The League of Women Voters of Pennsylvania

Marcellus Shale Natural Gas Extraction Study
2012

Study Guide Addenda

Economic Factors

League of Women Voters of Indiana County

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Introduction

Economic factors and new information continue to alter the economic outlook of Marcellus Shale natural gas in Pennsylvania. Currently, natural gas supplies are up, and demand is down. This is the result of a mild winter and low usage by manufacturers and related gas-intensive industries. Although consumers benefit from lower natural gas prices, this is bad news for natural gas producers. Many variables impact the overall economic outlook for natural gas development.

Supply and Demand

As of January 2012, the price of natural gas has fallen to less than $2.50/British thermal units (MMBtu) (US Energy Information Administration 2012, Jan 21). This has had the effect of slowing drilling/production in the near term. Companies, including Chesapeake (Buurma, Klump, Wethe, Klimasinska, Carroll, 2012) and CONSOL (Litvak, 2012), have announced a reduction in gas production this year to slow the price slump. Louis D'Amico, President of Independent Oil and Gas Association (2012), reports that as of 2011, Pennsylvania can meet its own natural gas needs and have enough for export. Such a surplus had not previously been anticipated until 2014. In spite of these short-term concerns, demand is expected to increase through 2050 (Moniz & Jacoby, 2011).

During 2011, drilling in the Marcellus Shale doubled, providing more data and more accurate estimates of the amount of available natural gas in the Marcellus Shale (US Energy Information Administration, 2012, Jan 23). The US Energy Department recently announced a reduction of estimates by 66%, from 410 trillion cubic feet (Tcf) to 141 Tcf (Buurma, 2012; Frazier, 2012, Jan. 28; Urbina, 2012). The US Geological Survey (USGS) estimates were even lower (84 Tcf). Engelder, an early predictor of large reserves in the Marcellus Shale, believes the US Department of Energy's Energy Information Administration (EIA) only considered proven reserves, ignoring potential reserves in undeveloped areas. As a result, the EIA came up with a "worst case or not-so-great case" scenario (Frazier, 2012, Jan. 28). In clarifying these apparently contradictory reports, Penn State's Marcellus Shale Center for Outreach and Research (2012) notes that the "EIA compared its most recent estimate of 141 Tcf of *unproved technically recoverable resources* to its previous estimate of 410 Tcf of *undeveloped technically recoverable resources*…," thus, comparing different terms (apples and oranges, so to speak). Also, the use of different models, assumptions, and factors by various scientists and government agencies accounts for the variety of reported estimations. As more drilling occurs, even more consistent estimations should become available.

Economic Impact

Researchers have been examining the economic impact of natural gas production in Pennsylvania from various angles over time. Thus the amount of economic activity reported has varied widely based on given assumptions and definitions used. The industry-supported Marcellus Shale Coalition report (Considine, Watson & Blumsack, 2010) estimated total

economic activity at $7.17 billion. Kelsey, Ward, Michael & Murphy (2011) on the other hand estimated it at $3.1 billion in 2009. Kelsey, et al's study considered money spent on wages, leasing and royalty payments. They found that a significant portion of the money was either not spent in the year that it was earned, or it did not stay in the community where the land was leased. In counties with Marcellus activity, only about half of the properties are owned by county residents. Of the remainder, one quarter are owned by Pennsylvania residents who live elsewhere, and about 8% are owned by out-of-state residents. Seventeen percent is public land. This implies "that a large portion of the economic benefits immediately leaves the communities being impacted by drilling." When investigating the economic impact of Marcellus Shale activity, specifically in Bradford, Tioga, Susquehanna, Sullivan and Wyoming counties, Kelsey, Shields, Ladlee & Ward (2012), found: workers may live outside the county; businesses are usually based outside the county; and the majority of equipment and materials are purchased outside of the county. The Considine study did not consider these factors and "assumed that all the dollars accrue to Pennsylvania households and are spent like normal income." In addition, the Considine study postulated 44,000 jobs supported by the Marcellus Shale industry in 2009 whereas Kelsey et al indicated about 23,000 jobs. Nonetheless it should be noted that employment is up in counties with significant Marcellus shale activity (Kelsey, Shields, Ladlee & Ward, 2012). Marcellus shale economies are regional economies, not local economies. Therefore specific local governments may be dealing with costs without the full economic benefit.

