

YOUTH PERSPECTIVES ON MARCELLUS SHALE GAS DEVELOPMENT: COMMUNITY CHANGE AND FUTURE PROSPECTS

The Marcellus Impacts Project Report #4



Executive Summary

This research examined the perspectives of youth in Pennsylvania communities that have experienced active Marcellus Shale natural gas development. The data were gathered during focus group discussions with educators and youth in 2013 in the northern tier Pennsylvania counties of Bradford and Lycoming, and the southwest counties of Washington and Green. These focus groups were conducted as part of a larger, multi-sector case study assessment of Marcellus Shale development impacts. The focus groups discussed Marcellus-related community change, workforce development, youth career, educational and residential aspirations, and the ways in which schools were perceived to be affected by and/or responding to Marcellus-related community change. In this research, the focus was on several particular topical areas, including youth perceptions of community change, curricular offerings and workforce development in response to Marcellus Shale development, and youth aspirations for future residence, educational attainment and career paths, and how these aspirations may or may not be shaped by the changes youth see around them that they associate with gas industry development.

The main themes that emerged from these focus groups are as follows:

- The gas industry, in many places, has affected what youth see as the unique, close-knit rural character of their home communities.
- Traffic has dramatically increased and so have concerns about road conditions and driving safety. Unprompted, students in all discussions spoke at length about these issues.
- Youth spoke about what they interpreted as fragmentation of land, and destruction of natural areas, with direct impacts on wildlife and their ability to enjoy the local natural amenities.
- Youth expressed uncertainty about the investment that the gas industry had in local areas. While noting examples of local philanthropy by gas companies, far more often, students talked about the industry presence and characterized industry workers as transient and lacking commitment to the affected localities.
- Relatedly, youth also expressed uncertainty about the longevity of the gas industry and economic impacts. While not using this language, their discussion often made reference to the likelihood of a post-boom “bust”.
- Students expressed relatively moderate to low interest in obtaining gas industry work after leaving high school. Even though many of the students had friends or family members working in the industry and acknowledged the near unprecedented earnings for someone just coming out of high school, there were concerns regarding work longevity, stability, and injury. Concerns

related to shift-hours, travel, and possible relocation were noted as being particularly incompatible with a family friendly work environment.

- Youth reported that industry recruitment efforts contained messages discouraging post-secondary educational attainment, and, that given the potential wages, college was seen by many as a “waste” of time, money and opportunity.

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The Center for Rural Pennsylvania is a bipartisan, bicameral legislative agency that serves as a resource for rural policy within the Pennsylvania General Assembly. It was created in 1987 under Act 16, the Rural Revitalization Act, to promote and sustain the vitality of Pennsylvania’s rural and small communities.

Information contained in this report does not necessarily reflect the views of individual board members or the Center for Rural Pennsylvania. For more information, contact the Center for Rural Pennsylvania, 625 Forster St., Room 902, Harrisburg, PA 17120, telephone (717) 787-9555, email: info@rural.palegislature.us, www.rural.palegislature.us.

About This Project:

The Marcellus Shale Impacts Project chronicles the effects of shale-based energy development in Pennsylvania by focusing on the experiences of four counties with significant extraction and production activity – Bradford, Lycoming, Greene, and Washington counties. The project examines social and economic changes in these counties within the context of regional and statewide trends. A series of nine reports describes the research results as follows: (1) population, (2) health, (3) education, (4) youth, (5) housing, (6) crime, (7) local government, (8) local economy, and (9) agriculture.

Study Counties

Bradford, Lycoming, Greene, and Washington counties are studied in this project. They have experienced some of the highest levels of Marcellus Shale development in Pennsylvania, yet they have diverse populations, histories, economic bases, and geographic locations. These differences allow comparisons that facilitate understanding of the potential effects of Marcellus Shale development across the commonwealth and by region. The regional comparisons are defined based on adjacency to the four study counties. The northern tier contains 12 counties: Bradford, Lycoming, and the 10 neighboring counties of Clinton, Columbia, Montour, Northumberland, Potter, Sullivan, Susquehanna, Tioga, Union, and Wyoming. The southwest region consists of six counties: Greene, Washington, and the four neighboring counties of Allegheny, Beaver, Fayette, and Westmoreland.

All four study counties are classified as rural by the Center for Rural Pennsylvania with population densities of less than 284 people per square mile.

Table 1 offers an overview of selected characteristics from 2000 for the four study counties as well as counties in the surrounding region and the state. These data provide important context for understanding differences between the counties and regions prior to Marcellus Shale development. As Table 1 shows how the counties and regions differ across indicators. In the northern tier, Lycoming's population was nearly twice that of Bradford's, and Lycoming County had a slightly higher unemployment rate than Bradford County. The percentage employed in mining was very small in 2000 in both northern tier counties, although a larger percentage of people were employed in the industry in Bradford (0.6 percent) than in Lycoming (just 0.1 percent). The two counties had comparable median household incomes.

In the southwest, the differences between Greene and Washington are more pronounced. Greene had the smallest population of the four counties (40,672) and 6.7 percent of employed individuals in the county were working in mining. The unemployment rate (9.2 percent) was more than 3 points above the state's average (5.7 percent), and the median household income (\$41,972) was well below average for the region (\$52,004) and the state (\$55,460). In contrast, the median household income in Washington County was just over \$10,000 higher than in Greene. Only 1.3 percent of the employed work in mining and the unemployment rate was notably lower (5.3 percent).

The two counties of the southwest had more diversified economies than counties of the northern tier. In Bradford and Lycoming, the same three industries (Manufacturing, Health Care and Social Assistance, and Retail Trade) employed around half the population (52.4 percent and 47.4 percent, respectively (Census 2000). In contrast, just over one-third of the working population in Greene County worked in the same three industries (Health Care and Social Assistance, Retail Trade, and Educational Services).

Washington's top three industries (Manufacturing, Health Care and Social Assistance, Retail Trade, and Manufacturing) employed 41.7 percent of the working population.

