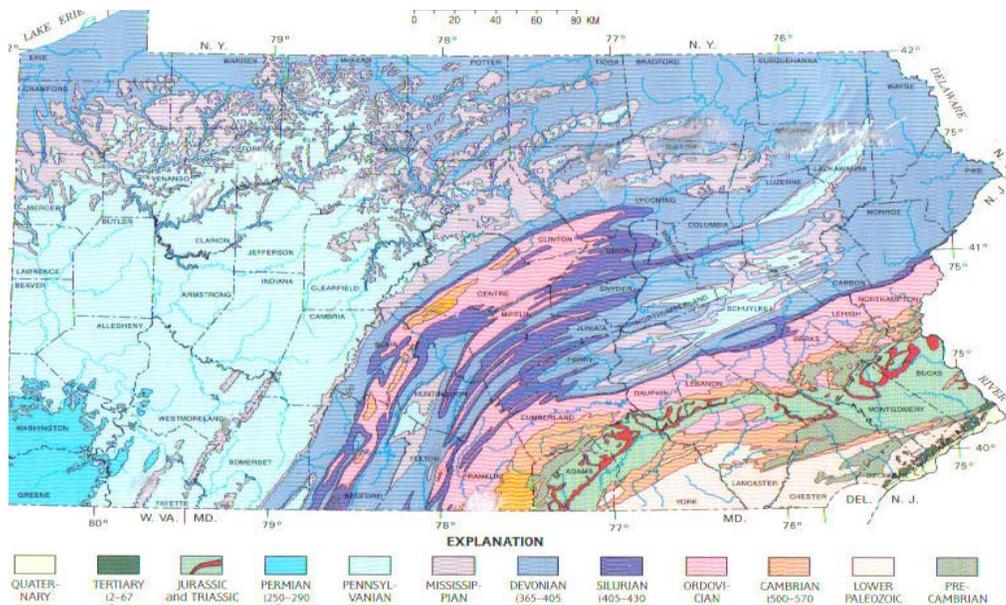


# JOINT UrbanStudies CENTER

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## The Impact of Marcellus Shale in Northeastern Pennsylvania with an Emphasis on Charities, Crime, and Poverty



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A partnership among Keystone College, King's College, Luzerne County Community College, Misericordia University, Penn State Wilkes-Barre, University of Scranton, & Wilkes University

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## Executive Summary

Northeastern Pennsylvania is on the verge of a new era. Many emerging changes throughout the region, including increased business activity and population growth, are occurrences that the area has not experienced in more than 60 years. In the report, "The Rise of Luzerne County," Joint Urban Studies Center (JUSC) examined the county's unexpected population increase and contributing factors. JUSC discovered that many people are moving to Luzerne County from more eastward locations due to soaring housing prices; this migration pattern is expected to continue.

Another reason to move to the region in the near future may be natural gas industry employment. Any who have read a newspaper or watched the local news in recent months knows there is much discussion about natural gas that may exist deep within the ground, in a rock formation known as Marcellus Shale. This discovery is new to the region and most are just beginning to grasp its meaning. How exactly could this new industry impact Pennsylvania – and particularly an industry that may directly affect residents and potentially transform thousands of lives? This study examines the potential that lies beneath that rock for counties comprising Northeast Pennsylvania.

In performing this study, JUSC sought to examine other natural gas plays and how they have affected other U.S. regions. JUSC used case study methodology to compare Northeast Pennsylvania with other U.S. regions in terms of wealth, employment, and housing and charitable giving. Case studies provide a systematic way of examining events, which allows sensible comparisons that help infer what may occur in similar scenarios.

First, JUSC looked at the Barnett Shale in Texas, where the natural gas industry has helped the Dallas/Fort Worth economy remain virtually recession-proof. Referred to as the icing on the cake for that region, Barnett Shale generates a multi-billion-dollar direct impact on the region's economy, and has multiplier effects rippling through virtually all regional industries. Texas production has resulted in \$10.1 billion in annual output, and 55,000 permanent jobs. Specifically JUSC studied Denton County circa 1990 – before the Barnett Shale play. At the time, Denton County was very similar to some in Northeast Pennsylvania. JUSC tracked Denton County's growth in terms of population, income and housing. In 1995, Denton County had a population of 317,850. At the time, 156 wells provided the county with mineral revenue of \$88,786. By 2004, Denton County's population reached 528,950 and 1,460 wells provided it with mineral revenue of more than \$2.7 million. This represents a 66.4% population increase, an 835.9% increase in its number of wells, and a staggering 2,976% mineral valuation increase. Barnett Shale has also fostered significant charitable donations throughout the region. JUSC tracked several charities by examining IRS Form 990. All charities examined experienced increases in increased in both direct public support and net assets. Following is an excerpt from an interview with a

the CEO of a Texas Acquisition Firm representing natural gas companies who discussed a fund raising gala his company sponsored to benefit local police, fire fighters and the local Salvation Army:

Our Gala is the first Barnett Shale charity event honoring our heroes, "The Police and Fire Fighters Memorial and the Salvation Army." The Barnett Shale play has generated long term employment for many and wealth for others in Fort Worth. So, I wanted to orchestrate an event that would reflect the prosperity we share because of the Barnett Shale.

These remarks show how important charitable giving is to several energy companies as well as their employees and even the land owners from which they lease. On their respective web sites, virtually all energy companies mention corporate giving; over time, local newspapers have followed such giving.

