The League of Women Voters of Pennsylvania

Marcellus Shale Natural Gas Extraction Study
2009-2010

Study Guide III

Marcellus Shale Natural Gas: Its Economic Impact

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Natural gas has become more accessible and affordable in North America. Improved fracing technology now makes it a major player in the energy market. The large domestic reserves of gas will reduce the nation's dependency on foreign energy sources and, consequently, contribute to reducing the trade deficit. Natural gas is the cleanest carbon based fuel and produces less than half as much carbon pollution as coal for the same power output. Many who have spent significant time and thought on global warming issues (Podesta and Wirth, 2009), as well as natural gas producers, have urged the use of natural gas as a transition source. This would promote energy efficiency and provide needed time for the development of renewable energy resources such as wind, solar and biofuels. Replacing oil and coal with natural gas in power generation and powering fleet vehicles such as buses, delivery trucks, taxis, and government vehicles is anticipated to be a key component of a strategy to reduce greenhouse gases (Considine, Watson, Entler, & Sparks, 2009; Podesta & Wirth, 2009).

Because a large part of the Marcellus Shale gas deposit lies within Pennsylvania, it has the potential to have a significant impact on Pennsylvania's economy through creating new jobs and generating income and wealth for future generations. The proximity of Pennsylvania's natural gas deposit to the heavily populated Northeast Corridor makes producing natural gas from the deep Marcellus Shale reserve financially lucrative. In an industry-funded study, Considine et al. (2009) estimates Marcellus Shale natural gas has a $.90 (ninety cents) per one thousand cubic feet (mcf) advantage over natural gas coming from the Barnett Shale play in Texas.

OVERALL ECONOMIC IMPACT

Marcellus Shale natural gas drilling and production is anticipated to have a huge economic impact in Pennsylvania over the next 20-50 years. Economic output numbers vary and are dependent on the source and the date of the estimate. Kelsey (2009) estimates that $500 billion will be added to the state's economy over twenty years. (As a point of reference, the state's total economy was $339 billion in 2006.) Considine et al. (2009) found the Marcellus natural gas industry generated $2.3 billion in total value added, more than 29,000 jobs, and $238 million in state and local taxes during 2008. They predicted that the economic output will top $3.8 billion in 2009, create 48,000 jobs, and provide more than $400 million in state and local tax revenues. By 2020, Considine et al. (2009) said the industry "could be generating $13.5 billion in value added and almost 175,000 jobs." They based their estimate on a model that predicts "for every $1 that the Marcellus industry spends in the state, $1.94 of total economic output is generated" (Considine et al., 2009). (The reader should note that the Considine et al. report was funded by and received its data from the Marcellus Shale Committee, a natural gas industry sponsored group.)

Economic impact can be divided into three categories, direct, indirect, and induced economic impact. Direct impact consists of the industry's need for services, labor, and locally supplied goods. It includes such things as drilling/production equipment, pipeline installation, exploration activities, transport of water, workers, legal services, royalty and tax revenue, and other capital and service expenditures. Indirect economic impact occurs when companies that serve the natural gas extraction companies buy services and goods from yet more companies.

Induced economic impacts occur when wages earned by employees increase household incomes, which in turn stimulate spending for local goods and services.

ECONOMIC ISSUES IN OTHER STATES

Experiences in other states assist us to anticipate economic issues in Pennsylvania. Studies of the economic impact of natural gas shale drilling and production have been made in Texas, Arkansas, and Wyoming. Although Kelsey (2009, February 2) suggested information from other states is instructive, he warned that extrapolating the data precisely to Pennsylvania is difficult. Economic impact studies are dependent on the existing economic relationships in the communities being studied. Pennsylvania drilling sites are not located in as sparsely populated areas as Wyoming nor in as urban a setting as Fort Worth, Texas. In most parts of Pennsylvania where drilling will occur, there is little if any existing industry and infrastructure. Therefore, at least initially, firms and employees from outside of Pennsylvania will conduct much of the economic activity. This will lessen the impact on existing local businesses. (Cautionary note to the reader: all of these studies were commissioned by interested parties, the Perryman (Texas) and Arkansas studies by industry and the Wyoming study by the Sublette County Commission.)

