state: respondents from Pennsylvania are more likely to provide more specific answers to questions regarding risk and are more likely to cite local benefits than respondents from Michigan, a state which has seen a lower level of fracking activity than Pennsylvania to this point.
- 4. In both states, the perception of the risks of fracking among certain segments of the population may be unchanged in the event of an expert determination that its risks are either high or low. Respondents appear more likely to believe an expert determination of high risk levels than low risk levels associated with hydraulic fracturing.
- 5. A threat of industry withdrawal or restricted development due to taxation or over-regulation does not appear to be credible to a majority of the public in either state.
- 6. Respondents from both states generally support regulation and taxation of the hydraulic fracturing industry and view natural gas primarily as a public resource. In both states, there is overwhelming support for disclosure requirements to identify chemicals used in fracking procedures and strong support for the creation or maintenance of severance taxes assessed on the value of resources extracted through fracking. A severance tax is a fee imposed by the state on the extraction of non-renewable resources such as natural gas; severance taxes are separate from and may be imposed in addition to other taxes such as income tax.
- 7. The majority of respondents in both states support a moratorium on shale gas extraction until there is further understanding of its risks.
- 8. Respondents in both states indicate that they would be most likely to turn to environmental groups for reliable information on drilling in their state as opposed to any particular level of government, to industry sources, or to the media.
- 9. Although confidence in state elected officials regarding hydraulic fracturing policy is generally tepid, most respondents in both Pennsylvania and Michigan express preference for maintaining governmental decision-making authority at the state level, rather than at the federal or local levels.
- 10. In both states, Republicans are most likely to support—and Democrats are most likely to oppose—shale gas extraction when comparing these groups with Independents. These differing levels of support correspond with different perceptions of the relative risks and economic benefits associated with fracking by these groups.

I. Background

Issue Overview

Pennsylvania ranks sixth and Michigan ranks 16th in natural gas production among the 33 conventional and unconventional natural gas producing states in the country.¹ Unconventional gas includes gas from shale, tight sands, and coal bed methane, all of which require a method of hydraulic fracturing, or fracking, to access. Fracking involves injecting a mixture of water, sand, and chemicals deep into the ground through encased wells at high pressure to create and expand fractures in the rock, releasing trapped oil and natural gas. Both the Energy Information Administration and the US Geological Survey have estimated the quantity of technically recoverable natural gas in domestic shale plays. Pennsylvania sits atop the heart of the Marcellus shale, which is the largest shale gas play currently identified in the United States. It has an estimated 140,000 billion cubic feet of technically recoverable natural gas, approximately 88,000 billion cubic feet of which are located in Pennsylvania (see *Table 1*). Although shale gas drilling activity in the state has focused on the Marcellus shale, the Utica shale, which contains an estimated 38 trillion cubic feet of natural gas, underlies the Marcellus formation and is partially located within Pennsylvania. The Michigan Basin, which includes parts of neighboring states in addition to Michigan, contains 18 trillion cubic feet of natural gas; this includes Michigan's Antrim formation, which is located in the state's northern lower peninsula and contains an estimated 7,500 billion cubic feet of technically recoverable natural gas. Michigan also contains a portion of the Utica-Collingwood shale gas formation, which underlies a significant portion of Michigan's lower peninsula. The reserves contained in this formation have not yet been quantified but have nonetheless generated interest in the state.

 Table 1

 US Shale Gas Plays, Lower 48 States



Source: Energy Information Administration based on data from several published studies. Updated: May 9, 2011

<u>History of and Trends in Unconventional Drilling in</u> <u>Michigan and Pennsylvania</u>

Michigan has a longer history with the hydraulic fracturing process, but industry activity in recent years has grown much more rapidly in Pennsylvania in response to estimates of large natural gas deposits in the Marcellus shale. In Michigan, more than 12,000 well sites have seen some form of hydraulic fracturing since the 1960s, mostly in the Antrim shale formation.² Since Pennsylvania issued its first permits for unconventional drilling in 2005, the number of wells permitted and drilled has expanded significantly and rapidly. As of February 2013, the Pennsylvania Department of Environmental Protection had issued 12,736 permits for unconventional shale gas wells, with drilling completed on 6,390 wells.³

Recent advances in unconventional drilling technology, including the ability to drill deeper and horizontally, have increased the productivity of wells. These advances have contributed to an unprecedented rise in hydraulic fracturing across the US, with shale gas production increasing from five percent to 25 percent of total domestic natural gas production;⁴ however, the density and type of activity across regions and states containing shale has not been uniform. To date, most of the deep shale gas development has focused on sites outside the Michigan Basin with a large amount of activity occurring in the Appalachian region. For example, in Pennsylvania 1,920 unconventional wells were drilled in 2011 alone,⁵ while Michigan has issued only 40 permits for unconventional wells since 2008.6 Most of Michigan's fracking sites have historically used shallow, vertical drilling to reach the natural gas reservoir, although horizontal drilling has been tested in the Utica and Collingwood shale gas formations. In Pennsylvania, where horizontal drilling is common, the quantity of gas produced reflects the intensive drilling activity in the state. In 2011, drilling operators in Pennsylvania reported 1.0 million cubic feet of total natural gas production from the Marcellus Shale,⁷ representing more than four percent of national natural gas consumption for the same time period.8

The increased supply of natural gas has led to a dramatic drop in the price of the commodity. However, the effect of the price decline on industry activity is unclear: while the number of new drilling rigs may be in decline, drilling companies continue to pursue leasing arrangements, perhaps in anticipation of an increase in demand in response to lower prices. Data suggest that the explosive growth of the Pennsylvania shale gas industry is likely to slow if the price of natural gas remains low.⁹ While the number of new wells in the state has increased from two in 2006 to 1,920 in 2011, the rate of expansion declined toward the end of this period. Almost three times more new wells were drilled in 2008 than in 2007, compared to a less aggressive 31 percent increase from 2010 to 2011.¹⁰ Although a decline in the rate of expansion would be expected as the number of wells drilled each year increases, it appears likely that fewer total wells were drilled in Pennsylvania in 2012 than in 2011. As of September 2012, drillers have installed just over 1,000 new wells in the state during the year, putting the industry on pace to complete more than a quarter fewer wells in 2012 than in 2011.

Although the number of permits in Michigan is substantially lower than in Pennsylvania, the state's potential reserves have attracted unprecedented interest, demonstrated by expanding industry efforts to obtain drilling leases for both state and private lands. In 2010, oil and mineral leases on state-owned land were auctioned for \$176 million, nearly as much as the \$190 million Michigan received in total for these types of leases between 1929 and 2009. Although estimated drilling activity declined by more than 22 percent during the first half of 2012 compared to the same period in 2011, oil and gas leasing agents continue to seek leases on private lands across much of the state's lower peninsula.

Benefits and Risks associated with Fracking

Within Pennsylvania, where the drilling activity has grown more rapidly than in Michigan, controversy has accompanied the expansion of drilling as policymakers weigh the potential benefits of fostering a resurgent energy industry within the state against the potential downsides of a technology that may pose a range of environmental risks. Key economic benefits for the state include royalties or leasing payments made to land owners, direct hires of workers by the natural gas industry, and indirect economic benefits from the purchases of goods and services associated with the development and expansion of the natural gas industry within the state, although estimates of these benefits vary significantly.¹¹ Benefits through fees collected from industry are less subject to debate; for example, although Pennsylvania has resisted passing any type of taxation on the industry so as not to deter development, legislation enacted in early 2012 established a per-well impact fee which extracts revenue from industry, although not labeled as a "tax." The fee, which fluctuates based on natural gas prices, garnered \$204 million in 2012 to be split among state, county, and municipal governments.¹² While there is less public debate in Michigan regarding hydraulic fracturing, the potential benefits to the state are similar to those realized in Pennsylvania.