State Tax Revenues

Another way to obtain financial information is to examine tax revenues. See Table 1. The Department of Revenue reported that 178 of 900 drilling companies paid corporate net income taxes of $98 million in 2010. As of May 2011, 97 companies had paid $199 million (Couloumbis, 2011). In a departure from previous years documentation, the Department's analysis reported the number of filers who paid taxes, but failed to show those that owed no taxes. When asked by the PA Budget and Policy Center, the Department of Revenue indicated that 20% of corporate tax filers paid some amount of corporate income tax in 2010, a number consistent with 2008 (PA Budget and Policy Center, 2011). In other words, 80% of corporate tax filers paid no corporate income tax in 2010. Since 2006, the Department of Revenue reports that large natural gas drilling companies have paid $1.1 billion in taxes. This number includes receipts not only from drillers, but also from companies supplying ancillary services, such as sand providers. This figure thus includes a range of taxes, from corporate taxes and sales taxes the companies paid on goods, to withholding taxes for their employees (Couloumbis, 2011).

Table 1: Total Taxes Paid

Type of Tax	Effective Dates	Amount Paid
Royalties	2011	$46.2 million**
Net Profit (Business)	2010	$98 million *
	As of May 2011	$199 million *
Total Taxes paid (includes corporate, sales, and withholding taxes for employees)	Since 2006-May, 2011)	$1.1 billion *

(*Couloumbis, 2011, **White, 2012)

The Marcellus Shale Information Fact Sheet (Penn State University, College of Agricultural Sciences Cooperative Extension, 2011) used a stepped approach to analyze county tax receipts. This document grouped counties by level of drilling activity, rather than averaging receipts for the whole state. Counties were divided into three categories: those with 150+ new wells; those having 1-149 new wells; and those without any new wells. The analysis covered three types of taxes: sales tax; realty transfer tax; and state income tax. See Table 2 below.

Table 2: Changes in Tax Income*

Tax	**Effective Dates**	**Type of County**	**Type of County**	**Type of County**	**State Average**
		150+ wells	**1—149 wells**	**0 wells**	
Sales	7/1/07-6/30/10	+11.36%	-3.11%	-6.55%	-3.77%
Realty Transfer	7/1/07-(6/30/10	-14.54%	-16.38%	-27.93%	-22.10%
		10+ wells	**1-9 wells**	**0 wells**	
Personal Income	2007-2008	+6.96%	+3.08%	+0.89%	2.04%
Net Profit (Business)	2007-2008	10.8%	7.1%	1.5%	3.7%

*(Penn State University, College of Agricultural Sciences Cooperative Extension, 2011)

An overview of the table reveals the following:

Sales Tax: Counties with 150 or more wells showed an increase of 11.36% in revenue, while all other counties showed a decrease in sales tax receipts. Counties with 1-149 new wells, performed better than counties with no wells and slightly better than the state average. Although this is an imperfect measure of retail sales - since clothing and food sales are not included, the results do show that counties with Marcellus activity experienced an increase in retail sales.

Realty Transfer Tax: Overall, realty tax receipts were down in the Commonwealth between 2007 and 2010 and reflected the weak real estate market across the country. However, counties with more than 150 wells performed the least badly. In these locales, transfer tax dropped by -14.54% as opposed to counties with no wells, which showed nearly twice the decline or a 27.93% drop.

State Personal Income Tax: Data by county were only available during 2007-08, and thus reflect only the initial phase of natural gas drilling in the Marcellus. At that time, few wells had been drilled. Counties with 10 or more wells reported an average of 6.96% increase in taxable income, counties with 1-9 wells reported a 3.08% increase, and counties with no wells, a 0.89% increase. As wages and salaries increased only slightly more in counties with Marcellus wells than in those with no wells, this increase most likely can be attributed to growth in royalty and leasing income. This is confirmed by an increase of 44% in individuals filing returns with royalty and leasing income. Such returns showed a 325.3% increase in income! However, royalty and leasing income was up not only in counties with wells, but also in counties without wells. This may reflect income for individuals owning land outside their county of residence.

Net Profits (business tax): On average, business income was up in Marcellus counties in 2007-08. Interestingly, while the number of returns went down in Marcellus counties, taxes on profits rose 10.8% and 7.1% in counties with 10 or more wells and 1-9 wells respectively. Counties with no wells showed only a 1.5% increase in taxable profits.

Real Estate Tax Income

Real estate taxes are paid at the local level and are reported by the Pennsylvania State Tax Equalization Board. According to this agency's data, county receipts had not change in counties with Marcellus Shale drilling. However, municipalities with any Marcellus well activity "experienced slightly higher real property tax base increase" from 2007 to 2009 (Kelsey, Adams, & Milchak, 2012). This study suggests that there has been only a minor impact on property values at the county level and a slightly higher than average increase in total market values within municipalities experiencing shale development. Again, these results reflect only the early trends in Marcellus Shale development.