Table 1. Pre-Marcellus characteristics of study counties in 2000

	Population	People per square mile	% employed in Mining	% Unemployed	Median Household Income (adjusted for inflation to 2012 values)
Northern Tier*	47,968	83	0.6%	6.0%	\$47,071
Bradford	62,761	55	0.6%	5.5%	\$48,451
Lycoming	120,044	97	0.1%	6.3%	\$47,038
Southwest*	370,881	505	1.8%	6.6%	\$47,901
Greene	40,672	71	6.7%	9.2%	\$41,972
Washington	202,897	237	1.3%	5.3%	\$52,004
Pennsylvania	12,281,054	274	0.3%	5.7%	\$55,460

The northern tier region contains 12 counties: Bradford, Lycoming, and the 10 neighboring counties of Clinton, Columbia, Montour, Northumberland, Potter, Sullivan, Susquehanna, Tioga, Union, and Wyoming. The southwest region consists of six counties: Greene, Washington, and the four neighboring counties of Allegheny, Beaver, Fayette, and Westmoreland. Source: Social Explorer Tables (SE), Census 2000, U.S. Census Bureau and Social Explorer. * County average, includes study counties.

Marcellus Shale Activity

Table 2 shows the number of unconventional wells drilled in the Marcellus Shale each year in the six Pennsylvania counties with the highest total number of wells drilled between 2005 and mid-year 2013 (Pennsylvania Department of Environmental Protection).

Table 2. Six counties with the most wells drilled and wells drilled each year, 2005-2013*

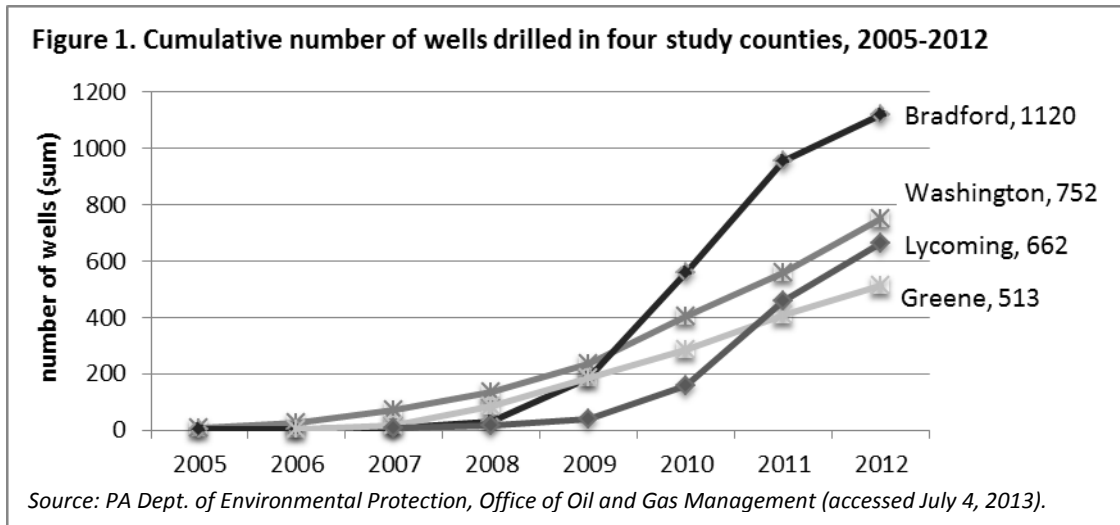
county name	2005	2006	2007	2008	2009	2010	2011	2012	2013* mid-year	Total, by county
Bradford⁺	1	2	2	24	158	373	396	164	66	1186
Washington⁺	5	19	45	66	101	166	155	195	120	872
Tioga	0	1	0	15	124	273	272	122	13	820
Lycoming⁺	0	0	5	12	23	119	301	202	89	751
Susquehanna	0	1	2	33	88	125	205	191	102	747
Greene⁺	0	2	14	67	101	103	121	105	54	567
Total wells drilled in top six counties:										4943

Source: Pennsylvania Department of Environmental Protection, Office of Oil and Gas Management. *Data through June 30, 2013 (accessed July 4, 2013); ⁺Study counties.

The four study counties have experienced significant Marcellus Shale well drilling and account for half (3,376) of the 6,833 unconventional wells drilled in the commonwealth. The two counties located in the southwest, Washington and Greene, experienced more well development through 2008 than the other counties. Bradford County experienced significant growth starting in 2009. Despite the late start,

Bradford County quickly surpassed all other Pennsylvania counties with nearly 400 new wells drilled in 2011, for a total of 1,186 by June 30, 2013. Lycoming similarly experienced more new drilling activity in 2011 than occurred in the southwest and had the highest number of new wells drilled in 2012.

Figure 1 shows the cumulative number of wells drilled from 2005 to 2012 in each of the study counties. Although some wells may no longer be in production by 2012, and some have not yet been put into production, the lines reveal overall trends in the counties and across regions. The northern tier counties (Bradford and Lycoming) had steeper increases in the past 3 years, whereas those in the southwest (Washington and Greene) had more gradual but steady increases in the number of wells drilled.