In addition to potential state-specific benefits, proponents of increased domestic production through unconventional drilling highlight myriad national benefits. Compared to oil and coal, natural gas is a cleaner-burning fossil fuel, and therefore, increasing the use of natural gas as an alternative to other fossil fuel sources would reduce domestic carbon and conventional air emissions. Further, increasing the use of a domesticallymined source would reduce dependency on fossil fuel imports. Finally, with the expansion of natural gas drilling, the price of natural gas has decreased substantially, decreasing energy costs for residential customers as well as commercial and industrial customers. Thus, if domestic mining were to increase, this would likely mean even more of a boon for business and the manufacturing industry than has already been realized through reduced energy costs.

However, a series of environmental and safety concerns have been linked to fracking, especially as the use of technologies such as horizontal drilling has increased. Much of the debate over hydraulic fracturing has focused on the potential contamination of groundwater from injecting chemically-laced fracking fluids into the well, stress on the existing water supply due to large withdrawals of freshwater for use as fracking fluids, and the management of wastewater that must be disposed after fracturing shale rock when the fracking fluids return to the surface. Other concerns include increased air emissions of methane and hazardous pollutants as a result of drilling procedures, as well as the limited nature of many disclosure procedures for chemicals injected during the fracking process.

While media attention, including the 2010 documentary *Gasland*, has highlighted the potential for groundwater contamination as a result of fracking activity, contamination has been difficult to prove or disprove due to both a common lack of well testing prior to fracking activity and a common lack of full disclosure of the contaminants contained in fracking fluid. This lack of full disclosure is often allowed by state policies that provide for disclosure exemptions, based on the industry argument that fracking fluid mixtures represent trade secrets.

The issues of water usage and disposal are more defined due to greater industry transparency about the volumes of water required for and resulting from hydraulic fracturing. In Michigan's Antrim shale formation, shallow vertical wells drilled to depths of 500 to 2000 feet below the surface use approximately 50,000 gallons of water. However, horizontal drilling practices, such as those used in Pennsylvania, require depths of 4,000 to 9,500 feet and use as much as 5 million gallons of water per well.¹³ Wastewater from hydraulic fracturing operations includes both "flowback" and "produced" water. Flowback is the injected fluid used in the hydraulic fracturing process that flows back to the surface after completion of the well, and that contains chemical additives and other pollutants such as barium and radium that are leached from the shale. Produced water naturally occurs in the shale formation and flows to the surface during well production, and may also contain leached pollutants. In Pennsylvania during the first half of 2012, waste from unconventional wells included 3.8 million barrels of flowback and 7.2 million barrels of produced water.¹⁴ Some states allow wastewater to be re-injected into deep-wells for disposal. However, the use of deep-well injection techniques to store wastewater has been linked to expanded earthquake activity in Arkansas, Ohio,¹⁵ and the United Kingdom.¹⁶

Federal and State Policy

Although hydraulic fracturing is occurring across the country, statutory exemptions limit federal-level regulation of the industry. The Energy Policy Act of 2005 (EPAct) specifically exempted fracking fluid other than diesel fuel from regulation under the Safe Drinking Water Act (SDWA), federal legislation that otherwise grants the federal government the authority to regulate underground injection activity. Due to this exemption and general exemptions for the oil and gas industry from other federal environmental legislation, such as the Resource Conservation and Recovery Act (RCRA), Clean Water Act (CWA), and the Comprehensive Environmental Responsibility, Compensation, and Liability Act (CERCLA), regulation of unconventional gas drilling falls primarily under the purview of state and local governments. Since 2009, legislation has been introduced annually in both houses of Congress to amend the SDWA to include underground injection of all fluids used for hydraulic fracturing for oil and gas production, but there does not currently appear to be a political consensus to enact such legislation. Indeed, some states have urged Congress to leave regulatory authority with them through formal resolutions passed by state legislatures. Despite current exemptions, several federal agencies have begun to weigh environmental risks associated with fracking and establish some regulatory presence, including some new EPA standards applied to air emissions.

<u>Pennsylvania</u>

Even as drilling occurs within Pennsylvania, the state's natural gas regulatory and taxation policy continues to evolve as the public debate weighing benefits and risks plays out in the media, amongst policymakers, and in the courts. Pennsylvania has established unconventional well construction and engineering standards, such as minimum setbacks from schools or water sources. Notwithstanding these standards, aspects of the state's fracking policy, such as chemical disclosure requirements, taxation, and jurisdiction over land-use decisions, remain highly contentious and, in the case of land-use jurisdiction, uncertain pending a decision from the Pennsylvania Supreme Court. After some debate regarding the taxation of unconventional well operators under former Governor Edward Rendell, a Democrat, and the passage of limited disclosure requirements in 2010 following the election of Republican Governor Tom Corbett, the Pennsylvania state legislature passed comprehensive fracking legislation by a fairly comfortable margin in February 2012 in a vote that largely followed partisan lines (see *Table 2*). The Unconventional Gas Well Impact Fee Act, or Act 13, addresses a broad range of issues related to fracking, including chemical disclosure, public revenues, and land-use jurisdiction. Notably, Act 13 is not only vast in scope, but also remarkably detailed in its prescriptions and aggressive in its expansion of state control over municipalities. This state preemption, particularly in the area of land-use regulation, is noteworthy given Pennsylvania's long tradition of strong local autonomy in planning matters. The Act has generated substantial media coverage and triggered considerable political controversy across the state.

Table 2

PA State Legislature Votes in Favor of and Against Act 13 by Party Affiliation					
	Yea Nay No Vote				
House	House				
Republican	99	10	1		
Democrat	2	80	5		
Total	101	90	6		
Senate					
Republican	26	3	0		
Democrat	5	16	0		
Total	31	19	0		

Prior to the passage of Act 13, Pennsylvania had enacted disclosure requirements similar to those adopted in many other states; however, critics cited the lack of a publicly-searchable database and the existence of exemptions for "trade secret" chemicals as evidence of ineffectuality. Although the Act failed to address previous complaints about loopholes that allow drilling operators to decline to disclose "trade secret" chemicals, the legislation does stipulate that chemical usage reports submitted to the state be published in an online, searchable database.

Act 13 does not enact a severance tax but rather authorizes an impact fee. Under this fee, revenues collected as a result of fracking activity are shared between state and local governments, contingent upon local compliance with the land-use provisions of the law. The impact fee is a flat fee per well enacted at the discretion of the county, is collected through the state Public Utility Commission (PUC), and allocates 60 percent of revenues to local governments in which, or near where, fracking occurs and the remaining 40 percent to state agencies. The fee could vary annually based in part on natural gas prices; in 2012, the fee was \$50,000 per horizontally drilled well and \$10,000 per vertical well, and raised approximately \$204 million dollars statewide.¹⁷ The PUC has authority to withhold allocation of any such revenues to local governments that pass any laws, ordinances, or regulations more stringent than those outlined in Act 13.