In a survey by Penn State Cooperative Extension researchers, school district officials reported that their districts had obtained little economic benefit from Marcellus Shale activity. Survey respondents included 940 superintendents, high school principals, high school directors of curriculum and instruction, and directors of Career and Technology Centers across the 17 Intermediate Units within Pennsylvania's Marcellus Shale region (Schafft, 2012).

Royalty Income

Recent reports indicate that tax revenue from royalties is $46.2 million -- down from earlier estimates of $102.7 million in 2011. Earlier reports were based on prepayments that were higher than the actual revenues generated (White, 2012).

Reduction in production and lower prices for natural gas further affect state revenues from leases and royalties on state-owned land. In testimony before the Senate Appropriations Committee on February 16, 2012, Department of Conservation and Natural Resource (DCNR) Secretary Richard Allen predicted that the Oil and Gas Lease Fund would receive between $56-57 million (Detrow, 2012, Feb. 17). The Governor's budget sets the figure at $69 million. Since a significant portion of the Fund goes to the DCNR, this could have implications for DCNR programs. However, Allen elaborated that Oil and Gas Lease Fund monies represents only 4% of the DCNR budget (Swift, 2012, Feb. 20; Phillips, 2012, Feb. 7).

Likewise, individual lease-holders will not receive royalties in the near term as drilling/production slows and, in some cases, comes to a halt. However, as Falchek (2012) comments, leaseholders will benefit in the long run, as their royalties will increase with the projected increase in gas prices in the future.

Employment Opportunities

With the current economic downturn, the creation of jobs through the development of natural gas resources is an important consideration. Currently, data is emerging that describes the number of jobs, the nature of the employers, average salaries, and employment in locales with significant drilling.

Job Numbers

Tables 3 and Table 4 demonstrate that the Marcellus Shale industry is contributing to the employment strength of Pennsylvania. When interpreting hiring data, Herzenberg (2011) clarifies the important difference between "new hires" and newly created jobs. New Hires is a specific term defined as all persons employed during a specified period of time. It includes those jobs resulting from both newly created jobs and jobs due to resignations, firings or replacements. Thus, when the Marcellus Shale industry reports 48,000 jobs in a two-year period, it means 48,000 new hires, not 48,000 newly created jobs. Some of those jobs existed prior to the two-year reporting period. In fact, Herzenberg's analysis indicates that 5,669 jobs were newly created in a three-year period. The difference in years reported is a result of the sources of the data Herzenberg used. Although this employment is welcome and important to the Commonwealth, Herzenberg points out that the Marcellus core has generated only a small percentage of jobs needed to plug the job deficit. Job creation in this sector is not enough to drive an economic recovery. Indeed, following the "Great Recession," job growth turned positive in February 2010 when Pennsylvania created an additional 111,400 jobs. Although helpful, the 9,288 jobs created in the natural gas domain were small relative to total job growth.

Table 3: Jobs Created In Pennsylvania* (Herzenberg, 2011)
Note reporting period differences due to dates.

	Total Jobs Created in PA between 4th quarter 2009 - 1st quarter 2011	Total Jobs Created by Marcellus Shale Industry 4th qtr 2009 –1st qtr 2011 (reported by Marcellus Shale Industries)	Jobs Created by: Core Marcellus Shale Industry 4th quarter 2007 4th qtr 2010 (reported by CWI)	Ancillary Jobs (reported by Marcellus Shale Industry)	Net jobs created by Marcellus Shale Industry 4th quarter 2007-4th qtr 2010 (CWIA)
New Hires	2.8 million	48,000			
Newly Created Jobs	85,400		9,288	-3,619	5,669

*(Herzenberg, 2011)

More recently, the Center for Workforce Information and Analysis (CWIA), a division of the Pennsylvania Department of Labor and Industry (2012, May), reported a total of 239,000 persons employed in the Marcellus Shale industries in the third quarter of 2011.

Employers (See Table 4.)

The CWIA, (2012, May) shows increased hiring is taking place in the "Core Industries," that the CWIA restricts to six classifications: 1) liquid extraction; 2) drilling oil and gas wells; 3) support activities for oil and gas operations; 4) oil and gas pipeline and related structures construction; 5) pipeline transportation of natural gas; and 6) crude petroleum and natural gas extraction. Jobs have remained virtually unchanged in "ancillary industries." Such industries consist of thirty different types including, but not limited to, fossil fuel electric power generation; natural gas

