

Pennsylvania Residents' Perceptions of Natural Gas Development in the Marcellus Shale

Data from a 2009-10 Survey

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Introduction

The presence of vast natural gas reserves in the region known as the Marcellus Shale – an area including much of Pennsylvania and stretching from New York to West Virginia – has been known for decades. However, the recent emphasis on domestic energy production, coupled with technological advancements that make the recovery of these deep natural gas reserves cost effective, have led to increasing interest and activity in developing these resources.

Most of the counties within the region are rural in nature, and the potential impact of widespread gas development is profound. Large scale energy development can bring increasing economic investments, jobs, and population growth. At the same time, there are both environmental and social risks. The hydro-fracturing process used to free the embedded gas uses large quantities of water and requires treatment/disposal of flowback water. The drilling process requires clearing land, often in forests or on farms, altering ecosystems, wildlife habitats, and landscape amenities. The influx of new workers and residents may stress community services and infrastructure, shift community power structures, and alter community interactions, norms and values.

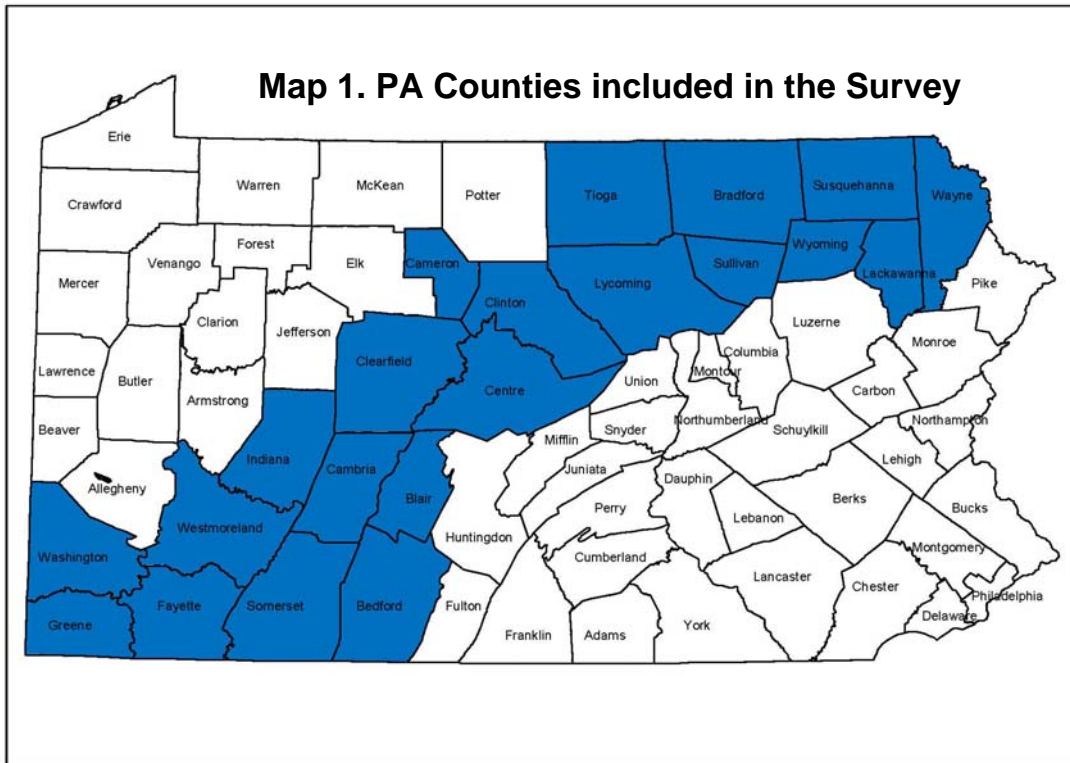
Given these potential changes how do people living in the region view the natural gas industry developing in their area? To address this question, a household survey of residents in the Marcellus Shale area in Pennsylvania was conducted during 2009-2010 to assess residents' knowledge and perceptions of the Marcellus natural gas industry during the early stages of its development.