The Perryman Group (2008) analyzed the effect of the Barnett Shale drilling activity in the Fort Worth, Texas area based on 2007 data. Fort Worth and the urban counties overlying the Barnett Shale have a well-developed natural gas industry with supporting infrastructure. However, the comprehensive Perryman Report provided useful indications regarding the overall economic impact in Pennsylvania. In 2007, the Fort Worth area Barnett Shale natural gas industry accounted for $8.2 billion in annual output. This amounted to 8.1% of the total output in the regional economy with 83,823 jobs or 8.9% of the total jobs. Table 1 delineates the economic impact of the Barnett Shale natural gas industry according to type of economic activity, gross product, personal income and employment for the year, 2007. Experts suggested that the stability of the natural gas economy has shielded the Fort Worth region from the recent economic downturn. The economic impact in Pennsylvania communities could be much higher considering that the economy is relatively smaller.

Table 1: **Economic Impact of the Barnett Shale Natural Gas Industry in the Fort Worth, Texas, area in 2007 using input-output (IO) tables available from the Minnesota I-PLAN**

Types of Economic Activity	Gross Product	Personal Income	Employment
Exploration, Drilling, and Operations	67%	62%	58% of new jobs
Leasing and Royalties	11%	12%	14% of new jobs
Pipeline Infrastructure	22%	27%	28% of new jobs

In Arkansas, economists from the University of Arkansas found natural gas drilled in the Fayetteville Shale contributed $2.6 billion to the economy in 2007, employed 9,533 people, and provided $62,964,550 in state and local taxes (Perryman, 2008). The core counties in the Fayetteville Shale account for 12% of the state's population and are primarily rural with one urban area.

In Wyoming, the Ecosystems Research Group (2008) focused on the large, very rural Sublette County (6,000 pop.). Energy producers paid $1.1 billion in taxes on oil and gas production in 2008. Sublette County and its municipalities directly received $66.4 million (5.86% of total taxes paid by the industry).

In summary, experience from other states indicates that the Marcellus Shale industry will have a significant effect on Pennsylvania's economy. It is important to remember, however, that the amount of natural gas is finite; it will eventually "go bust." Larry L. Michael, executive director of Pennsylvania College of Technology's Work Force and Economic Development, reported the findings of the Marcellus Shale Workforce Needs Assessment at an economic summit held by the Williamsport-Lycoming Chamber of Commerce in September 2009. Performed by the college in partnership with the Penn State Cooperative Extension, the study found that 83% of the jobs are going to go away. To drill a single well is estimated to require about three weeks of time for 410 workers with 150 different occupations to complete. Workers generally labor 28 days straight and then take two weeks off. This can contribute to a high turnover rate. The hours worked during the drilling and well-completion portion of shale development will equal slightly more than 11.5 full-times jobs over the course of a year. For every 100 wells in production, 17 full time jobs are created. As more wells are drilled, more jobs will evolve.

FACTORS IN NEW BUSINESS DEVELOPMENT AND ECONOMIC OUTPUT

There are specific factors that affect how fast development of the Marcellus Shale natural gas development will occur. First, the cost of drilling is high because of the depth of the wells. Unless significant amounts of gas are produced, it is not economically viable to extract the gas. To date, the high output of existing Marcellus Shale wells makes Pennsylvania an attractive production site.

Second, the price of gas determines whether drilling the expensive horizontal wells is profitable. After a peak in 2008, the price of natural gas has been drifting lower. Between August and October of 2009, natural gas prices have been fluctuating from under $3 to $4 per million British thermal units (MmBtu). This has slowed development. Analysts, examining Fayetteville Shale play, indicate that the price of gas must be $6.00+/MmBtu to make exploration and drilling profitable (Center for Business and Economic Research, 2009).