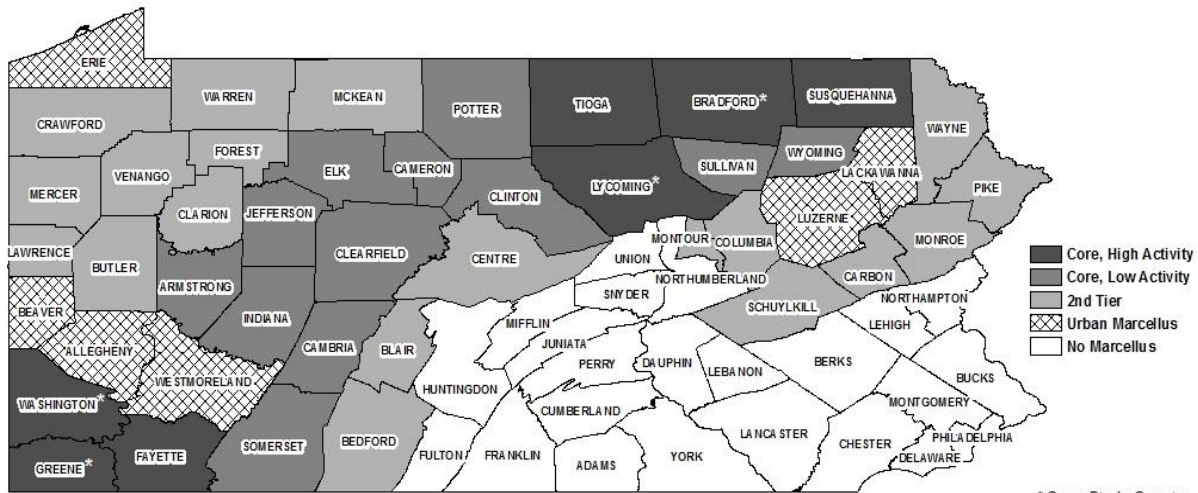


In 2012, the pace of new drilling slowed in Bradford and Lycoming, likely due to the declining price of natural gas. In contrast, drilling in Greene and Washington counties in 2012 was on par with the previous year. This may be because gas in southwestern Pennsylvania tends to be “wet” gas, meaning it contains more marketable compounds (liquid natural gases such as butane and propane) that can generate higher revenues than “dry” natural gas (i.e. methane) alone. Even so, mid-year figures suggest that new drilling activity across all four counties in 2013 may be comparable to 2012. A table listing well counts for all counties in Pennsylvania is in Appendix A.

Classifying Counties by Marcellus Shale Activity

To further understand the effects of Marcellus Shale activity, the analyses compared counties based on their level of Marcellus Shale activity using a five-category county typology. The typology was created by combining several definitions based on estimated shale value and actual development activity, including publicly available maps of the thickness, depth, and thermal maturity of the shale (McLaughlin et al., 2012). This typology also differentiates urban counties because the population and economic dynamics in these counties are fundamentally different from that of rural counties.

Figure 2. Marcellus Shale Typology



* Case Study County
Typology based on the number of unconventional wells drilled through September 2012

In Pennsylvania, the number of wells is highly concentrated in a small number of counties. There are 7 counties (including the four study counties) that account for 90 percent of the total number of wells drilled through June 30, 2013. These 7 counties are classified as “core” counties with high drilling activity, and are shaded with the darkest gray in Figure 2. The other four typology categories are: “core” counties with low drilling activity, 2nd tier counties (with lower quality shale and limited drilling activity), urban counties with potential or some Marcellus Shale development, and those counties with no Marcellus Shale. For a full description of the typology, see Appendix B.

Data and Methods

In each of the four study counties, the researchers used end of 2012 well count data from the Pennsylvania Department of Environmental Protection to calculate the number of Marcellus Shale gas wells drilled within each school district. The researchers then identified the the three districts with the most drilling within each county, and then randomly selected one district per county for fieldwork.

In these districts, focus groups were conducted with district educators and with youth. The educators included superintendents, principals, teachers and district employees, such as business managers, bus drivers and guidance counselors, who could provide valuable perspectives on Marcellus-related community change and impacts on schools. Administrators at each of the four districts were asked to identify a group of between six and eight 11th graders, with an even gender mix, representing more or less demographically “typical” students within the district. These student focus groups cannot be considered to include students “statistically representative” of 11th graders in the district as they were not considered a random sample. However, the youth focus groups are notable for the consistency across districts in the views and experiences the students expressed. In all but one focus group, no school administrators were present. In the focus group in which administrators were present, the students were notably more positive in their assessments of Marcellus community impacts. It is impossible to know whether the attitudes and opinions expressed in this case were influenced by the way the district administrators chose student participants and/or their presence at the focus groups.

While in most school districts one educator focus group and one youth focus group were held, one of the districts arranged two youth focus groups, and another district arranged two educator focus groups.

This resulted in a total of five youth focus groups and five educator focus groups across the four-county study area. These were supplemented by two additional focus groups conducted with groups of school district superintendents at two separate Intermediate Unit meetings. Intermediate Units are comprised of multiple school districts, formed for the purpose of coordinating shared educational services. Intermediate Unit 1, in the southwest, covers Washington, Green and Fayette counties, while Intermediate Unit 17 covers Tioga, Bradford, Lycoming and Sullivan counties. One focus group was also held at the southwestern Career and Technical Center with vocational educators. In total, 13 focus groups were conducted with 36 youth across four counties and 47 educators and administrators across seven counties.

The research used the information from the focus groups as well as some quantitative data from the Pennsylvania Department of Education, and the federal Department of Education's National Center for Education Statistics (NCES). However, the focus was principally on the perspectives gathered through the youth focus groups. It should be noted that the focus group information has limitations as it is not representative. The youth focus groups, in particular, represent the views of young people within four school districts, purposefully selected by school administrators in response to the request to recruit young people who were more or less representative of the larger student body within their schools. At the same time, many of the themes that were discussed were consistent across these communities and focus groups, despite the geographic differences across study sites.

All of the youth participants provided candid opinions regarding both the benefits and the problems associated with the development of the Marcellus Shale in their communities. In only one focus group – the discussion held in a Washington County school district – were students unanimous in their opinion that the shale gas industry had represented a clearly positive development for their community. In the other school districts, opinions were very mixed and often mostly negative. While youth welcomed new economic opportunities and growth, they also expressed concern about road and public safety issues, environmental damage, and changes in the atmosphere of their community. Additionally many expressed uncertainty about the Marcellus Shale industry, its longevity, and the capacity of the industry to provide safe, local and stable employment. In the sections that follow, youth perceptions of Marcellus-related community change are discussed, along with how this change may or may not have impacted their school experiences. Finally youth aspirations for the future in light of local industry-related change are also examined.

Youth Perspectives on Natural Gas Development and Community Change

All four districts in which youth were interviewed are considered rural and/or small town residential area, even though the district in Washington County is less than an hour's drive from Pittsburgh and the Lycoming County district is in relatively proximity to Williamsport. Across all districts youth tended to describe their communities in similar ways, using descriptors like "small town," "rural," "everybody knows everybody," "close-knit," and "quiet." Also across all districts youth frequently mentioned the qualities of small town and rural lifestyles and their attachment to the local community. One girl said "from living in the city whenever I was younger to moving out here, it's a lot different. There are a lot more things you can get used to out here, peaceful, quiet, it's real nice."