While granting counties have authority to determine whether or not to impose an impact fee, Act 13 severely limits the authority of local jurisdictions over land-use decisions by requiring local governments to allow drilling in all zoning designations other than densely-populated residential areas. In July 2012, the Pennsylvania Commonwealth Court declared that the land-use aspect of the Act violated the constitutional right to due process for Pennsylvania's local governments, a decision the Corbett Administration appealed to the state Supreme Court.¹⁸ In the interim, the PUC continued to investigate whether or not local land use ordinances complied with Act 13, withholding impact fees from three counties; however, on October 26, the Pennsylvania court ordered the PUC to halt its review of local land use regulations.¹⁹ A State Supreme Court decision on the case is pending.

<u>Michigan</u>

According to Michigan's Department of Environmental Quality (DEQ), the agency responsible for permitting and regulating oil and gas production in the state, there have been no cases in which hydraulic fracturing has caused adverse impacts to the environment or public health in Michigan despite its long history of use.²⁰ However, growing public interest regarding the use of fracking across the country and the potential new drilling techniques for the Utica-Collingwood shale formation has prompted debate over the benefits and risks of Michigan's natural gas regulatory policy. During the 2011-2012 legislative session, state lawmakers introduced several bills addressing concerns over fracking, including a state-led study of the impact of fracking on Michigan's environment and drinking water and a two-year moratorium on new permits. In addition, a citizen-led effort to establish a 2012 ballot proposition that would have banned fracking in Michigan failed to secure the required number of signatures, though fracking opponents have vowed to continue to pursue this option as well as new legislation. In December 2012, Republican Governor Rick Snyder delivered a special message on energy and the environment that outlined some of the benefits of fracking in the state, including low natural gas prices and additional money from state leases that fund Michigan's public lands and parks. Public concern regarding hydraulic fracturing in Michigan has centered on the potential large water withdrawals and the disclosure of chemicals used during fracking. In response to these concerns, Governor Snyder also announced that the state is participating as a member of a steering committee alongside several environmental and industry groups on an integrated assessment study of the impacts of fracking that will be led by the University of Michigan's Graham Environmental Sustainability Institute. This report is not formally connected with that study and has received no funding from it or any state-based industries or environmental groups, though the authors have agreed to share detailed survey findings with senior analysts leading that integrated assessment.

The governor's address on energy and the environment comes over a year after the Michigan DEQ issued new regulations for the shale gas industry, signaling an anticipated increase in fracking activity. In May 2011, the DEQ issued new regulations, known as Supervisor of Wells Instruction 1-2011, requiring reporting and monitoring of the effects of fracking on water resources. Under the regulations, large water withdrawals with a cumulative total of over 100,000 gallons per day must be evaluated to ensure that surface waters and surrounding water wells are not adversely impacted. The regulations require oil and gas operators to monitor any wells within 1,320 feet of the proposed withdrawal site and to provide information concerning the proposed total amount of water used, the depth of the water wells to be drilled, and the type



of aquifer from which the water will be withdrawn. According to the Michigan DEQ, no previous hydraulic fracturing activity had required large water withdrawals. However, the Department issued the new regulations in anticipation of development in the Utica-Collingwood shale formation, which requires oil and gas operators to drill much deeper and to use larger volumes of water.

In addition to the new water reporting requirements, the 2011 regulations also require oil and gas operators to provide the Michigan DEQ with Material Safety Data Sheets (MSDS) for chemical additives being used, records relating to injection pressures, volumes of fracturing fluid, and volumes of fracking wastewater, including flowback and produced water. The MSDS includes information on toxicity, health effects, and storage of the chemical additives. However, some chemical compounds are still exempt from these disclosure requirements because manufacturers can withhold the identity of chemicals deemed "trade secrets." Also, the MSDS information is not required until the record of well completion is due, within 60 days of drilling completion. Although Michigan's disclosure requirements are similar to those adopted in many other states, the public support of expanded chemical disclosure competes with the industry's interests in trade secrecy.

Michigan has retained its long-standing severance tax levied on the value of resources extracted through fracking, which is set at a rate of five percent for gas and a maximum additional fee of one percent gross cash market value on all oil and gas produced in the state during the previous year.²¹ Severance taxes are deposited into the state's general fund. Most natural gas-producing states have implemented some form of a severance tax to ensure that the producers pay costs associated with resource extraction. In 2010, Michigan raised \$57 million in revenue through severance taxes, representing less than one percent of the state's general fund.²² Similar to other natural gas-producing states such as Colorado and Oklahoma, Michigan uses a portion of the natural gas severance tax for environmental reclamation. The state allocates two percent of natural gas and oil severance tax revenue, up to \$1 million each year, for the Orphan Well Fund when the balance of the fund drops below \$3 million. The Fund enables the DEQ to plug abandoned or improperly closed oil, gas, or brine disposal wells, as well as to conduct environmental remediation and site restoration.²³ The use of revenue from natural gas severance taxes varies among states, but includes conservation efforts, educationrelated projects, and specific-purpose funding transfers to help mitigate budgetary shortfalls. Aside from the Orphan Well Fund, Michigan does not disburse revenue from the natural gas severance tax to any other special-purpose program.

II. Survey Findings

Survey Methodology

The findings included in this report, drawn from telephone surveys using representative random digit dialing samples that include both landlines and cell phones, represent responses from 415 Michigan citizens who were interviewed between October 21 and October 25, 2012 and 424 Pennsylvania citizens who were interviewed between October 24 and November 4, 2012. This produces a margin of error of five percent, calculated at a 95 percent level of confidence. Percentages throughout this report are rounded upward at the 0.5 percent mark; thus, many totals in the results will not equal 100 percent. All data summarized in this report are weighted by age, gender, race, ethnicity, and educational attainment to reflect population estimates in Pennsylvania and Michigan. The surveys were funded through general revenues of the Muhlenberg College Institute of Public Opinion and the Center for Local, State, and Urban Policy of the Gerald R. Ford School of Public Policy at the University of Michigan, under the auspices of the National Surveys on Energy and Environment (NSEE). The survey instrument was developed by Professor Christopher Borick of Muhlenberg College and Professor Barry Rabe of the University of Michigan. Erica Brown and Kristine Hartman of the University of Michigan served as research assistants.

Public Awareness and General Views

There is a wide distribution in the level of attention Michigan and Pennsylvania citizens are giving to the issue of fracking. A majority of Pennsylvanians (59 percent) state that they are following the debate around natural gas drilling very closely or somewhat closely (see *Table 3*). This is an increase from the 48 percent of respondents who said they were very closely or somewhat closely following the debate around natural gas drilling in a similar survey question included in the 2011 survey of Pennsylvania residents administered by the Muhlenberg Institute and CLOSUP.

The debate over hydraulic fracturing in Pennsylvania has brought substantial media attention to the state in recent years. Films such as *Gasland*, a 2010 documentary, and *Promised Land*, a 2012 feature film starring Matt Damon, highlighted the environmental risks associated with fracking. Recently, oil and natural gas companies have also invested significant resources to promote the economic benefits of fracking via mass media and as noted above, in 2012 the Pennsylvania legislature considered and passed comprehensive fracking legislation, which received substantial media coverage. Despite this media attention devoted to shale gas development, 13 percent of Pennsylvanian respondents say they have never heard of fracking (see *Table 4*). In Michigan, much less media attention has been given to issues surrounding fracking, and a majority of respondents (52 percent) state that they are either not too closely or not at all following the issue of natural gas drilling in shale deposits (see *Table 3*). Nonetheless, in Michigan, 40 percent of respondents state that they have heard a lot about the process of hydraulic fracturing, while this figure stands at 46 percent of respondents in Pennsylvania (see *Table 4*).