The Sample

A total of 21 counties within the Marcellus region in the Commonwealth were chosen as the survey sites:¹ Bedford, Blair, Bradford, Cambria, Cameron, Centre, Clearfield, Clinton, Fayette,

¹ In addition, eight counties in the southern tier of New York were included in the larger study. However, in 2008, New York's Department of Environmental Conservation began reviewing regulations related to the industry, effectively halting permits for wells that use hydraulic fracturing. As a consequence, development of the industry in New York has been curtailed. This report deals only with the Pennsylvania data.

Greene, Indiana, Lackawanna, Lycoming, Somerset, Sullivan, Susquehanna, Tioga, Washington, Wayne, Westmoreland, and Wyoming (Map 1). A sample of 4496 household addresses was drawn at random from these counties and questionnaires mailed in late 2009. About 10% (421 cases) were returned by the post office as “undeliverable.” From the remaining sample, 1461 usable questionnaires were returned – a 36% response rate.



Relative to data available from the 2000 U.S. Census of Population, women, younger people, and those ending their formal schooling with high school were somewhat underrepresented in the sample. Thus, to the extent that the perceptions of residents differ by gender, age, or education, the current findings may over-represent the views of males, persons who were older, and those with higher educations.

Experience and Knowledge

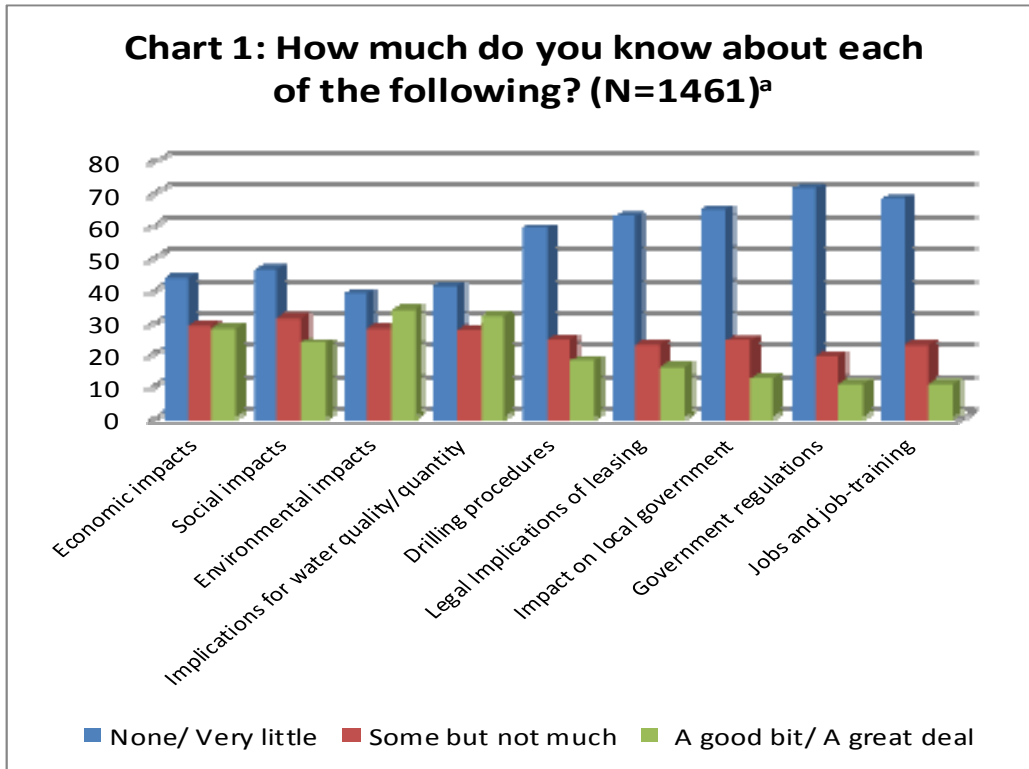
Energy companies began exploring and leasing land in the Marcellus region around 2003, with leasing activity accelerating beginning in 2006 after initial test wells began to

produce gas at potentially profitable quantities. However, in 2009 when respondents were asked about their experiences with the natural gas industry, only 18% reported having been approached by a gas company representative, just 10% had signed gas leases, and, fewer than 2% actually had any drilling or pipeline construction on their land. The limited experiences with gas exploration and leasing partially reflected the fact that just 44% of those responding actually owned land in the region. Moreover, most of these land holdings were small and alone unlikely to be suitable for gas development. In addition, it was unclear what proportion of the landowners also owned the gas/mineral rights to their land. When asked, only 45% reported that they were certain they owned these rights; 28% indicated they did not own them, and an additional 27% did not know.