All four groups, however, were able to describe marked changes that had occurred in their communities over the last 4 years or so, changes that they attributed to Marcellus Shale development. For many young people, however, the peaceful qualities of the communities in which they live have been disrupted, at least to some extent, by Marcellus Shale development. Interestingly, a recurring theme across the sites was the concern that the changes were affecting the rural character of the locality in a process of what students described as "urbanization," connected to the erosion of the local rural

character. In Greene County, a student said, “The place now looks like you’re in the middle of the city. There’s so many people. There’s so much going on.” Another Greene County student later described what he saw as the disappearing rural character of the local area, and said “On our neighbor’s hill, we went up and you look out and you could see six drilling things, just looking around and it’s crazy. It’s like a city at night. All of it lights up.” And in Lycoming County, a student said “It’s turnin’ the whole area pretty much into a city.” The increased activity was often in the form of increased heavy truck traffic and new arrivals to the area in the form of gas industry employees and occasionally extended families and children.

Increased Traffic and Concerns about Road Safety

One of the most visible changes the youth spoke about was in traffic, road conditions and their perceptions of road safety. This included multiple mentions of vehicular accidents involving or associated with gas industry traffic, roads damaged by heavy truck traffic (or delays caused by road repair), and traffic slowdowns. Several students talked about the extra challenges this caused as they were becoming newly licensed drivers. A student in Bradford County told us, “It’s scary for us because we just got our licenses. I’ve had mine for a while, but most of us just got our licenses. Before, it was just like, “Oh, just drive safe.” Now, it’s watch out for people cuz they drive crazy.” Similarly, in Washington one youth recounted, “it’s just so many different people around here just speeding down all these roads. I’ve seen a lot of accidents with these pipeliners. A real close friend of mine was in a—rolled his truck over because there’s a line of pipeliners on the wrong side of the road just getting around these bends real fast. I mean, it boosted the traffic up a lot. There’s been a lot of accidents.” Some of the students attributed some of the blame to carelessness on the part of gas industry traffic. In Lycoming County a student said, “They think they own the road. They don’t pay attention to any other drivers,” and in Greene County another said, “they come up here with different companies and they just do whatever they want, drive as fast as they want, however they want, wherever they want. They have no respect for the road or any of us out here.”

In Bradford County, a student talked about his experiences volunteering as an emergency responder and the uncertainties that road conditions caused regarding delays in response times.

“I usually have a five to eight minute response time at the station, but due to the traffic, they can have the road closed. That can increase my time from 8 to 15 minutes before I can get to the ambulance, and that time is taken away from response time for the patient, so we can’t get there as quickly. If the road is blocked, I’ll have to call in and say, ‘Hey, I can’t get through here. I need someone else to fill for me,’ so that takes more time. It’s really impacted response times for me especially.”

Uniformly across all groups the increase in traffic and road safety concerns emerged as one of the foremost ways of describing the most noticeable community changes.

Lights, Noise and Environmental Concerns

One of the most contentious areas of debate about Marcellus Shale gas development in Pennsylvania has been the concern around environmental impacts and especially problems with water contamination. The students in these focus groups, without specific prompting, raised these issues, but mostly in terms of land use and the ways in which land had been “fragmented” by drilling pads and pipeline construction. This, they felt, was having an adverse effect on wildlife (in addition to multiple mentions of increased incidence of wildlife roadkill) and reduced their own ability to enjoy the natural amenities of the surrounding area. In Greene County a student said:

“Any time the weather’s nice, I’m outside, walking around or on a four-wheeler. Even lately, I love being in the woods, and it’s almost like ever since the industry came into the county, there’s just less woods around. The land is just pretty much gettin’ tore up. So to speak, they put it back, but it’s just there’s almost not the same feeling in the county as what there was 5, 6 years back.”

In Lycoming County, the following exchange was recorded:

Student 1: There’s no wildlife cuz they’re taking it away from—yeah.

Student 2: Drilling everywhere and noise.

Student 3: They’re puttin’ up animal fences, and—

Student 1: It’s like they’re way different than what it was a few years ago.

Student 3: They’re fencing us off in a way.

Moderator: Fencing you off how?

Student 3: They’re splitting every little area up. It’s not the same.

In both of these examples, students talk about not only the changes they see in the nearby landscape, but also how those changes have affected the very nature of the areas in which they have grown up due to what they interpreted as the destruction of wildlife habitat, reduced access to forest lands, and changes in the appearance of natural areas. As a student from Lycoming County told us, “There’s nothing to do in this town anymore cuz they took away our mountains.”

While students often spoke about the landscape changes they had seen, they spoke less frequently about specific instances of environmental damage that they attributed directly to Marcellus Shale industry activities. In one instance though, a female student talked about babysitting for a local family whose house had, the student claimed, been affected by methane migration into the well water as well as other contaminants. She said“(when) I first started babysitting for them, I had to learn, they had one of those gas lights that goes off if the levels get too high. They had to teach me if this goes off, we have an emergency bag, and where all their stuff was to get out cuz the house could...”

Moderator: This is when you were babysitting?

Student 1: Mm-hmm. It was a little scary. I was nervous, but, I mean, it never happened. We weren’t allowed to use their water in their house. They had one of those filter—

Student 2: Tank?

Student 1: tanks, and the people had to come every so often and change their water. We weren’t allowed to, only for washing dishes and stuff. When I was trying to give the little girl a bath, she would get burn marks on her arm sometimes from the water. It was just scary.

More frequently students described the effects of noise and light pollution. This included lights from well pads, the noise from truck traffic and compressor stations, and occasionally the noise made by gas workers in towns working third shifts. In Bradford County, a student said “My uncle’s on the borough council, and he said they’ve been getting a lot of complaints cuz they get up so early and they rev their engines and stuff and it wakes people up, especially the old folks.” Similarly in Greene County a student related, “I used to live in a quiet, like you couldn’t hear anything, and now all you hear is the beeping from the trucks. It was like I had a little town right over my house because it’s just always lit up. It’s loud,

and if I have to leave anywhere, I have to leave a few minutes earlier because I know that the trucks will be moving a lot.” Another from the same district explained, “it’s just all these wells are so close together that anywhere that you live or anywhere that you’re at, you can hear one. The closer you get, the louder it is. So maybe people don’t like the constant roar.”

Newcomers to Shale Gas Communities

Students often described their rural communities as places where “everybody knows everybody.” This sense contributes to the close-knit nature of these communities and others like them. It also, however, makes the arrival of new faces all the more noticeable, and the strong sense of “belonging” within a small rural community can also create an equally strong sense of who falls outside of the social boundaries of community. Students described their unease at suddenly not knowing many of the faces they saw in their towns. In Bradford County, a student said, “When I was younger there was, you know, I knew everybody who was my neighbor. Now, I don’t know half the people who live on my street cuz they’re all either gas well people or I just haven’t met them because I’m getting older” and in Lycoming County another student said, “There’s no more actual families. This used to be a town that everybody would raise their kids in, and everybody would be friends with friends, quiet. You could let your kids go out and play and not lock your doors. The past few years, you’ve had to lock your doors. There’s been break-ins and stuff.”