	Michigan	Pennsylvania	
Very Closely	17%	17%	
Somewhat Closely	31%	42%	
Not Too Closely	32%	23%	
Not At All	20%	19%	
Not Sure (Vol)	<1%	<1%	
Survey Question: How closely have you been following the debate around the issue of natural gas drilling in shale gas deposits in Michigan/Pennsylvania?			

Table 3 Public Awareness of Fracking



	Michigan	Pennsylvania
Heard a Lot	40%	46%
Heard a Little	42%	40%
Never Heard of it	17%	13%
Not Sure (Vol)	1%	1%
Survey Question: To extra known as "hydraulic fract have heard a lot about this about it before?	ct natural gas from shale fo uring" or "fracking" is used s technique, a little about it	ormations, a process d. Would you say that you , or you have never heard

 Table 4

 Public Information on Fracking Technique

Some differences occur among respondents when asked if Michiganians and Pennsylvanians support or oppose the extraction of natural gas, although perception of the term "fracking" is nearly identical in the two states. In Michigan, where relatively little media attention has been given to hydraulic fracturing and no incidents of surface and ground water contamination from fracking have been reported, respondents are more likely to strongly support natural gas extraction. Pennsylvanians, by contrast, are more likely to strongly oppose the extraction, although this latter difference is just within the survey's margin of error (see *Table 5*). Despite these differences, when asked directly about connotations of the term "fracking," respondents in Michigan and Pennsylvania are equally as likely to consider the term positive (31 percent), negative (45 percent), or neutral (17 or 16 percent) (see *Table 6*).

Table 5 Public Support for Shale Gas Extraction

	Michigan	Pennsylvania		
Strongly Support	32%	23%		
Somewhat Support	22%	26%		
Somewhat Oppose	19%	19%		
Strongly Oppose	16%	21%		
Not Sure (Vol)	12%	12%		
Survey Question: In general, would you say that you strongly support,				

somewhat support, somewhat oppose, or strongly oppose the extraction of natural gas from shale deposits in Michigan/Pennsylvania?

Table 6

Public Perception of the Term "Fracking"

	Michigan	Pennsylvania	
Positive	31%	31%	
Negative	45%	45%	
Neutral/Neither (Vol)	17%	16%	
Not Sure (Vol) 6% 8%			
Survey Question: In general, when you hear the word "fracking," do you consider it a positive or negative term?			

General Risks and Rewards

Public opinion data on the risks and benefits associated with fracking demonstrate cautious support for unconventional drilling, with respondents generally viewing risks as counter-balanced by rewards, and benefits outweighing problems. Risks generally comprise environmental threats, while the benefits identified as most important by respondents include national security and economic development. Overall, the majority of respondents from both Michigan and Pennsylvania believe that hydraulic fracturing provides more benefits than problems to citizens of their respective states. These results are similar whether focused on current benefits and problems or future benefits and problems. The only significant differences here are that Pennsylvanians are more likely than Michiganians to say that fracking has presented more problems than benefits so far (30 percent as opposed to 24 percent), and Michiganians are twice as likely as Pennsylvanians to say they are not sure about the impact so far (16 percent versus 8 percent) (see *Table 7*). The findings regarding benefits and problems to-date appear consistent with the actual level of fracking activities in the respective states, as explained in more detail below.

	So Far		In the Future	
	Michigan	Pennsylvania	Michigan	Pennsylvania
More Benefits	52%	54%	53%	54%
More Problems	24%	30%	31%	30%
About Equal (Vol)	8%	9%	6%	6%
Not Sure (Vol)	16%	8%	10%	9%
Survey Question: In general, do you feel that drilling for natural gas in Michigan/Pennsylvania has SO FAR provided more benefits or problems for the citizens of Michigan/Pennsylvania? In general, do you feel that drilling for natural gas in Michigan/Pennsylvania will provide more benefits or problems in the FUTURE for the citizens of Michigan/Pennsylvania?				

Table 7 Public Perception of Benefits and Problems Associated with Fracking Now and In the Future

Although difficult to quantify, estimated economic benefits to both states from hydraulic fracturing activities are sizable. An industrysponsored study estimates that, in Michigan, fracking added \$859 million in value to the economy in direct spending in 2010. In Pennsylvania, where fracking is more common, the same study estimated added value in direct spending in 2010 at \$2.4 billion.²⁴

The NSEE survey data show that both Pennsylvanians and Michiganians view hydraulic fracturing as important to their respective state economies, with 38 percent of Pennsylvania respondents and 36 percent of Michigan respondents citing fracking as very important and 46 percent in each state citing fracking as somewhat important (see *Table 8*). Views in both states on the value of hydraulic fracturing to the state economy are similar despite a clear difference in the level of fracking activity in each state.

	Michigan	Pennsylvania
Very Important	36%	38%
Somewhat Important	46%	46%
Not Very Important	10%	9%
Not Important at All	5%	4%
Not Sure (Vol)	3%	3%
Survey Question: How in to the overall condition o say that natural gas drilli important, or not at all in	portant would you say that f the Michigan/Pennsylvania ng is very important, somew portant to the Michigan/Pe	natural gas drilling is a economy? Would you /hat important, not too nnsylvania economy?

Table 8 Public Opinion on Economic Importance of Fracking for the State



Public opinion in both states indicates a general belief that fracking has provided—and will continue to provide—more benefits than problems; however, environmental challenges remain and continue to be publicized by individuals and groups opposed to fracking. Perception of risk within Michigan and Pennsylvania seems to reflect uncertainty about the degree of risk associated with hydraulic fracturing, given arguments by environmental groups that risk is high and arguments by industry that risk is low. When asked about expert consensus on the risks associated with hydraulic fracturing, respondents most frequently report that experts are divided as to whether fracking poses any risk, with 45 percent of respondents in Michigan and 55 percent of respondents in Pennsylvania viewing experts as divided (see *Table 9*). Slightly more of the remaining respondents in each state believe that experts agree that the risks of fracking are low rather than high. Michiganians respond in this manner more frequently than Pennsylvanians, perhaps reflecting the fact that, to date, the issue of fracking is more contentious in Pennsylvania than in Michigan.

	C	
	Michigan	Pennsylvania
Most experts agree that the risks associated with hydraulic fracturing in your state are HIGH	18%	17%
Most experts agree that the risks associated with hydraulic fracturing in your state are LOW	25%	20%
Most experts are divided on whether hydraulic fracturing poses any risk	45%	55%
Not sure	12%	8%
Survey Question: Please tell me which statement closes	st fits your views:	

Table 9 Public Perception of Expert Views on Fracking Risks

Slight differences in opinion between Michiganians and Pennsylvanians about the primary potential benefit of fracking may reflect different experiences within these states. While similar percentages of respondents in each state identify energy independence, an increase in tax revenue with an attendant reduction of governmental debt, and a reduction in energy costs as the primary potential benefits, Pennsylvanians are considerably more likely than Michiganians to cite economic stimulus through job creation and industry development as fracking's primary benefit (see *Table 10*). The higher percentage of Pennsylvanian respondents identifying job creation may reflect the comparatively higher level of fracking activity in Pennsylvania and the higher amount of value added to the Pennsylvania economy than to the Michigan economy in recent years.