distribution; water supply and irrigation systems; highway, street and bridge construction; sewage treatment facilities; general freight trucking; industrial machine and equipment wholesales; nonresidential site preparation contractors; petrochemical manufacturing; iron and steel mills; iron and steel pipe and tube manufacturing from purchased steel; oil and gas field machinery and equipment manufacturing; and engineering services. The CWIA states clearly that although much of the "Marcellus Shale related employment can be found in these industries, not all establishments in these industries are involved in Marcellus Shale" (p. 2, CWIA, 2012, May). In fact, much of the activity in these industries is unrelated to Marcellus Shale. Therefore, it is difficult to determine if Marcellus Shale hiring is off- setting loss of jobs in other portions of the ancillary category. (See Table 4.) Further, although this data demonstrates the continuing employment strength of the Marcellus Shale core industries as opposed to all of the industries in the Commonwealth, Pennsylvania must rely on a diversified economy, not an economy based on its natural resources.

Regarding the people who were hired, the Marcellus Shale Coalition (2011, May 31) reports that 71% were Pennsylvania residents.

Table 4: Employment Statistics in Marcellus Shale Related Industries*

	Core Industries	Ancillary Industries	All Industries in Commonwealth
Total Employment (3rd quarter 2008 - 3rd quarter 2011)	+17,000 (+157%)	+600 (+<1%)	-134,000 (-2%)
New Hires (1st quarter 2009 – 1st quarter 2012)	422.7% higher	36% higher	20.1% higher
Average wages (4th quarter 2010 – 3rd quarter 2011)	$80,328	$64,060	$47,233

*CWIA (May 2012)

Wages

The CWIA (2012, May) reports that jobs in the Marcellus Shale core and ancillary industries are good quality jobs. As seen from Table 4, the following average salaries from the fourth quarter of 2010 to the third quarter of 2011: all industries in PA: $47,233;
core industries: $80,328; and ancillary industries: $64,060.

Employment in Drilling Areas

Areas with significant Marcellus Shale drilling activity saw a notable decrease in unemployment rates. The CWIA (Jan, 2012) reported a decrease in unemployment of 1.2% as opposed to an overall Pennsylvania rate of 0.7% in the areas with substantial Marcellus Shale drilling from 2008 to 2011. Table 5 shows the employment growth in these areas (CWIA, 2012, May). For more detailed information go to:
http://www.paworkstats.state.pa.us/admin/gsipub/htmlarea/uploads/Marcellus_Shale_Fast_Facts_Viewing.pdf.

Table 5: Employment Growth in the Core and Ancillary Industries by Geographic Workforce Investment Areas (WIA) with Substantial Marcellus Shale Drilling

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	2008 3rd Quarter	2011 3rd Quarter	Volume Change	Percent Change
Core	6,069	14,623	8,554	140.9%
Ancillary	47,482	52,391	4,909	10.3%

(Taken from CWIA, 2012, May)

In summary, the Marcellus Shale drilling and production has provided quality jobs in the core and ancillary industries in the Commonwealth.

Costs and Benefits :

To quote Kelsey, "Even though many of the industry dollars are not being spent in the specific counties where drilling is occurring, it also is very obvious from anecdotes, surveys, and secondary data that the amount of dollars being spent in these communities is significant (Kelsey, Shields, Ladlee & Ward 2012, p. 3, Sullivan County)." The following sample anecdotes, surveys and secondary data provide further information regarding these issues.

Benefits

Training/Education Facilities:

- The PA College of Technology, the state Fire Academy, Lycoming County and the gas industry are partnering to create the Natural Gas Applied Technology and Safety Training Center, which will provide training for emergency personnel to deal specifically with natural gas emergencies at a wide range of natural gas-related facilities (Thompson, 2011).
- Geology Professor Marshall Miller of West Virginia University reported students with graduate degrees in geology and geophysics are starting jobs in the industry at $120,000 (Junkins, 2012).

Businesses:

- New office buildings are being built at the Southpointe II complex in Washington County by Burns and Scalo Real Estate Service of Washington County, and by Keystone Property Group of Warrendale (Belko, 2012). Development is fueled by the needs of the oil and gas companies moving into the region.
- Passengers using the Wilkes-Barre/Scranton International Airport were up 7% during the past year, due to increased travel to and from Charlotte, NC, the connector hub for Dallas/Fort Worth (Seder, 2012).
- Lobbyists for the natural gas industry and its trade groups spent $3.37 million, and environmental groups spent $178,909 between January and September 2011 (Micek, 2012).
- Hotel rooms have a high rate of occupancy. Revenue per available room in Bradford, Lycoming, Susquehanna, and Tioga counties has grown at an estimated average annual rate of 14.8% as compared to a national rate of -1.7%. (Hotel Online, 2012).
- Shell plans to build an ethane cracker plant in Beaver County providing up to 10,000 new jobs (Frazier, 2012, March 17). In June 2012, the state said Shell would "invest $4

billion, creating 10,000 construction jobs and up to 20,000 permanent jobs (Maykuth, 2012)." In exchange, the Corbett administration has asked the legislature to approve a tax credit that could exempt Shell from state taxes for 25 years (up to $1.64 billion over 25 years (Maykuth, 2012).