Gas workers and to a lesser extent their families, coming from places like Texas and Oklahoma, were often described as outsiders. While several students said that the gas workers they met were friendly and “nice,” youth more frequently tended to regard newcomers with ambivalence and as people who had no attachment to the local community and its residents. In Lycoming County, the following exchange was recorded:

- Student 1:* They don’t care about the inner people that actually live here and whatnot, so it’s like—
- Student 2:* Just cuz they have a job here, and they move with their job, but when they’re here, it’s like there is—
- Student 3:* I think it—
- Student 1:* They treat it like it’s trash, like it’s not theirs so they can just do whatever to it.
- Student 3:* I think it divides up a lot of people cuz a lot of people have TAFT tee shirts and stickers for their cars and stuff like that against the gas line.
- Moderator:* What does that mean?
- Student 3:* “This ain’t freakin’ Texas.” *[Laughter]* A lot of people get that on their vehicles now. There’s some of ‘em in the parking lot.

While no student related any personal experiences or experiences of others they knew with unsafe interactions with out-of-state gas workers, they often described low-level anxiety about who their neighbors were. This anxiety was more often expressed by girls, like the female student from Bradford County who said:

“Well, they live down the street from me, and I work at the hotel, which is really close. It’s a restaurant in town, and they have a bar connected. A lot of them—I’ll walk home from work at night, and they’ll be coming home from the bar and they’re walking

around tipsy. I mean, it's just a little scary. They ruin the yards cuz I know there's an apartment building at the bottom of my house, or my street, that two old ladies used to own but they passed away. Nobody was there, so their apartment was auctioned off, so these gas guys all came and that house got auctioned to—there's six or seven of them living in a two apartment house. They've got trucks everywhere and it's muddy.”

In several of the school districts, notably in Bradford and Greene counties, students also talked about the housing shortages created by the influx of new workers, and also the increases in rental prices. “With all the people coming in from Texas,” one student told us, “it runs up the housing, real estate, and all the renters. Most of ‘em rent, but you know what I mean, it just runs up rent. People who do rent their homes can get a lot more, so people who are from here can’t afford, to compare it with the people from Texas, to even have a place to live.”

There has been little evidence from statewide data to suggest that there have been marked changes in student populations in most districts within high drilling activity areas (see Topic Report #3 on Education). In most districts where drilling has occurred, enrollments have continued to decline as they were before Marcellus Shale natural gas development began. This may be because many of the out-of-state workers who came to work in the gas fields either came as single men or left families elsewhere. Yet, in several of the focus groups students talked about new faces in their schools. A student from a school district in Bradford County said, “When we were in elementary school, having a new student was like ‘holy cow!’ and everybody wanted to be friends with them, and a week later you knew their whole life story. Now I don’t even know half the kids in my grade anymore.” Students also noted the transient nature of peers from out-of-state gas worker families. In Washington County, focus group participants spoke about a number of students who had entered the district from places like Texas over the last few years, noting that about half of those students had since left the district. In Bradford County, a female student said, “Yeah, I’m used to being really eager cuz I like meeting new people, so I used to be really eager and be like, ‘Hi, I’m Janet and stuff,’ but now I don’t do it so much cuz I don’t really think they’re gonna be there that long.” In Lycoming County, the following exchange with a female student occurred:

Student: I made a really good friend last year, year before. Last year. She went to our school, and her mom was in charge of one of the wells. She had to move down here with her mom from Texas. Other than that, I haven’t had anything good come from the gas line.

Moderator: Is she still around?

Student: No. She moved back to Texas after mom—the pad they were working on got dropped, so they moved back to Texas.

This is consistent with what educators also related. They tended to describe initial expectations regarding spikes in enrollments as new students entered the districts along with gas worker families. Instead, what most districts experienced was generally fewer new students enrolling, but increased levels of student transiency. This also is largely borne out by state-level data. Table 3 shows total enrollments in the four case study districts as well as their surrounding counties for the academic years 2005-06 and 2010-11. During this time period, statewide enrollments dropped by slightly more than 2 percent. Over the time period covering the initial expansion of the Marcellus Shale industry, none of the four case study counties experienced enrollment increases, and three of the four experienced declines exceeding the state average. The declines in those counties exceeded the state average, including Greene County, with a nearly 8 percent decline. In both regions, only Beaver County experienced net enrollment gains.

Table 3. Total School District Enrollment with Net Change, 2005-06 and 2010-11 for Selected Counties

	Number of Students		Change from 05/06 to 10/11	
	2005-06	2010-11	Net Change	Percent Change
Pennsylvania	1,830,684	1,793,284	-37,400	-2.04%
Southwest Region				
Greene	5,855	5,387	-468	-7.99%
Washington	30,105	29,576	-529	-1.76%
Adjacent Counties				
Allegheny	163,943	149,281	-14,662	-8.94%
Beaver	29,907	33,698	3,791	12.68%
Fayette	19,757	18,348	-1,409	-7.13%
Westmoreland	54,322	51,722	-2,600	-4.79%
Northern Tier Region				
Bradford	10,736	9,904	-832	-7.75%
Lycoming	17,497	16,834	-663	-3.79%
Adjacent Counties				
Clinton	4,864	4,655	-209	-4.30%
Columbia	10,841	7,268	-3,573	-32.96%
Montour	2,607	2,537	-70	-2.69%
Northumberland	13,010	12,546	-464	-3.57%
Potter	2,809	2,573	-236	-8.40%
Sullivan	777	630	-147	-18.92%
Susquehanna	7,955	7,023	-932	-11.72%
Tioga	6,232	5,671	-561	-9.00%
Union	4,184	4,061	-123	-2.94%
Wyoming	4,415	3,991	-424	-9.60%

Source: Pennsylvania Department of Education

Net enrollment change, however, can hide the overall volume of student enrollments and withdrawals. An educator from Bradford County explained:

“Five or 6 years ago when this began, as a teacher we were hearing rumors or predictions that maybe our enrollment would explode as far as number of people moving in. That's never happened. I think there's a lot of revolving door that's kinda going, so we got a lot of kids in, and then they've moved out. There have been kids that have moved into the district, but I don't think we ever saw an explosion like maybe we were expecting.”