Third, the availability of four different types of infrastructure affects drilling and production profitability. Roads and water supplies are necessary for exploring and drilling. Thousands of miles of gathering pipelines must be put together in a network. Processing plants are required to remove water and other contaminating hydrocarbons found in Pennsylvania's "wet gas." Lastly, there must be interstate and intrastate pipelines, rail facilities, and/or truck facilities for by-products from the processing plants.

Fourth, supply and demand must be synchronized. For example, investment in drilling is dependent upon price volatility. This makes it difficult for producers and suppliers to plan. Time lines may vary from a few months to up to ten years for the process to evolve from exploration to permit approval. Demand for skilled workers may outstrip the supply as drilling and fracing are 24/7 activities that require advanced planning. Weather and water supply may also interfere

with the anticipated development of natural gas wells (Center for Business and Economic Research, 2009; Considine, 2009).

ECONOMIC BENEFITS: JOBS

Previously cited impact studies note an increase in permanent jobs that can last up to 40 years. Such employment resulted in a rise in median income in the counties studied (Perryman Group, 2008; Center for Business and Economic Research, 2009; Ecosystems Research Group, 2008). Jobs directly attributed to the gas and oil industry include those not only of drill crews, water haulers, processing plant employees, but also the people needed to identify properties to lease, write the leases, and to conduct related legal regulatory work. Jobs indirectly related to the gas and oil industry are those involving industry suppliers–service companies, local contractors, area surveyors, attorneys, local fuel operators, stone workers, and cement suppliers. Community colleges increase their revenue by offering certification classes for people who want to work in the industry. The higher paying jobs are in the drilling sector according Kelsey (Penn State Webinar presented in Indiana County, October 14, 2009). Kelsey estimated that three-quarters of the jobs require only a high school education, and local people are often hired as laborers and for security. Low paying jobs, such as those found in hospitality and local retail, are also created.

Since the shale gas industry is resource-based, employment opportunities will vary as the industry evolves. Analysts in Sublette County, Wyoming, projected that the largest number of jobs will occur in the first twelve years or the development phase. The number of jobs will fall off dramatically during the following six years. During the production phase fewer, but more permanent jobs, will emerge. With closure of the industry, even fewer reclamation jobs will be available. (See Table 2.) Although Pennsylvania's numbers and time estimates will be different, the pattern of employment is expected to be the similar (Michaels, 2009). Jobs will be gone when the reserve of natural gas is gone.

Table 2: **Annual Number of Full Time Employees Needed to Complete Development, Production and Post-production Reclamation Phases in Sublette County, Wyoming** (Adapted from Ecosystem Research Group, 2008)

Phase	# of jobs	Duration	Comments
Development	1894	11 years starting 2007	Employment strong for 11 years with a rapid decline for the next 6 years.
Production	250	Ca. 28 years	Gradual increase of jobs from year 1 to 15. Steady employment for the duration of the production phase, ca. 28 more years.
Reclamation	Less than 100	Ca. 12 years	

ECONOMIC BENEFITS FOR INDIVIDUALS: LEASING AND ROYALTY INCOME

Leasing and royalty income will account for a small share of the total economic impact. However, such funds will have a large impact on a few Pennsylvania residents. In July, 2009,

Range Resources reported that they had paid $9.4 million in lease bonuses since 2002 and $11 million in royalty payments, as of that date, just in the Mt. Pleasant/Hickory area (Westmoreland and Washington Counties). Since leasing bonuses are up front payments in exchange for an agreement to use the resources, the big money for individuals owning natural gas rights will be in royalty payments. For example, a group in Sullivan and Wayne Counties has recently leased 60,000 acres for $5500 an acre, with 20% royalty on the extracted gas (Israel, October 18, 2009).