Contacts with the gas industry were most common among large landowners. Of those respondents owning 25 acres or more, 79% reported having been approached about signing a lease, and nearly half (49%) of those had signed. However, only 5% of landowners with 25 or more acres had actually experienced drilling or pipeline construction on their land.

While only a minority of the respondents had first-hand contacts with gas company representatives, 42% were aware of Marcellus gas wells or pipelines within 10 miles of where they lived. Nevertheless, when the survey respondents were asked to rate their knowledge about the potential impacts of gas drilling in the Marcellus Shale, they were more likely to report they had “no” or “very little” knowledge than that they knew “a good bit” or “a great deal” (Chart 1). Reported knowledge levels about possible environmental impacts and the implications for water quality and quantity were somewhat greater than for the social and economic effects of gas industry development.

- 46% said they knew nothing or very little about social impacts; 23% indicated they knew a good bit or a great deal; the remainder knew some, but not much.
- 38% answered they knew nothing or very little about the environmental impacts; 34% knew a good bit or a great deal.
- 41% indicated they knew nothing or very little about the implications of Marcellus gas drilling for water quantity and quality; 32% reported they knew a good bit or a great deal.



^a Numbers of cases for each topic may vary from the total due to non-response to the items

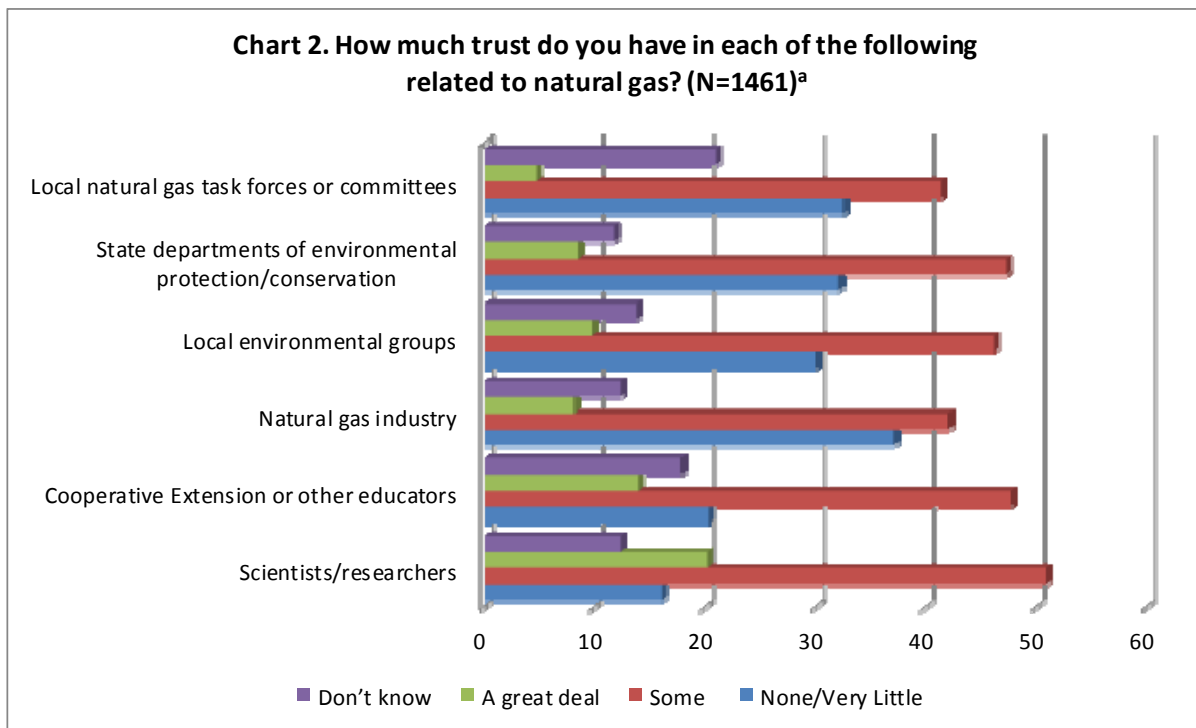
Self reported knowledge levels about other matters relating to natural gas extraction were even lower, with the majority of subjects reporting they knew very little or nothing about drilling procedures (59%), the legal implications of leasing (62%), the impact on local government (64%), relevant government regulations (71%) and jobs/job training (68%). Less than one-fifth of respondents reported “a good bit or a great deal” of knowledge on these topics, with only one-in-ten having this level of knowledge about government regulations and jobs or job-training related to Marcellus Shale.