Tourism:

- Hotel tax revenues were up as much as 50-60% in gas-rich Washington, Fayette, Bradford and Tioga counties. In Washington and Fayette counties tax revenues benefit non-profits catering to tourists. They are receiving construction grants for building exhibition and meeting halls, and buying advertising (Boren, 2011).
- Cornell University researchers found that tourism employment: a) declined in counties with some wells, b) grew modestly in core counties, i.e., counties with lots of wells, and c) grew in counties with few wells. Tourism employment declined in very rural counties and modestly rural to modestly urban counties. Average growth in tourism employment occurred in urban counties (Diaz, et al, 2011).

Costs

Criminal/Police

- Bradford County reported that its correctional facilities were full even though they were enlarged just five years ago (Detrow, 2012, Feb. 15).
- Criminal justice salaries are up 25-30% in order to prevent employees moving to the gas industry (Detrow, 2012, Feb. 15).
- Twenty-five state troopers have been reassigned to the Marcellus Shale drilling region in Northeast Pennsylvania during the past two years due to population growth and consequent increase in law enforcement incidents according to State Police Commissioner Frank Noonan at a Senate Panel (Swift, 2012, Feb. 17).
- Bradford County police calls have increased 25% (Orr, 2011).
- Traffic is much heavier in heavy drilling areas such as Mansfield, PA (Orr, 2011).

Housing:

- Housing costs have soared in Tioga County, increasing homelessness and forcing families to double up, sometimes triple up. Local churches are housing homeless families. An estimated 75% of Tioga residents who were homeless were displaced by gas workers (Orr. 2011).
- There are 340 Tioga county residents and 800 Bradford county residents on a waiting list for rental assistance. As apartment owners are able to obtain higher rent, they have removed their apartments from rent support programs. A public Housing Assistance agency in Bradford County has provided tents for the homeless (Clarke, 2011; Orr, 2011; Ooms et. al, 2011).
- Ooms, et al (2011) found that median income did not increase as fast as median rents in shale development counties.
- Rent increases were greater at the periphery of core drilling areas. (Periphery areas were defined as areas near core areas, but with few wells.) Rent increases were larger in counties where the largest town had a population of 5000-10000 people. Rent increases were greater in the northern tier than the southwestern tier. In general, researchers found

that it may be too early to obtain accurate data in Pennsylvania. There are many reports of pressure in core areas. (Diaz et al, 2011).

Employment:

- Local delivery firms have lost key employees to the gas industry in Williamsport, PA (Orr, 2011).
- Car dealers are having difficulty hiring car mechanics in Greene County (Baker, 2012).

Tourism:

- Negative impacts on tourism include: Tourists being crowded out of hotel rooms; increased traffic; damaged landscape and "brand" erosion; and decrease in hunting and park visitations (Diaz et al, 2011).

Education:

- Schafft (2012) reported that four percent of school officials reported increases in school enrollment in high Marcellus activity regions.
- A northern tier school district administrator reported an increase in transient local population as a result of housing shortages and rising rental prices. Families looking for lower rents are moving from school district to school district (Schafft, 2012).
- School districts are having difficulty establishing curricula to address workforce needs due to lack of information, funding, and poor communication between the districts, career and technology centers, and gas companies (Schafft, 2012).

Roads

- According to school district officials, problems with road congestion and road damage have interfered with school bus routes, schedules and public safety (Schafft, 2012).

Conclusion

Although it is early in the development of the Marcellus Shale play, the Commonwealth of Pennsylvania is experiencing both economic benefits and costs. Economic impacts are regional rather than local in nature, leaving local governmental units to cope with costs without corresponding resources. Therefore it is essential to involve all stakeholders (i.e., local, state, and school governing units, the natural gas industry, and local/state businesses) in communication and problem-solving in order to: balance the needs of the economic losers with the rights of the economic winners; enhance benefits and minimize costs; and engage in long-term planning given the boom/bust nature of this industry.

It should also be noted that Pennsylvania has received over $200 million dollars in revenue from impact fees from 2011 instituted by the legislature in February 2012. The Public Utility Commission (PUC) is designated to distribute these moneys to counties to compensate them for the costs to their communities involved in natural gas development (Boehm, 2012).

REFERENCES
Economic Factors

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