Interestingly, leasing and royalty issues are different for different parts of Pennsylvania. In the Northeast, gas rights owners and surface property owners are frequently the same person. In the Southwest, they are often different parties. The person owning the gas rights has the potential to do very well financially while the person who owns the surface land is less fortunate. Such individuals suffer the many inconveniences of drilling–around the clock noise, traffic, and dust for four to six weeks–and perhaps the disruption and permanent change of the land with little or no remuneration (Kelsey, 2009).

POTENTIAL ECONOMIC BENEFITS AND COSTS FOR STATE AND LOCAL MUNICIPALITIES

In all counties studied in the shale natural gas area, there has been a significant increase in the population. In Denton, Texas, population increased 66%, growing from 317,850 in 1995 to 528,950 in 2004. In Sublette County, Wyoming, population increased 34% between 2000 and 2007. In Faulkner County, Arkansas, population grew 40% between 1990 and 2006. With such rapid increases in population, communities need to understand, plan, and adjust for similar benefits and costs of a boom/bust economy.

BENEFITS

- New Businesses: New local businesses may be created or existing businesses expanded to meet the needs of the natural gas companies and their employees. Increased employment has been reported in maintenance and repair, construction, hospitality, retail trade, and legal service businesses in Texas, Wyoming, and Arkansas.

- Personal income: Median income grew in all three states studied. As further evidence of increasing wealth, the Perryman Group in Texas noted dividend income, as reported on income tax returns, also increased.

- Owner Occupied Housing: Owner occupied housing expanded in all three shale areas. This provides an increasing tax base. In Pennsylvania, new structures increase property tax receipts. Older structures, once purchased, are reassessed to current property values.

- Charitable Giving: Using case study methodology, Murray and Ooms (2008) found charitable giving increased in the specific charities studied in natural gas producing areas. In addition to cases in which the natural gas industry provided large grants or "gala" events, there were, in general, significant gains in the charitable donations.

- Water: With many companies buying the water needed for drilling and fracing directly from municipal water companies, local revenue sources expand.

- Leasing Public Land: Lease bonuses and royalties provide increased revenue for local governments that own land on which producing wells are located. However, such income is

short term and will disappear when wells cease to operate. For this reason, Rodgers et al. (2008) strongly recommended that these funds not be used to fund on-going budgetary expenses, but to be targeted to improve infrastructure and the long term needs associated with population and business growth.

• Tax Revenues: Based on industry-provided data, Considine et al. (2009) projected the "present value of additional Pennsylvania state and local taxes earned from the Marcellus development between now and 2020 is almost $12 billion" (p. iv). During 2008, the Marcellus Shale natural gas industry in Pennsylvania contributed $2.3 billion to the economy. This included $238 million in taxes to the Commonwealth and local municipalities. The largest component of tax revenue increase came from the employees' federal, state, and local income tax returns. Taxes generated from indirect business taxes, such as excise taxes, property taxes and sales taxes, contributed significantly to the overall revenue sources. The Pennsylvania Budget and Policy Center (PBPC) refuted Considine et al.'s numbers and determined the $238 million paid in taxes to be "overstated" by more than $100 million (2009, October 1). The PBPC noted that 31% of Considine et al.'s tax figure is for property taxes that are not assessed on natural gas reserves or drilling equipment. Such commodities are not deemed to be "property" in Pennsylvania. Another 30% of Considine et al.'s tax figure comes from sales tax paid by drilling companies. PBPC notes that such figures are questionable because, even if machinery used by drillers were purchased in Pennsylvania, much would be exempt from sales tax due to the manufacturing exemption.

COSTS TO MUNICIPALITIES

● Non-violent Crime: As the number of wells increased, non-violent crime increased modestly. This can necessitate the need for more law enforcement in both rural and urban counties. Costs for additional police personnel are proportionately greater, in terms of budgetary impact, in small towns than in urban areas. (Kelsey, 2009; Murray & Ooms, 2008b; Ecosystem Research Group, 2008).