Table 10 Public Opinion on the Primary Benefit of Fracking

	Michigan	Pennsylvania
Fracking reduces carbon emissions by increasing the supply of natural gas.	15%	11%
Fracking promotes energy independence by increasing the supply of fossil fuels extracted in the US.	27%	27%
Fracking provides an economic benefit by stimulating investments and creating jobs.	20%	28%
Fracking increases the amount of tax revenue collected by government, thereby helping to reduce government debt.	3%	4%
Fracking reduces energy costs for consumers and industries.	13%	13%
There are no potential benefits from fracking. (Vol)	13%	8%
Not sure (Vol)	10%	9%
Survey Question: In your opinion, which of the following v benefit of fracking for the United States?	would you say is t	he primary

Public Health and Environmental Risks

Public health and environmental problems have been linked to hydraulic fracturing by numerous organizations, especially as the natural gas industry has implemented advanced technology such as horizontal drilling. Policymakers recognize the revenue potential the industry could bring to state and local economies, but they are also responsible for ensuring that regulations are in place to protect the environment and public health. In response to an open-ended question regarding the most important environmental risk associated with hydraulic fracturing, Pennsylvania respondents are more likely to cite specific risks, such as water contamination and gas release; Michigan respondents, in contrast, are more likely to describe general risks, such as health issues and pollution (see *Table 11*).

When asked about the likelihood that fracking poses serious risks to the health and environment for residents living near drilling operations, Pennsylvania and Michigan residents provide a wide distribution of responses, with the majority in both states assuming moderate risks (see *Table 12*). In Michigan, a slightly higher proportion of respondents indicate that fracking is not likely to pose serious risks to the environment (25 percent), as compared to those in Michigan who indicate that the risk posed by fracking is very high (21 percent). Pennsylvanians, on the other hand, are slightly more likely to assume a higher likelihood of risks from fracking than a lower likelihood of risks (26 percent compared with 17 percent). These differences may demonstrate the effect of experience on the public's perception of risk: while Michigan has experienced less fracking in the state in recent years and no reported incidents of water contamination, Pennsylvania has seen a significant increase in drilling activity, with reported incidents of water contamination and methane release.

	Michigan	Pennsylvania
Water Contamination (General)	18%	34%
Ground Water/Well Contamination	8%	9%
Health Issues	14%	9%
Pollution/Chemicals	8%	3%
Environmental Damage (General)	6%	6%
Earthquakes	2%	1%
Gas Release/Air Pollution	1%	6%
General Risks	2%	2%
The Risk of Not Fracking	1%	1%
No Risks or Minimal Risks	6%	4%
Other	1%	1%
Not Sure/Don't Know	25%	18%
Survey Question: What would you say is the mo Michigan/Pennsylvania?	ost important risk related to	fracking in

Table 11 Public Opinion of the Most Important Risk Related to Fracking



	Michigan	Pennsylvania	
Low Likelihood (0-2)	25%	17%	
Moderate Likelihood (3-7)	43%	45%	
High Likelihood (8-10)	21%	26%	
Not Sure	11%	12%	
<i>Note: Categories collapsed for readability.</i> Survey Question: On a scale from 0 to 10, where 0 indicates "extremely unlikely" and 10 indicates "virtually certain," how probable is it that hydraulic fracking poses serious risks to the health and environment for residents living near drilling operations?			

Likelihood of Fracking Impacts on Health and the Environment

Interestingly, when asked the same question regarding the probability of serious health and environmental risks due to fracking activity under the assumption of a high or low finding of risk among state environmental regulators, the shift in public opinion appears to depend on the assumption presented to respondents (see Table 13). Under the assumption that state regulators determine risks to be very low, the shift in public opinion is significant from current perceptions, but is much less than under the assumption that state regulators determine risks to be very high. This difference is particularly evident in the case of Pennsylvania respondents, in which the assumption of a finding of low risk shifts the percent of low likelihood responses from 17 to 23 percent, while the assumption of a finding of high risk produces a more significant shift in the percent of high likelihood responses from 26 to 49 percent. At the same time, a certain percentage of individuals appear to be unmoved in their perception of risk regardless of risk determination by state regulators. Nonetheless, these findings suggest that the public is more confident in and is more likely to be influenced by an expert determination of high risk than of low risk.

	Baseline (Current Perception)		If Low Risk Findings		If High Risk Findings	
	Michigan	Pennsylvania	Michigan	Pennsylvania	Michigan	Pennsylvania
Low Likelihood (0-2)	25%	17%	33%	23%	22%	15%
Moderate Likelihood (3-7)	43%	45%	38%	45%	33%	28%
High Likelihood (8-10)	21%	26%	18%	20%	32%	49%
Not Sure	11%	12%	12%	12%	13%	8%

Table 13 Likelihood of Fracking Risks on Health and the Environment, Given Hypothetical Expert Findings

Note: Categories collapsed for readability.

Survey Questions: Now suppose that experts from your state's lead environmental agency, the Michigan Department of Environmental Quality/Pennsylvania Department of Environmental Protection, release a report concluding unequivocally that the risks related to the extraction of shale gas through fracking methods in Pennsylvania are VERY LOW. On a scale from 0 to 10, where 0 indicates "extremely unlikely" and 10 indicates "virtually certain," how probable is it that hydraulic fracking poses serious risks to the health and environment for residents living near drilling operations? (OR) Now suppose that experts from your state's lead environmental agency, the Michigan Department of Environmental Quality/Pennsylvania Department of Environmental Protection, release a report concluding unequivocally that the risks related to the extraction of shale gas through fracking methods in Pennsylvania are VERY HIGH. On a scale from 0 to 10, where 0 indicates "extremely unlikely" and 10 indicates "virtually certain," how probable is it that hydraulic fracking poses serious risks to the health and environment for residents living near drilling operations?

One area of increasing public concern is the potential for the contamination of drinking water. Fracking fluid could contain hazardous chemicals and, if not handled properly, could result in leaks or spills of harmful substances into groundwater or surface water. When asked whether natural gas drilling poses a major risk to state water resources, respondents are more likely to agree than disagree that it does pose a risk in both Pennsylvania and Michigan (see *Table 14*). Once again, Pennsylvanians are slightly more likely than their Michigan counterparts to view fracking as an environmental threat, with 59 percent of residents in Pennsylvania either somewhat or strongly agreeing that fracking poses a major risk to water resources compared to 51 percent of Michigan residents.

	Michigan	Pennsylvania	
Strongly Agree	32%	35%	
Somewhat Agree	19%	24%	
Somewhat Disagree	15%	17%	
Strongly Disagree	21%	17%	
Not Sure (Vol)	13% 8%		
Survey Question: Indicate if you strongly agree, somewhat agree, somewhat disagree, or strongly disagree with this statement: Natural gas drilling in Michigan/Pennsylvania poses a major risk to the state's water resources.			

Table 14 Public Agreement or Disagreement that Fracking Poses a Major Risk to Water Resources

Chemical Disclosure Requirements

There are no federal regulations requiring the disclosure of chemicals used by oil and gas producers for hydraulic fracturing. Oil and natural gas extraction is exempt from the Emergency Planning and Community Right to Know Act (EPCRA), which requires facilities with more than 10 employees to report toxic chemicals released, stored, or transferred. The 2005 Energy Policy Act also exempts fracking fluids from federal chemical disclosure requirements, so state governments have been left to determine whether to require disclosure of fracking chemicals and, if so, to design a system of disclosure. When asked if natural gas drilling companies should have to disclose the chemicals they inject underground as part of the fracking process, Pennsylvania and Michigan residents overwhelmingly agree (91 and 90 percent, respectively) that the public has a right to know about any health risks that might be posed by these chemicals (see *Table 15*).