Despite the relatively low levels of self-reported knowledge, only about 1 in 4 (24%) of the residents surveyed reported they had actively sought information about gas development, although nearly half (49%) had discussed the topic with others. About one in ten (11%) had attended a public meeting related to gas development, and 6% had contacted the media or government officials to express their opinions about the issue. Very few had spoken at a public meeting (4%), participated in (3%) or given money to (1%) groups working on gas issues.

Sources of and Trust in Information

The survey also included questions about sources of information and involvement in activities related to natural gas development. The media (newspapers, radio, television) were reported as the most likely contributors to respondents' knowledge about gas well drilling with 59% of the respondents indicating they received at least "some" information from newspapers, radio, and/or television. Information was also obtained from the Internet (30%), gas industry representatives (23%), Cooperative Extension or other educators (19%) and environmental regulatory agencies (19%).

Respondents also were asked to rate how much they trusted various sources of information: "not at all," "very little," "some" or "a great deal." In these questions, respondents also could choose "don't know." The most common response across sources of information was an indication of "some" trust for each group (Chart 2).



^aNumbers of cases vary from the total due to non-response to the items

- Scientists and researchers were the most often seen as being trustworthy, with 51% of the respondents placing some trust in them, and 20% reporting they had a great deal of

trust. However, 16% expressed little or no trust in scientists and 13% didn't know how they felt.

- Cooperative Extension/other educators were seen as being at least somewhat trustworthy by 48% of the respondents, with 14% of the respondents indicating they had a great deal of trust in them. However, 1 in 5 (20%) had little or no such trust, and 18% said they didn't know.
- Local environmental groups and the Pennsylvania Department of Environmental Protection were somewhat less likely to be rated as trustworthy with 46% and 47% respectively trusted some, and 10% and 9% trusted a great deal. About 30% had little or no trust in these groups, while the remaining respondents were unsure about their trustworthiness.
- About 4 in 10 had at least "some" trust in the natural gas industry, but only 8% trusted it "a great deal," 37% had "very little" or "no" trust in the industry, and 13% did not know.
- Not all counties had local natural gas task forces/committees, and over one in five respondents did not know how trustworthy they were. Of those subjects who did have an opinion, four out of ten subjects trusted them some, and about one-third trusted them not at all or very little.

Expected Effects of Marcellus Shale Gas Development

When residents were asked about the changes they expected to see in their communities from Marcellus Shale development, half (50%) reported they believed the overall quality of life in their communities would stay the same. Just 17% said it would get worse, and nearly as many (14%) expected it would get better. About one in five (19%) reported they didn't know how their quality of life would change as a result of gas industry development (Table 1).

Asked about expected changes in specific community attributes, more than six out of every ten subjects believed the quality of medical services/health care, neighborliness/friendliness, the quality of public schools, and cultural events/activities would remain the same. However, availability of jobs and job training opportunities were more likely to be expected to "get better" than to "get worse" (41% vs. 2% for jobs; 30% vs. 4% for job training). Other

community attributes were more likely to be viewed as getting worse rather than better. These included: quality of the natural environment (47% vs. 4%), drinking water (40% vs. 3%), roads and streets (30% vs. 10%), cost of living (27% vs. 9%), recreation opportunities (14% vs. 5%), freedom from crime and violence (23% vs. 3%), and availability of affordable housing (19% vs. 8%).