● Poverty Levels: The number of people living below the poverty line has increased in more populated areas (as opposed to the sparsely populated Sublette County, Wyoming). This places a larger financial burden on social services (Murray & Ooms, 2008b; Kelsey, 2009; Rodger et al., 2009). As the need for service industry workers increases, the number of working poor in an area also increases. In Pennsylvania, the Department of Public Welfare supplements family income of the working poor with food stamps, Medicaid, cash assistance, and daycare.

● Emergency Responders: In all cases, as the number of wells increased, the number of emergency runs directly increased. This requires more emergency vehicles and crews. In rural areas, new emergency vehicles with high clearance are often required to access the back roads. Pennsylvania Emergency Management Agency (PEMA) plans require modifications to deal with natural gas well emergencies and with the toxic substances that are used in or result from drilling and fracing (Kelsey, 2009; Murray & Ooms, 2008b; Rodgers et al., 2008). Municipalities that operate their own fire and ambulance services see a direct increase in costs. In areas where private services and volunteer fire departments operate, costs accrue to those services that are, in turn, passed on to local citizens and service users.

● Roads: To access drill sites, particularly in rural counties, more roads are needed. Existing roads are not capable of sustaining the heavy pounding of drilling industry trucks. Road bonding

amounts are low ($12,500 per mile) and inadequate to repair/replace existing roadways at current prices (Kelsey, 2009; Rodgers et al., 2008).

● Health Care Services: An increase in population expands the need for health care. Small rural medical centers in Wyoming have reported the demands for medical care exceed their ability to provide services both in terms of personnel and finances (Ecosystem Research Group, 2008).

● Housing Infrastructure: An increased demand for more housing is a direct result of population growth. If there is inadequate housing, the influx of workers cannot find a place to live within a community and contribute to its tax base. On the other hand, the need for development phase workers will decrease significantly in the short term (10+) years. Some communities need to weigh the value of temporary housing to protect the value of long term resident housing. The building of "Man Camps" has been proposed in some areas to house transient workers (Long, 2009). Kelsey noted that if new homes are built in response to an influx of workers, the municipalities may have a glut of housing after the drilling phase is over in ten to twelve years (Webinar presented in Indiana County, October 14, 2009). Demand for drinking water, sewage treatment, and waste management will increase and require appropriate governmental response and funding

● Impact on Other Businesses: With the onset of higher salaries and availability of overtime, employees of local businesses may leave for higher paying jobs. To attract replacement employees, wages must rise with a concomitant rise in costs. In areas that rely on tourists attracted to the "wilds" of Pennsylvania, hotel rooms can be clogged with transient workers. Disruption of sites that attract tourists and hunters in such an area can also occur (Kelsey, 2009). Kelsey (2009) further pointed out that little new revenue is coming into the coffers of local municipalities. Why? Natural gas is not subject to local taxes; earned income tax is paid where people live; and transient workers (drilling and fracing crews) move with the rigs so they tend to live in more central areas with larger populations. For example, State College and Bloomsburg may benefit from additional taxes while the expenses are passed on to towns where the actual drilling is occurring. To further confound matters, the Pennsylvania Oil and Gas Act prohibits local municipalities from regulating drilling activity. Thus municipalities cannot control or reduce their costs by passing them on to drilling sites. However, two recent court cases may have provided some leeway in this area. Based on an analysis of financial data, areas with less population are affected more proportionally by these increased costs (Murray and Ooms, 2008).

● Clean and Green Act: Clean and Green (P.L. 973 of 1974) is a program that provides preferential tax assessment for eligible farm and forest lands. Land is assessed as it is currently used, e.g., as farmland, not as it could potentially be used, e.g., as a housing development. The law does not state whether leasing land for natural gas drilling makes the land ineligible for Clean and Green. County commissioners will need to consider how they will treat such land. Decisions in this matter impact all of the players from the industry and surface owners to neighboring residents and gas rights owners.