In a focus group with northern Pennsylvania superintendents held at an intermediate unit meeting, questions were asked specifically about how expectations of gas-industry-related school and community change matched what schools actually experienced. Speaking specifically about enrollment change, another administrator said:

“Yeah, but (enrollments were) already declining. It was already declining. The rate of decline was greater than the rate of these new kids coming. People didn't think that that was going to happen. They thought that all these kids were going to come and it was going to overpass the rate of decline. It was already declining before the industry came here.”

Youth Perspectives on the Local Economic Impacts of Marcellus Shale Gas Development

In only one district in Washington County, youth seemed united in their general opinion that Marcellus Shale gas development represented a net positive change for the community. These youth primarily spoke about the positive economic benefits they had seen for their families and others in the community. “The pipeline is what paid for my dad’s new truck,” one student told us. “It was definitely needed. It really helped us out in that aspect. We actually have the ability to go out and do stuff that we couldn’t do before.” “There’s gonna be a lot more money,” another student said. “It’s gonna be a – I don’t wanna say richer area, but it’s not gonna be as bad as it was.” These students spoke about the benefits they had seen for many of the local small businesses. In this respect, there were similarities across all districts, as students in all focus groups had, to one extent or another, described some aspects of local economic expansion and/or segments of the local population, principally landowners, experiencing marked economic benefits. In Bradford County students described the impacts on small businesses and hotel development.

With the exception of the student group from Washington County, in all other focus groups some students expressed concerns about the creation of new “haves and have-nots” and also uncertainty about the longevity of the economic activity associated with the Marcellus Shale industry. Some of the youth spoke about farmers within their community, and sometimes family members or family friends who had been able to financially save their farming operations with the assistance of windfall revenues from gas leasing income. However, others spoke about how those without the possibility of leasing land were largely left with the drawbacks of local gas development (such as increased rental prices and decreased housing availability), without any of the benefits. Students also expressed uncertainty regarding the longevity of industry-associated employment and the economic ripple effects of gas development activity. Bradford County has already experienced several fluctuations in drilling activity as the Marcellus Shale industry in 2012 increasingly focused efforts in the southwest part of the state to drill for “wet gas.” When asked what they projected for their community’s future one student said, he didn’t know what the future might hold. “It could be booming or it could be a ghost town.” This statement reflected the uncertainty present in the other focus groups.

Natural Gas Development and Youth Aspirations for the Future

Many areas in which Marcellus Shale natural gas development has occurred with the greatest intensity are places like the rural communities of the northern tier that have long endured stagnant economies and limited opportunities for youth. In the past, there truly were very limited opportunities for young people who wished to stay in the area and secure family-supporting jobs. In other places of relatively intense Marcellus Shale development, such as the southwest region, economies and labor markets are somewhat more diversified because of the proximity to the Pittsburgh metropolitan area. The development of the gas industry is seen more as an addition to the already diverse portfolio of industries and employment opportunities. Regardless, the research team was interested in how the development of the gas industry might have influenced the future educational, career, and residential plans of youth within areas with significant Marcellus Shale gas development. They asked questions about the career aspirations the youth in the focus groups, and what these youth heard from their peers.

One question the research team asked was whether the Marcellus Shale industry and the proliferation of new – and often lucrative – economic opportunities might encourage postsecondary enrollment, particularly within STEM fields such as geology and engineering, or whether it might discourage college enrollment given the costs of paying for post-secondary education while simultaneously foregoing current labor market opportunities. The students, for the most part, talked about a variety of plans for

life after graduation, including military service, entering the local workforce, getting post-secondary vocational credentials or going to college. Surprisingly, relatively few students expressed the intention to take advantage of employment directly associated with the Marcellus Shale industry (and of those, only males), although several saw their career paths, such as in health care, as influenced by new consumer and service demands associated with the changing labor market and demographic conditions. While several students described knowing or hearing about women working within shale gas industry jobs, these jobs were mainly associated with office work.

The students in all four districts spoke at length, however, about how employment opportunities in the industry had shaped the future plans of friends and family members, especially those who did not consider themselves to be college-bound. In Bradford County, the following exchange was recorded:

Student 1: That's what a lot of people talk about that aren't going to college. They're gonna go work for the gas company.

Student 2: That's what my brother does right now. He graduated 2 years ago. He just bought a new truck cuz he's loaded apparently cuz I guess they make a lot of money.

A similar back and forth was heard in Lycoming County:

Student 1: An 18-year-old kid coming out of high school, saying "here's \$20 an hour, or you can go to college."

Student 2: He's gonna say, "Yeah, gimme the money!" [Laughter]

Student 1: Rather go get the money than sit in class.

In several focus groups students talked about peers they knew who had dropped out of school to obtain employment. State-level data do not suggest spikes in dropout rates associated with local Marcellus Shale industry activity (see Report #3 on Education). However, both students and educators described this happening, such as in Bradford County:

Student 1: We have a lot more kids drop out.

Moderator: Really?

Student 2: Yeah.

Student 1: Oh, yeah. Drop-out rates [*fading voice*].

Moderator: The companies will hire people who drop out?

Student 1: Yeah.

Student 2: For the most part, I think. I think they have to get a GED, but they do that after work.

Moderator: They do that while they're working?

Student 2: Yeah, normally.

And in Washington County a student related, "I know last year we had a lot of graduates go straight to working on the wells because that's where the business, you know, that's where their job openings could be. They didn't have to waste time at school. They just went right in and started making good money for being an 18-year-old that just graduated." In several of the focus groups, students spoke about experiencing direct industrial recruitment, suggesting that the information they received clearly

indicated that a college degree was not a requirement for entering the Marcellus Shale industry workforce. In Lycoming County, a student said:

Student: I went to (a different, nearby school district) the past two years, and Halliburton comes directly to the school every year and recruits the high school graduates as soon as they graduate. They offer ‘em a job right outta high school so they pretty much tell ‘em, “You don’t have to move forward, we’ll give you a job with money and some’n’ to do right out of that. You don’t have to go back to school.”