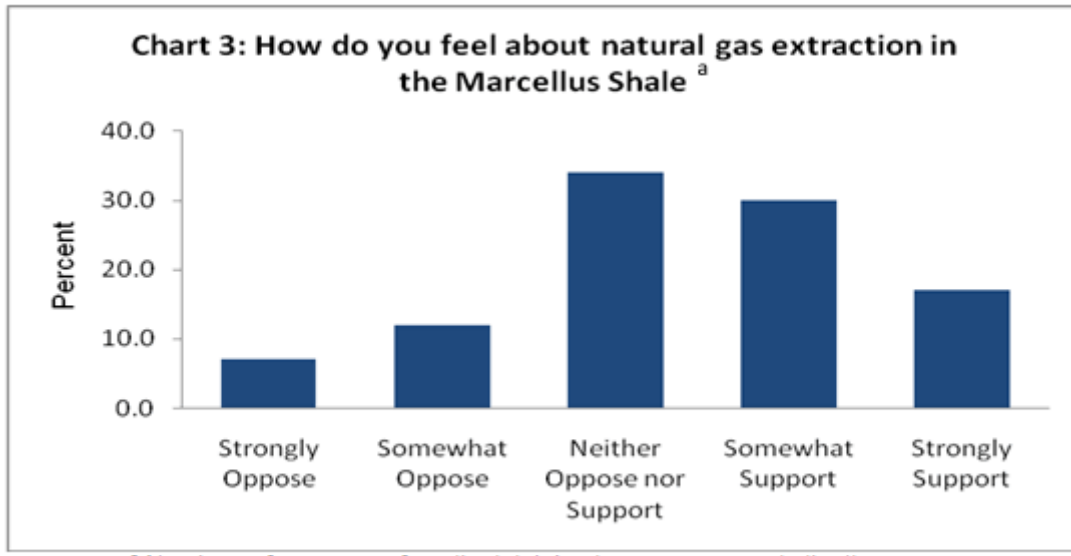
Table 1: How much do you expect Marcellus Shale gas development to impact each of the following? (N=1461)^a

	Get Better	Stay the same	Get worse	Don't know
	-----%-----			
Overall quality of life	13.8	49.9	16.7	19.6
Availability of good jobs	41.2	34.1	2.1	22.7
Quality of public schools	9.1	65.1	4.3	21.6
Quality of health care	7.6	67.7	3.9	20.8
Availability of affordable housing	8.4	52.7	19.2	19.7
Roads and streets	10.2	43.2	30.0	16.6
Freedom from crime/violence	3.3	53.1	23.0	20.7
Quality of natural environment	4.1	31.2	46.6	18.1
Neighborliness/friendliness	4.0	66.4	8.9	20.7
Drinking water	3.0	34.5	39.6	22.9
Recreation opportunities	5.2	59.0	14.2	21.6
Cultural events	5.5	65.7	4.8	24.0
Job training opportunities	30.3	43.7	3.9	22.0
Overall cost of living	9.2	43.1	26.9	20.8

^a Numbers of cases vary from the total due to non-response to the items

Despite the tendency to predict gas well development would negatively affect community life, more than twice as many respondents supported than opposed gas drilling. However, a sizable minority reported they were neutral or had no opinion on the matter (Chart 3). When asked: “Considering everything, how do you feel about natural gas extraction from the Marcellus Shale region?”

- 47% reported they either somewhat supported (30%) or strongly supported (17%) natural gas extraction in the Marcellus Shale region.
- 34% neither opposed nor supported the drilling.
- 19% were opposed (12%) or strongly opposed (7%) to natural gas extraction in the region.



^a Numbers of cases vary from the total due to non-response to the items

Perceived Risks and Benefits

To arrive at a more detailed understanding of how residents felt about the developing gas industry, respondents were asked whether they agreed, were neutral, or disagreed with a series of statements concerning potential risks and benefits (Table 2).