● Social Conflict: An influx of new people into well-established communities can create a "social cost." Older residents may like the town the way it was and resist change. Rig crews may

enjoy a style of life that may be in conflict with traditionally accepted norms. When new costs to the community are funded by existing revenue sources, people who have not benefited from the natural gas boom may resent paying the price of higher taxes.

To determine how locally elected leaders viewed the costs to their community, an informal survey was conducted. Officials in Washington, Susquehanna, Butler, Armstrong, Wyoming, Fayette, and Indiana Counties were asked about costs they were experiencing. Generally, officials really did not know what the costs were to their communities. Perhaps more accurately, there was no tracking of such costs to their communities. In Indiana County, a commissioner described how it is impossible to learn even where the Marcellus Shale natural gas drilling is going to be. In Wyoming County, officials reported that courthouse staff is being overwhelmed with the processing of deeds and leases. In Susquehanna, Butler, and Armstrong Counties, officials reported wear and tear on roads. Roads were bonded, and, in some cases, the drilling companies have repaired the roads. Lack of information by local officials is not surprising given the early stage of the industry activity in these areas.

ENVIRONMENTAL COSTS TO THE STATE

Environmental problems emerging in the Western states suggest that natural gas extraction may cause unanticipated problems that will have long-lasting costs.

● Abandoned wells: If an environmental cleanup is required after a bond is released, the lease expired, or the property has changed owners, the State is responsible. First they must track down the owner. If there is no agreement as to the responsibility of the former owner, the current landowner is legally responsible. If the costs are prohibitive to the current owner, the State looks for others to share the costs. In the absence of others to assume financial responsibility, taxpayers foot the bill.

● Reclamation: Pennsylvania has and will continue to have high costs for post-mineral extraction cleanup. For example, the coal industry has left expensive environmental reclamation costs. DEP estimates that the 2,500 miles of damaged streams and 250,000 acres of unrestored surface coalmine land will cost approximately $15 billion to restore. Cleanup costs from the gas industry may also be both indirectly and directly paid by the state. After a bond is released, a lease expired, or the ownership of a property transferred, the State is responsible for tracking down who is financially responsible for any environmental damages. If others are not legally responsible or cannot pay, Pennsylvania taxpayers will pay the cleanup costs. Given the environmental problems emerging from natural gas extraction in other states, it appears that Pennsylvania may experience unanticipated problems that will have long lasting costs.

● Growing Greener: Growing Greener provides bond money to support partnerships between state, local and non-profit agencies (usually volunteers) to deal with environmental issues. Its funds are nearly depleted. Marcellus Shale drilling will require additional financial resources to cleanup inevitable accidents, spills, and unforeseen, cumulative effects.

● Radioactive Waste: An unanticipated cost, yet to be determined, involves radioactive waste. As of November 10, 2009, the radioactive levels publicly reported in flowback from Pennsylvania's Marcellus Shale natural gas wells fall within naturally occurring radioactive material (NORM) guidelines. However, the radioactive levels from eleven of thirteen wells drilled in New York did not (Lustgarten, November 9, 2009). While radioactive material can be

filtered out of the flowback at wastewater treatment plants, plants must be designed to do so. The resulting hazardous waste may then need to be taken to special disposal sites in Idaho and Washington. The flowback can also leave a radioactive sludge in the pipes used in the drilling process. In one such incident in Louisiana, radioactive well pipe was recycled into school bleachers (OSHA Hazard Information Bulletins, 2009, October 26).

● Administrative and Monitoring Costs: The Department of Environmental Protection (DEP) needs to expand its workforce to handle the increasing paperwork required for permits and to monitor such factors as compacted soils, disrupted habitats of flora and fauna, water pollution, and land contamination. Although permit fees and surcharges contribute to DEP's budget, the need to oversee the current 63,000 natural gas wells and the new drilling of hundreds more each year will significantly increase the workload for DEP inspectors. Many of these positions and services will be funded by increasing permit fees paid by drilling companies.