Respondents were also asked if natural gas companies should not be required to disclose the chemicals they use if the chemicals are considered "trade secrets." The level of detail regarding chemical disclosure differs across states. As of January 2013, at least 23 states require—or have proposed new legislation requiring—some level of disclosure of chemicals used in the fracking process. All states with chemical disclosure requirements provide disclosure exemptions, which allow manufacturers to withhold the identity of chemicals that are considered industry trade secrets. Public opinion data from both Pennsylvania and Michigan show that residents either somewhat or strongly oppose trade secret exemptions from disclosure requirements (see *Table 16*), although the mention of trade secrets appears to lessen support for disclosure requirements slightly.



Table 15

Agreement and Disagreement with Hypothetical Requirement that Chemicals Used in Fracking be Disclosed based on Public's Right to Know about Health Risks Attendant to Fracking

	Michigan	Pennsylvania
Strongly Agree	78%	81%
Somewhat Agree	12%	10%
Somewhat Disagree	5%	2%
Strongly Disagree	3%	5%
Not Sure (Vol)	3%	2%

Survey Question: Indicate if you strongly agree, somewhat agree, somewhat disagree, or strongly disagree with this statement: Natural gas drilling companies SHOULD have to disclose the chemicals they inject underground as part of the fracking process because the public has a right to know about any health risks that might be posed by these chemicals.

Table 16

Agreement and Disagreement with Lack of Requirement that Chemicals used in Fracking be Disclosed based on Protection of Chemical Trade Secrets

	Michigan	Pennsylvania		
Strongly Agree	9%	6%		
Somewhat Agree	6%	4%		
Somewhat Disagree	12%	9%		
Strongly Disagree	71%	78%		
Not Sure (Vol) 3% 4%		4%		
Survey Question: Indicate if you strongly agree, somewhat agree, somewhat disagree, or strongly disagree with this statement: Natural gas drilling companies SHOULD NOT have to disclose the chemicals they inject underground as part of the fracking process because they contend that those chemicals are trade secrets.				

Taxation and Regulation

As described previously, respondents view the economic benefits of hydraulic fracturing in their respective states as one of the primary benefits of fracking in the US; this is the most frequent response in Pennsylvania and the second most frequent response in Michigan. Additionally, estimates of the value added to each state's economy are sizable. Because of the economic importance of the fracking industry, both perceived and real, some proponents of fracking oppose taxation and strict regulation of the industry, arguing that such actions would discourage drilling industry development. Nonetheless, Michigan maintains a severance tax assessed on the value of resources extracted through fracking, and Pennsylvania adopted an impact fee for drilling operations in 2012. Further, although both states have maintained trade secret disclosure exemptions, each jurisdiction has adopted increasingly specific regulations regarding setback requirements (the minimum distance between a gas well and schools, homes, or other buildings), well design specifications, and requirements for chemical disclosure.

A hypothetical threat of industry withdrawal or restricted development due to taxation or over-regulation does not appear to be credible with a majority of the public in either state. Respondents from both states generally disagree with the assertion that tighter government regulations and increasing taxation on natural gas drillers should be avoided because they would cause drilling firms to leave the state. On the issue of government regulation, 51 percent of Michiganians and 48 percent of Pennsylvanians either strongly or somewhat disagree with avoiding regulation so as not to drive drilling firms from the state, compared to 42 percent of Michigan

respondents and 41 percent of Pennsylvania respondents who either strongly or somewhat agree (see *Table 17*). Somewhat more decisively, on the issue of taxation, 54 percent of Michiganians and 64 percent of Pennsylvanians either somewhat or strongly disagree with avoiding taxation of the natural gas industry to deter drilling firms from leaving the state, compared to 37 percent of Michigan respondents and 32 percent of Pennsylvania respondents who either somewhat or strongly agree.

	Stricter Regulation		Increased Taxes	
	Should B	e Avoided	Should Be Avoided	
	Michigan	Pennsylvania	Michigan	Pennsylvania
Strongly Agree	19%	22%	18%	16%
Somewhat Agree	23%	19%	19%	16%
Somewhat Disagree	18%	20%	24%	30%
Strongly Disagree	33%	28%	30%	34%
Not Sure (Vol)	8%	10%	10%	4%

Table 17 Public Opinion on Avoiding Stricter Regulation and Tax Increases in the State to Retain Drillers

Survey Questions: Indicate whether you strongly agree, somewhat agree, somewhat disagree, or strongly disagree with each statement: Tighter government regulations on the extraction of natural gas in Michigan/Pennsylvania will lead drilling firms to leave the state and so should be avoided; (AND) Increasing taxes on natural gas drillers in Michigan/Pennsylvania will lead drilling firms to leave and so should be avoided.

A number of states, including Michigan, have a severance tax for the oil and gas industry that taxes the extraction of fossil fuels based on the quantity or value of the resource extracted. Some states, like Wyoming, North Dakota, and Alaska, obtain over 20 percent of their state revenues from severance taxes.²⁵ When asked specifically about severance taxes, Michigan respondents express more support for maintaining the state's current tax than Pennsylvanian respondents do for adopting such a tax, which the state currently does not have (see *Table 18*). In Michigan, 77 percent of respondents support and 13 percent oppose maintaining Michigan's severance tax, compared to Pennsylvania's 65 percent support and 27 percent opposition to adopting a severance tax. Given that Michigan already has a severance tax while Pennsylvania does not, the difference in support for a severance tax between the two states may to some degree reflect a status quo bias.

Table 18 Public Opinion on Maintaining or Adopting Severance Taxes

	Michigan	Pennsylvania	
Yes	77%	65%	
No	13%	27%	
Not Sure (Vol)	10%	8%	
Survey Question: Many states have created "severance taxes" in which drillers pay a tax that is based on the value of natural gas and oil that they extract from below the ground. Michigan does currently have such a tax. Do you think that Michigan should sustain such a tax or not? (OR) Pennsylvania does not have such a tax. Do you think Pennsylvania should adopt such a tax or not?			



It is also possible, however, that the newly-adopted impact fee in Pennsylvania contributed to the comparatively lower level of support for a severance tax in that state. In a similar survey question included in the 2011 survey of Pennsylvania residents administered by the Muhlenberg Institute and CLOSUP, 72 percent of respondents believed that drilling firms should pay such a tax, while 19 percent were opposed to taxation of drilling firms. In the interim, however, Pennsylvania passed Act 13, which authorized an impact fee for natural gas drillers. The seeming reduction in support for taxing the drilling industry between the 2011 survey and the 2012 survey may have resulted, at least in part, from the fact that some respondents may be opposed to imposing both an impact fee and a tax on the drilling industry.

Severance taxes in most states, including Michigan, are typically deposited in the state's general fund and may be used to offset some of the costs to the state that result from resource extraction, including road maintenance and environmental protection. While Pennsylvania does not have a severance tax, the distribution of revenue collected from the state's impact fee is notably transparent and prescribed in remarkable detail by Act 13. Currently, in Pennsylvania, revenue from impact fees is split between the state and local governments in which, or near where, fracking occurs. Of the 60 percent allocated to local governments in 2012, the state distributed 36 percent to counties with unconventional wells, 37 percent to municipalities with unconventional wells, and 27 percent to municipalities within a certain distance of those with unconventional wells, to be spent at the discretion of the local government. Of the 40 percent allocated to the state, the money was distributed to fund infrastructure improvement projects such as bridges and sewer projects, environmental funds, and liquefied natural gas projects.²⁶

Public opinion on the preferred use of tax revenue is similar among both Michigan and Pennsylvania respondents, and reflects salient issues in the political discourse of each state. The most frequent response, which comprises 26 percent of the responses in each state, is to use tax revenue to reduce local property taxes (see *Table 19*). In both states, property taxes are highly contentious. In Pennsylvania, property tax reform is a long-standing subject of policy debate that culminated in special committee hearings in the summer of 2012, with the intention of making recommendations to change the tax structure in 2013.²⁷ In Michigan, voters have approved two amendments to the state constitution, the 1978 Headlee Amendment and the 1994 Proposal A, to limit increases in local property taxes.²⁸ The second and third most frequent responses, respectively, are supporting research on alternative energy and decreasing government debt.