Moderator: Do you know what kind of jobs those are?

Student: Labor. Labor jobs.

In the same focus group another said:

“Yeah. Down there, they bring in the trucks. They have the people that—one year they had—I think it was like a president or a CEO of this branch down in this area. He came down and he talked to us and showed us a big video of how they drill, and then he told us they replant everything. Then, the next year, they came up with a truck and showed everyone that and said, “You start out, this much money now, right outta high school. You don’t even have to think about it. Show us your diploma, and you have a job.”

Even for students who do consider themselves college-bound, the lure of well-paid positions is tempting, as another student from Bradford County said, “I’ve already had an offer when I turn 18. I can start out making \$3,000 a week from just as an assistant, and you don’t even need a degree for that. I still want to go to college and everything, but I might do that over the summer.” Several spoke of people they knew who planned to work for the gas industry to make money to pay for college, but they also noted that for those who choose that path, it might be difficult to go to college after having been out of school for a few years and in the workforce.

There was relatively little discussion in any of the focus groups about the overall value of a college education with regard to the Marcellus Shale industry. In Washington County, however, one student related that a college degree could be a good investment because “then you can make even more money than what you’d be able to as just a laborer” and jobs requiring post-secondary degrees might hold the possibility of not needing to work as many hours, especially after having a family. That way, “You can actually enjoy life instead of just working away.”

Uncertainties of Gas Industry Employment

A recurring theme across nearly all focus groups was what students saw as the downsides to working in the Marcellus gas industry, despite potentially lucrative employment. First, students expressed uncertainty about the overall longevity of the industry and the associated jobs. Second, of the jobs that appeared to be the most immediately available, students expressed wariness about the safety and overall viability of those jobs, especially given the long hours, working conditions, and possibility that what initially may have seemed like a “local” job may involve frequent relocations and perhaps moving out of state. As a student in Bradford County said, “When the gas moves, they’re gonna have to move with it.” A Greene County student said:

“I’ve noticed that a lot of people want to get into the drilling and things, but if you think about it, once they’re done drilling here, you have to move. You have to go with them. You have to follow them if you’re gonna probably stay with the company and get involved with it. So there are some people that have been like, oh, I’m gonna go to school to be a teacher so I can stay

around here and teach or they're eventually gonna have to move away if they're getting involved with the drilling and the sites and the operations."

From the perspectives of many of the youth, what may have initially appeared as local employment prospects may not provide the guarantee of remaining local after all. In Bradford County, a student talked about working at a local hunting preserve where some gas workers stayed briefly. "I'm close to a couple of the guys," he said. "They go all over the place. They'll be here for a week, and then go down to Louisiana for a month, and they come back up here. They were telling me to stay out of the life because it's terrible because you never know where you're going, and you never know what you're doing." Still other students spoke about accidents on drilling rig worksites, the time spent away from families, and the potential for workplace injury, such as this exchange from Lycoming County:

Student 1: Yeah, my brother worked there, and twice he had something wrong with his eyes from all the chemicals up there. His eyes glued shut and he had to go to the hospital, and he couldn't see anything for a couple of days because of the fumes up on the pads and stuff.

Student 2: It's so loud, they make you wear ear things on the inside and on the outside. My dad's only worked for this company for, like, two months, but you could be talkin' face to face; he can't hear you.

Overall, while students recognized the sometimes significant work opportunities within the industry, even those that may not require the time and financial investments of college, their enthusiasm for these opportunities was clearly mixed. Only a handful expressed direct interest in the possibility of obtaining gas industry jobs.

Conclusions

The development of the Marcellus Shale by the natural gas industry has been heralded as one of the most significant economic boons for Pennsylvania in decades. The governor's office has consistently expressed support for the gas industry and has supported industry-friendly policies to encourage its growth, a primary justification being the economic and job creation benefits for Pennsylvanians for generations to come. What opinions do young people, who represent Pennsylvania's next generation of working adults, have about gas development, the ways in which it has reshaped their communities, and how it may or may not be impacting their thoughts about their futures? Youth perspectives and outcomes are seldom considered in research on natural resource development-related community change. This report therefore offers an important look at how young people – the next generation of working-aged adults – see their futures in relation to the development of Pennsylvania's Marcellus Shale industry.

Young people, such as those who participated in this study, represent the future generation of Pennsylvania residents and its workforce. It is important to better understand the perspectives of young people as they enter adulthood and how youth evaluate local change associated with the gas industry and what that change means to their communities and their future.

While the youth in these focus groups did not constitute a true random sample of Pennsylvania youth in areas experiencing Marcellus Shale development, they nonetheless expressed frank opinions about the changes they had witnessed in their hometowns and what these changes meant to them. It is important to note that what is presented in this report may or may not reflect gas industry hiring practices, workforce conditions, or environmental impacts. Nonetheless, the opinions do represent the way the respondents interpret changes in their communities, and these perspectives are notable for their relative consistency across districts, counties, and indeed regions of the state. If these perspectives are

indeed more or less representative of youth opinions statewide, the implications should be troubling for state policy makers and for the gas industry itself. While only a handful of youth in the focus groups had unequivocally negative opinions of the gas industry, the vast majority of students spoken with had clearly ambivalent feelings about the changes they had seen taking place in their communities, changes that in certain respects have made local areas less attractive as places to live, work and raise a family.

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Appendix A: Unconventional Wells Drilled by County and Year, 2005-2013