PUBLIC HEALTH COSTS TO THE STATE

Potential health risks and costs are related to fracing fluids that go down the well and then return to the surface with added dissolved minerals. Because fracing fluids are exempt from regulations of the Federal Safe Drinking Water Act of 2005, little research has been done on their level of toxicity. A recent paper by Witter et al. (2008, August 1) reviewed studies done between 2003 and 2008 that focused on the effects of low level exposure to toxins used in the gas and oil industry. She found:

> Few studies had been published on the health effects of oil and gas exploration and extraction on communities living and working in the vicinity of these activities. A lack of specific evidence, however, does not negate the fact that oil and gas operations use and produce toxic contaminants that adversely affect human health. Available studies show that exposure to air pollutants, toxic chemicals, metals, radiation, noise, and light pollution cause a range of diseases, illnesses, and health problems. . . . Neighborhoods, schools, and workers in close proximity to oil and gas activities may be at increased risk for cancer, cardiovascular disease, asthma, and other disorders due to uncontrolled or high exposures.

In a subsequent White Paper, Witter et al. (2008, September 15) called for a Health Impact Assessment to be part of any environmental impact assessments.

Dr. Theo Colburn (2007, October 31), founder of The Endocrine Disruption Exchange, testified before the House Committee on Oversight and Government Reform hearing on the Applicability of Federal Requirements to Protect Health and the Environment for Oil and Gas Development. She reported that she had found many highly toxic chemicals from sample wells and wastewater pits in Colorado, Wyoming, and New Mexico. These have been known to wreak havoc on laboratory animals, especially females and the aging. One, 2-BE, has been reclassified by the EPA as a possible human carcinogen.

In Hobbs, New Mexico, a study looked at the air borne particles and soil samples from a six block area of homes built in 1976 on an oil well site that had been active from 1927 until it was shut down in the 1960s (Dalhgren, et al, 2007). Dalhgren found benzene, toluene, and xylene, chemicals used in fracing. The residents suffered Systemic Lupus Erythematous (SLE) and rheumatic diseases at a rate ten times greater than those in the study's control population.

The on-going costs of health care will be passed on to everyone.

PLANNING AND PROBLEM SOLVING

A boom/bust economy requires careful planning at both the state and local levels. Kelsey (2009) and Rodgers et al. (2008) strongly recommended the formation of a local task force composed of all of the community and business players. Such a group can dedicate itself to considering and dealing with evolving natural gas issues that require a wide range of expertise, authority, and time. Nevertheless, planning commissions can be effective. For example, in Bedford County, pipeline routes were altered to meet the needs of more persons. In Washington County, a gas company made donations toward the purchase of new emergency vehicles.

In examining policy and planning issues, local groups need to consider the following questions:

- How are local municipalities financed to meet the expenses resulting from the natural gas industry?
- How can it be ensured that "financial winners" pay a fair share of the taxes/costs?
- How can natural gas companies and employees be convinced to spend money locally?
- How can local businesses and workers compete for lucrative business opportunities?
- How can new business start-ups, technical assistance, and workforce training programs be developed?
- How are potentially threatened businesses like tourism/recreation to be protected from Marcellus Shale natural gas development?
- How can local planning be accomplished regarding infrastructure, balancing the demand for water between increasing population and natural gas industry needs, emergency plans (PEMA), zoning, capital planning, road bonding and law enforcement?

The extraction of Marcellus Shale natural gas will provide a large economic boost to Pennsylvania and many of its local communities. However, these economic gains will come with a variety of economic costs, especially to local communities. How Pennsylvania decides to deal with these issues will affect not only the near-term economy but also have implications for the long-term economic well being of the commonwealth and its communities.

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