	Michigan	Pennsylvania
De duce estate in come text	0.0/	100/
Reduce state income tax	9%	10%
Reduce local property tax	26%	26%
Reduce the government's debt	15%	11%
Support state research on alternative energy	20%	15%
Support state government costs of regulating drilling practices	5%	5%
Sustain state government programs	7%	9%
Or should the tax be repealed	8%	10%
Other use for the revenue (Vol)	4%	7%
Not sure (Vol)	7%	8%
Survey Question: Many states have created "severance that is based on the value of natural gas and oil that they How would you prefer to see the revenue from such a ta used to:	taxes" in which dr extract from belo x spent? Should th	illers pay a tax w the ground. e revenue be

Table 19 Public Preference for the Use of Funds Raised through Taxation of Fracking

Notably, although 13 percent of Michiganians and 27 percent of Pennsylvanians oppose severance taxes (see *Table 18*), when asked their preference on how the money from such a tax should be spent, only eight percent of Michigan respondents and 10 percent of Pennsylvania respondents state that such a tax should be repealed. This suggests that even among some for whom the industry tax is unpopular, the policies and programs funded by the revenue from such a tax remain popular.

Policy Options

In exploring the policy options available to Michigan and Pennsylvania regarding hydraulic fracturing within the respective states, it is useful to consider who "owns," and therefore, who should benefit from the extraction of subsurface resources such as natural gas. For example, if natural gas is considered a public resource, a tax that redistributes the wealth generated by extraction to all citizens of the state through either a reduction in property taxes or the provision of services would be appropriate. If, on the other hand, natural gas is considered a private resource, decisions on where extraction may occur and what chemicals may be used in the process might be left to the discretion of landowners and private industry.

When asked whether natural gas reserves within their state should be considered a public resource that benefits all citizens of the state, both Michigan and Pennsylvania respondents overwhelmingly agree that natural gas should be viewed as a public resource (see *Table 20*). The results are highly similar for both states. Conversely, the majority of respondents disagree with the statement that natural gas is a private resource that should benefit private companies and individual landowners, with Pennsylvanians more likely than Michigan residents to oppose the statement that gas is a private resource. However, some respondents who indicate agreement with the statement that natural gas is a public resource also indicated agreement with the statement that natural gas is a private resource. Based on the responses given, it appears that, for some respondents, the perception of whether natural gas is a public or a private resource may vary according to how the issue is presented or that the statements are not considered mutually exclusive.

	Natural Gas is a Public Resource		Natural Gas is a Private Resource	
	Michigan	Pennsylvania	Michigan	Pennsylvania
Strongly Agree	51%	50%	23%	11%
Somewhat Agree	32%	30%	20%	19%
Somewhat Disagree	6%	7%	19%	26%
Strongly Disagree	7%	7%	32%	40%
Not Sure (Vol)	5%	7%	7%	3%

Table 20 Natural Gas as a Public or Private Resource

Survey Questions: Indicate whether you strongly agree, somewhat agree, somewhat disagree, or strongly disagree with each statement: Natural gas reserves under Michigan/Pennsylvania are a public resource and should benefit all citizens of the state; AND Natural gas reserves under Michigan/ Pennsylvania are a private resource and should benefit private energy developers and individual landowners.

Because the risks associated with hydraulic fracturing remain uncertain, some states are considering or have decided to place a moratorium on the process until the risks are clearer. States that have at one time established moratoria in all or part of the state—or states considering temporarily banning fracking—include New York, New Jersey, Maryland, and West Virginia.²⁹ Under Governor Snyder's administration in Michigan and Governor Corbett's administration in Pennsylvania, moratoria seem unlikely given the history of and stated support for the hydraulic fracturing industry under both governors. However, the ballot proposition to ban fracking may resurface in Michigan, despite fracking opponents' failure to secure the necessary signatures for inclusion on the November 2012 ballot. Public opinion in each state supports a moratorium, with 52 percent of Michigan respondents and 58 percent of Pennsylvania respondents either strongly or somewhat in favor (see *Table 21*).



	Michigan	Pennsylvania	
Strongly Agree	36%	41%	
Somewhat Agree	16%	17%	
Somewhat Disagree	16%	6%	
Strongly Disagree	25%	25%	
Not Sure (Vol)	7%	10%	
Survey Question: Some states have imposed a "moratorium" on hydraulic fracturing until there is a fuller understanding of the possible risks. Do you strongly agree, somewhat agree, somewhat disagree, or strongly disagree that Michigan/ Pennsylvania should establish a moratorium on hydraulic fracturing, or not?			

Table 21 Public Opinion on Establishing a Statewide Fracking Moratorium

Confidence in Public Officials

When asked whether respondents approve or disapprove of the way each state's public officials have handled the issue of natural gas drilling, a majority of citizens respond that they are unsure regarding both the governor and legislature's actions (see *Tables 22* and *23*, respectively). For the remaining respondents, Michigan residents are divided over whether they approve or disapprove of Governor Snyder's actions (24 percent approval to 26 percent disapproval). In comparison, more Pennsylvanians object to the way in which Governor Corbett has handled natural gas drilling in the state (36 percent disapproval to 19 percent approval). The marginally higher disapproval rates for Corbett in comparison with Snyder likely reflect the contentious and highly publicized debate over Act 13 and the governor's major role in the law's development. For the remaining respondents asked about each state legislature's actions, 17 percent of both Pennsylvanians and Michiganians approve of the way their respective state legislatures are addressing natural gas issues, while 33 percent of respondents disapprove in Pennsylvania and 22 percent disapprove in Michigan.

Table 22 Public Approval of the Governor's Handling of Natural Gas Drilling

	Michigan	Pennsylvania	
Approve	24%	19%	
Disapprove	26%	36%	
Not Sure (Vol)	50%	45%	
Survey Question: In general, do you approve or disapprove of the way that Governor Snyder/Corbett has handled the issue of natural gas drilling in the state?			

Table 23

Public Approval of the Legislature's Handling of Natural Gas Drilling

	Michigan	Pennsylvania	
Approve	17%	17%	
Disapprove	22%	33%	
Not Sure (Vol)	60% 50%		
Survey Question: In general, do you approve or disapprove of the way that Michigan/Pennsylvania Legislature has handled the issue of natural gas			

drilling in the state?

The disapproval and uncertainty regarding the performance of the states' governors and state legislatures on fracking issues appears to be reflected in public preference to turn elsewhere for reliable information on fracking. According to the survey, respondents in Michigan and Pennsylvania rank environmental groups first for reliable information about the practices of natural gas drilling (see *Table 24*). Although there is a wide distribution in preferred sources of information, more Michiganians than Pennsylvanians would turn to their state and local governments for information.

	Michigan	Pennsylvania
Federal Government	6%	5%
State Government	20%	12%
Local Government	10%	7%
Environmental Groups	28%	33%
Drilling Industry Groups	9%	7%
Television	8%	9%
Newspapers	5%	5%
None of the Options (Vol)	5%	6%
Other Option (Vol)	7%	9%
Not Sure (Vol)	2%	8%
Survey Question: Where w practices of natural gas dr	, yould you turn first for relia illing in Michigan/Pennsylv	ble information about the vania?