The majority (56%) of those who answered the question agreed that “Extraction of domestic natural gas resources such as the Marcellus Shale should be encouraged to decrease our reliance on imported energy resources;” only 9% disagreed, with the remainder undecided. Moreover, 6 in 10 (60%) agreed that the negative impacts of gas extraction can be prevented if it proceeds carefully, 12% disagreed and 28% were undecided.

Although nearly half (48%) expressed the opinion that only a few people would receive any benefits from natural gas development, respondents were more likely to agree than to disagree that, all in all, benefits to the region would outweigh the costs (33% vs. 21%); that the industry would provide jobs that would help keep children in the area (34% vs. 24%); and that development of the industry made them optimistic about the future of the region (33% vs. 19%).

A slightly higher percentage (35%) disagreed than agreed (28%) that they worry about a catastrophic accident. Slightly more disagreed than agreed that any negative impacts can be fixed (35% vs. 23%). The percentages agreeing and disagreeing were similar for two items – “We know enough about impacts to move forward” (29% agree, 27% disagree), and “Gas development will create long lasting environmental problems” (27% vs. 25% disagree). However, except for the first three items, the most frequent response was “neutral,” suggesting the majority of residents did not have either strong positive or negative perceptions of gas drilling in the region.

Table 2. How do you feel about each of the following? (N=1461)^a

Item	Agree	Neutral	Disagree
	%		
Extraction of natural gas should be encouraged to decrease reliance on imported energy.	56.4	34.2	9.3
Negative impacts can be prevented.	60.3	28.1	11.6
Only a few people will benefit.	47.7	31.4	20.9
Benefits outweigh costs.	32.8	45.9	21.3
Industry will provide employment/keep children in area.	33.6	42.9	23.5
Development makes me optimistic about the future of our communities.	32.9	48.5	18.6
Know enough about impacts to move forward.	28.8	44.1	27.1
Worry about catastrophic accident.	28.2	36.8	35.1
Any negative impacts can be fixed.	22.8	42.6	34.6
Will create long lasting environmental problems.	26.8	48.5	24.7

^aNumbers of cases vary from the total due to non-response to the items.

Conclusions/Discussion

With natural gas development in the Marcellus Shale, communities throughout the region will increasingly experience rapid growth, environmental impacts, and social change. At the time of the survey many residents reported they had little knowledge of the potential impacts of gas drilling, did not expect changes in their overall quality of life, were uncertain about what sources of information to trust, and had not formed opinions about the nature of possible risks and benefits. Among those who did have opinions, more than two times as many expressed support for developing the gas industry as opposed it. However, a third reported they were neutral or had no opinion about whether they supported or opposed gas drilling. To the extent that parties at both ends of the spectrum seek to convert the large number of “undecideds” to their points of view, polarization and conflict within communities can occur. Access to objective information, delivered by trusted sources is needed to inform residents of issues and address misperceptions. Information about the effects of Marcellus Shale natural gas development on communities experiencing these impacts needs to be shared with those where drilling activity has not yet occurred. Understanding residents’ knowledge and concerns is needed for community response and action to focus on the most salient issues. Moreover, publicizing research findings about resident views such as those found in the current study can encourage public discussion of the issues surrounding natural gas extraction, foster information-seeking, and encourage citizen engagement in their communities and in the democratic process. Through these approaches it may be possible to mitigate some problems, provide early remediation for others, build community capacity to take advantage of opportunities and address new and emerging concerns.

Additional Information

The larger study on which the current report was based can be accessed at:

<http://www.institutepa.org/PDF/Marcellus/MarcellusShaleStudy08312010.pdf>

For additional information on issues concerning development of the Marcellus Shale natural gas industry in New York and Pennsylvania, see the following:

<http://extension.psu.edu/naturalgas>

<http://www.institutepa.org/MarcellusShale.html>

http://www.dep.state.pa.us/dep/deputate/minres/oilgas/new_forms/marcellus/marcellus.htm

<http://cce.cornell.edu/EnergyClimateChange/NaturalGasDev/Pages/default.aspx>