county name	2005	2006	2007	2008	2009	2010	2011	2012	2013*	Total, county
Bradford⁺	1	2	2	24	158	373	396	164	66	1186
Washington⁺	5	19	45	66	101	166	155	195	120	872
Tioga	0	1	0	15	124	273	272	122	13	820
Lycoming⁺	0	0	5	12	23	119	301	202	89	751
Susquehanna	0	1	2	33	88	125	205	191	102	747
Greene⁺	0	2	14	67	101	103	121	105	54	567
Westmoreland	1	0	4	33	39	49	59	42	22	249
Fayette	0	2	6	20	57	44	54	43	12	238
Butler	0	3	12	11	10	35	35	69	44	219
Armstrong	0	3	2	7	19	36	35	44	26	172
Clearfield	0	0	1	6	24	39	58	19	2	149
Wyoming	0	0	0	0	2	24	71	15	25	137
Clinton	0	0	0	4	9	35	39	10	1	98
Sullivan	0	0	0	0	0	22	19	27	5	73
Potter	0	0	8	6	8	36	11	1	0	70
Elk	1	1	6	8	6	16	22	1	3	64
McKean	0	2	1	5	7	22	19	5	3	64
Centre	0	0	1	4	7	41	8	2	0	63
Indiana	0	0	0	5	6	7	21	2	0	41
Jefferson	0	0	0	3	3	7	15	9	0	37
Allegheny	0	0	0	1	3	0	5	13	8	30
Lawrence	0	0	0	0	0	0	2	16	8	26
Beaver	0	0	0	0	1	1	5	17	2	26
Somerset	0	0	1	0	7	4	7	5	1	25
Clarion	0	0	3	1	3	3	10	4	0	24
Forest	0	0	0	0	5	1	0	12	4	22
Cameron	0	0	0	3	2	3	7	0	0	15
Mercer	0	0	0	0	0	0	0	5	3	8
Cambria	0	0	0	0	2	1	3	1	0	7
Blair	0	0	0	0	0	4	2	0	0	6
Venango	0	0	0	0	0	0	2	3	0	5
Warren	0	0	2	0	0	0	1	1	1	5
Wayne	0	0	0	1	0	4	0	0	0	5
Columbia	0	0	0	0	0	1	2	0	0	3
Crawford	0	0	0	0	0	0	0	3	0	3
Lackawanna	0	0	0	0	1	0	1	0	0	2
Luzerne	0	0	0	0	0	2	0	0	0	2
Bedford	0	0	0	0	0	1	0	0	0	1
Huntingdon	0	0	0	0	0	1	0	0	0	1
Total, by year	8	36	115	335	816	1598	1963	1348	614	6833

Source: Pennsylvania Department of Environmental Protection, Office of Oil and Gas Management.

*Data through June 30, 2013 (accessed July 4, 2013). *Study counties.

Appendix B. Marcellus Activity County Typology Definitions for Pennsylvania^a

Category	Geological Definition	Activity level	Counties
Core Counties with High Drilling Activity^b (N=7)	More than 50% of the land area is in the core Marcellus formation	Annual average 64 or more Marcellus wells 2005 to 2010	Bradford, Fayette, Greene, Lycoming, Susquehanna, Tioga, Washington
Core Counties with Low Drilling Activity (N=12)	More than 50% of the land area is in the core Marcellus formation	Annual average less than 64 Marcellus wells 2005 to 2010	Armstrong, Cambria, Cameron ^c , Clearfield, Clinton, Elk, Indiana, Jefferson, Potter ^c , Somerset, Sullivan ^c , Wyoming
Counties in the Marcellus 2nd Tier (N=19)	1%-50% land area is in the core <u>and</u> 25% or more land area is in the less viable areas (2 nd tier or gray areas in Figure 2)	Not applicable	Bedford, Blair, Butler, Carbon, Centre, Clarion, Columbia, Crawford, Forest ^c , Lawrence, McKean, Mercer, Monroe, Montour ^c , Pike, Schuylkill, Venango, Warren, Wayne
Urban Counties in the Marcellus Shale-- Core or 2nd Tier (N=6)	Marcellus Core or 2 nd Tier <u>and</u> identified as urban by the Center for Rural Pennsylvania	Not applicable	Allegheny, Beaver, Erie, Lackawanna, Luzerne, Westmoreland
Counties with No Marcellus Shale (N=23)	25% or less viable Marcellus land area or no Marcellus land area	Not applicable	Adams, Berks, Bucks, Chester, Cumberland, Dauphin, Delaware, Franklin, Fulton ^c , Huntingdon, Juniata, Lancaster, Lebanon, Lehigh, Mifflin, Montgomery, Northampton, Northumberland, Perry, Philadelphia, Snyder, Union, York

^aSee McLaughlin, et al. 2012.

^bNote this category includes all four study counties.

^cThese counties are excluded from those analyses that use American Community Survey (ACS) three-year estimates, as their populations are too small to be estimated.

*For more on maps, see the Penn State University Marcellus Center for Outreach and Research (<http://marcellus.psu.edu>) and Dell, Lockshin, and Guber (2008).

Appendix C: Youth Focus Group Protocol

INTERVIEW PROTOCOL FOR YOUTH FOCUS GROUPS

LOCAL-LEVEL CHANGE:

Tell me a little bit about this community. What is it like to grow up here? How would you describe it to someone who's not from here?

When did you first become aware of Marcellus Shale development? How did that happen?

[Core Question]: In what ways, if any, has your community changed since the beginning of Marcellus Shale gas drilling? What about the county in general?

[probe] What do you see as some of the positive benefits? What do you see as some of the concerns or challenges? (ask for examples)

[probe] How has Marcellus Shale development changed things for your family? What about your friends and their families? (ask for examples)

[probe] How are people in your community reacting to local changes connected to Marcellus Shale development? What are their main concerns? (Or say: What are people most worried about?) (ask for examples)

POST-SECONDARY PLANS & ASPIRATIONS:

[Core Question]: As juniors or seniors about to finish high school, are you planning to stay in the area after you graduate? Why/why not?

[probe] What do you see yourselves doing in the next 5 years? The next 10 years?

[Core Question]: Have your future plans changed because of the Marcellus Shale development happening here? Why/why not? Have your friends' plans changed?

[Probe] In areas with lots of Marcellus Shale development a lot of times you hear people say things like "*Anybody who wants to get a job around here can get a job.*" What do you think about that? How true is that around here?

[Probe] Do the same job opportunities exist here for both men and women?

SCHOOL SUPPORT FOR POST-SECONDARY ASPIRATIONS:

[Core Question]: In what ways has your school helped you to think about what you'll do after you finish high school?

[probe] In what ways has your school helped provide the preparation or training to take advantage of job opportunities available locally? What about local opportunities directly connected to the Marcellus Shale industry?

[probe] How could your school better support your future plans? (classes, curriculum, programs, guidance, advising, etc.)

[probe] Have you heard of other schools you think are doing it better? What are they doing?

WRAP UP/LOOKING FORWARD:

What do you think opportunities will be like for students graduating from your high school in 5 years? In 10 years?

Is there anything we *haven't* talked about relating to the Marcellus Shale development in your area that you want to talk about or you think is important to know?

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