Table 24 Preferred Sources of Information on Fracking

Yet, despite the fact that more respondents would turn first to environmental groups rather than the government at any particular level, public opinion data demonstrates that the majority of residents of both states prefer state and local authority as opposed to federal government authority in regulating where drilling sites can be located (see *Table 25*). Support for state-level control is roughly equal in Michigan and Pennsylvania, with 33 percent and 32 percent of respondents in each respective state indicating this preference, while support for local control is slightly higher in Pennsylvania than Michigan (29 percent as compared to 24 percent), perhaps reflecting the influence on public opinion of the current legal battle surrounding Act 13. Between one-fifth and one-fourth of residents in both states would prefer no governmental involvement, believing instead that fracking decisions should be made by private land owners.

Table 25 Preferred Decision-Making Authority regarding Drilling Site Locations

	Michigan	Pennsylvania				
Federal	14%	14%				
State	33%	32%				
Local	24%	29%				
Private Decision	25%	20%				
Not Sure (Vol)	4%	5%				
Survey Question: When it comes to regulating where drilling sites can be located, which level of government do you think should have the primary control, if any? Do you think the federal government, state government, or local government should have primary control for regulating where drilling sites can be located, or should this decision be made solely by private land owners without any government influence?						



Opinion and Political Affiliation

Neither Pennsylvania nor Michigan can be considered a stronghold of either major political party: while both states are currently governed by Republican governors and Republican-majority legislatures, a majority of voters in both Michigan and Pennsylvania supported Barack Obama in the 2012 election and have tilted blue in every presidential election since 1988. Federal legislative representation similarly conveys an electorate divided among the major political parties. While Michigan currently has two Democratic senators in the US Senate, seven Democrats and eight Republicans represent the state in Congress.³⁰ Pennsylvania currently has one Democratic and one Republican senator in the Senate and five Democrats and 13 Republicans in the House.³¹

Political events in both Michigan and Pennsylvania and historic partisan perspectives on energy and environmental issues ostensibly suggest partisan divide in support for hydraulic fracturing. In Michigan, with a long-standing but slowly expanding fracking industry, a Republican governor highlighted hydraulic fracturing in his 2012 address on energy and the environment. In Pennsylvania, a Republican governor who campaigned in large part on expansion of fracking within the state, championed and then signed into law sweeping legislation viewed largely as a boon to the industry under a Republican-majority legislature.

In general, we find similar relationships between partisanship and support for shale gas extraction in Michigan and Pennsylvania, with Republicans most supportive and Democrats least supportive of this activity when including Independents. However there are some notable differences that are observable both between states and among partisan groups. For example, across party divides, Michigan residents are more likely than their Pennsylvania counterparts to strongly support shale gas extraction with each respective party affiliation, while Pennsylvanians from each partisan group are more likely to strongly oppose shale gas extractions than individuals in Michigan with the same respective party affiliations (see *Table 26*). These differences may reflect the impact of both Pennsylvanians' first-hand experience with hydraulic fracturing and the more contentious debates that have occurred within Pennsylvania as fracking has become more widespread in the state.

	Michigan ¹			Pennsylvania			
	Democrat	Republican	Independent	Democrat	Republican	Independent	
Percent of Total Respondents	31%	25%	35%	41%	35%	16%	
Strongly Support	21%	52%	31%	17%	34%	21%	
Somewhat Support	25%	18%	22%	25%	24%	35%	
Somewhat Oppose	19%	13%	19%	22%	16%	12%	
Strongly Oppose	20%	9%	16%	26%	18%	24%	
Not Sure (Vol)	15%	9%	12%	11%	9%	9%	

Table 26 Public Support for Shale Gas Extraction by Party Affiliation

¹ Number of respondents does not add up to 100% because the following categories were omitted from this table: other, not registered, not sure, and refused.

Survey Question: In general, would you say that you strongly support, somewhat support, somewhat oppose, or strongly oppose the extraction of natural gas from shale deposits in Michigan/Pennsylvania?

The finding of slightly stronger support for shale gas extraction among Republicans when compared with Democratic respondents appears to correspond with different perceptions of risk and the importance of fracking to the state economy. In both states, Democrats are most likely to perceive expert agreement on fracking risks as high, and Republicans are most likely to perceive expert agreement on fracking risks as low when comparing these groups with Independents (see *Table 27*). Republicans in both states are also most likely out of all three groups to respond that fracking is very important to the state economy, although large majorities of Democrats, Republicans and Independents in both Pennsylvania and Michigan believe that fracking is at least somewhat important to their state's economy (see *Table 28*).

	Michigan			Pennsylvania			
	Democrat	Republican	Independent	Democrat	Republican	Independent	
Percent of Total Respondents	31%	25%	35%	41%	35%	16%	
Most experts agree that the risks associated with hydraulic fracturing in your state are HIGH	22%	13%	15%	26%	6%	24%	
Most experts agree that the risks associated with hydraulic fracturing in your state are LOW	19%	37%	27%	18%	25%	21%	
Most experts are divided on whether hydraulic fracturing poses any risk	43%	41%	49%	48%	63%	45%	
Not sure	16%	10%	9%	8%	5%	10%	
Survey Question: Please tell me which statement comes closest to your views:							

 Table 27

 Public Perception of Expert Views on Fracking Risk by Party Affiliation

Table 28

Public Opinion on Economic Importance of Fracking for the State by Party Affiliation

	Michigan			Pennsylvania			
	Democrat	Republican	Independent	Democrat	Republican	Independent	
Percent of Total Respondents	31%	25%	35%	31%	35%	16%	
Very Important	35%	50%	31%	28%	54%	31%	
Somewhat Important	47%	42%	51%	49%	39%	59%	
Not Very Important	12%	5%	12%	16%	2%	5%	
Not Important at All	3%	2%	2%	6%	2%	2%	
Not Sure (Vol)	3%	1%	4%	2%	2%	3%	

Survey Question: How important would you say that natural gas drilling is to the overall condition of the Michigan/Pennsylvania Economy? Would you say that natural gas drilling is very important, somewhat important, not too important, or not at all important to the Michigan/Pennsylvania economy?



Conclusions

This report compares public opinion on hydraulic fracturing between residents of Michigan and Pennsylvania, and finds generally similar views on numerous dimensions of the issue in each state. While citizens in both states generally have a positive view of the overall impact of fracking in their respective states, respondents also support regulation and taxation of the industry, and express significant levels of concern over its potential risks. Despite enthusiasm for hydraulic fracturing among state lawmakers, the majority of citizens in both states express support for a moratorium pending further assessment of the risks associated with the process. Generally, respondents from both states appear uncertain about the level of risk associated with shale gas extraction and appear more likely to believe an expert assessment of risks as high than an expert assessment of risks as low. In assessing both risks and rewards, Pennsylvanians' responses appear to be more informed by direct experiences and media exposure within the state than those from Michiganians.

While the public in both states supports decision-making at the state and local level, public opinion on the actions of state lawmakers on certain issues appears directly at odds with some of the actions of lawmakers, including chemical disclosure requirements and severance taxes in Pennsylvania. Both states are currently governed by Republican governors and majority Republican legislatures; however, support for the fracking industry as a whole is not strictly divided along party lines in either state, despite divergent perceptions of risks and rewards among identified Democrats and Republicans.

We will expand upon these findings in subsequent reports and publications while also undertaking further research that will assess public opinion on the issue over time and in other jurisdictions.

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