Next, JUSC examined Fayetteville Shale in Arkansas. Newer than the Barnett Shale play, the Fayetteville Shale play has already increased employment and significantly contributed to the state's local economies. Projections indicate major population increases and significant gains in employment through 2025. Specifically JUSC examined Faulkner and White Counties – areas that are also similar to Lackawanna, Luzerne, Wyoming, and Wayne Counties.

Finally, JUSC examined the possible effects of Northeast Pennsylvania's Marcellus Shale play. After reviewing current activity throughout each Pennsylvania county examined, JUSC found that many residents do indeed have leasing agreements with natural gas companies, that many natural gas companies have obtained state drilling permits, and that some natural gas companies have already begun drilling. Today, 93 drilling permits have been issued and eighteen wells drilled in Bradford, Lycoming, Susquehanna, and Wayne Counties. Currently, Lackawanna County neither has any drilling permits issued, nor wells drilled; however, county records indicate that as of 2008, there were 85 leasing agreements in place. Likewise, Wyoming County does not have any permits issued or wells drilled; there are, however, 594 lease agreements with nine energy companies in place. At the time of this study's completion, there was no data available to predict the amount of natural gas the region might produce and the companies themselves are non-committal.

JUSC examined the potential cash flow of typical Pennsylvania wells and calculated possible royalties a landowner may expect to receive. Average cumulative production from the initial fracture stimulation is 1.25 billion cubic feet (Bcf) of natural gas per well. The wells initially produce for about 1 million cubic feet (Mmcf) of natural gas per day, but experience a 50% decline in the first year. Then, wells typically stabilize to produce for an average 20 years, with an expected life span that exceeds 30 years. Re-facing a well after five years or so of production can add another three quarters of a billion cubic feet of natural gas to a well's overall production.

The example below uses Barnett Shale production rates as a baseline for estimates:

- If you own 100 acres of gas-producing land, and
  - You receive a royalty of 15%, and
  - Natural gas is priced at \$10 per Mcfe
  - The daily production rate is 2 Mmcf (million cubic feet) per day (a estimate), then
- 
- **Total royalty would be approximately \$1,095,000 in the first year.**

It is very difficult to predict a well's output at any point in time – especially so early in the Marcellus Shale play. This is only one possible scenario. It is also important to note that output declines quickly at first, but such decline slows towards the well's half life. A well's production typically lasts 20 – 30 years. The figure above does not include the lease value or sign-on bonuses.

So what exactly does Marcellus Shale mean for Northeast Pennsylvania? It is very early in the Marcellus Shale play to make any predictions as to how much natural gas production may occur, and many experts JUSC spoke with suggested that the play is only in its infancy. They did acknowledge, however, that it has even more potential than either the Barnett or Fayetteville plays. If such assumptions hold true, possibility of unprecedented wealth, employment jumps, and significant population increases exists in Northeast Pennsylvania. Time will tell.

Jeanette Elliott, of Ackerman McQueen, a marketing and public relations firm representing Chesapeake Energy, spoke with JUSC's executive director Teri Ooms on June 19, 2008.

Elliott indicated that Chesapeake is a very good corporate citizen. It gravitates toward "hallmark" charities, including the United Way. During the week of June 16<sup>th</sup>, Chesapeake made a large contribution to the United Way of NW Louisiana. Its \$100,000 contribution was applied toward their general campaign and benefits community improvement programs.

Elliott indicated that she was not surprised JUSC had difficulty obtaining specific information on contributions from either the charities or the gas exploration companies. New regions and new finds dilute the pool of available funds, so it is seen as competition. The gas companies don't like to be very public upfront so they can determine who and how much. Elliott is aware that charitable solicitations to Chesapeake increase each year.

The Marcellus Shale play could be the second catalytic event to happen in our region of late. In November 2007, JUSC published a study dealing with recent population shifts. Specifically, that this region has experienced real population growth [albeit in small numbers] over the past few years as a result of population

migration from New York and New Jersey as a result of available and affordable housing. Based on “who” is moving and “why” they are moving, this new trend will fuel double digit population growth over the next 15 years.

Now bring Marcellus Shale, a new industry, into the region. All the other case study areas experienced population growth as a result of the natural gas exploration and extraction –northeastern Pennsylvania is poised to do the same.

What does this mean to a region that has only experienced decline for over 70 years? How does this affect land use and transportation? What impact will this have on our public school systems? How will local government handle increases in need for public services and safety? What about health care? Do we have enough medical personnel, facilities, and state of the art medical equipment and procedures? What other businesses and job growth will result from this new industry? How much will the cost of housing increase? What types of housing will be available? In what areas will crime rise? What types of social service needs should we plan for?

These are a few of the questions this region must ask itself. First, we must have the vision; next we set the goals, and finally implement the strategies to intervene in these forces impacting our region. Only then can we expect to live in a region that maximizes the opportunity while mitigating the challenges brought about by growth and new development.

## Introduction

Throughout history, Northeast Pennsylvania has experienced many highs and lows – most notably, the coal mining industry and its regional impact. Once a booming and prosperous industry, it ultimately became the source of the area’s decline. For decades after coal mining faded, the region lost population, and maintained traditionally low wages and suffering job market. Today, Northeast Pennsylvania is on the rise – population is increasing and businesses are moving into the region. Further, the region is faced with the possibility of a new natural resource phenomenon – natural gas found in Marcellus Shale deposits.

Given the area’s history, while excited and hopeful, people are naturally curious and concerned. Increasing local and national media attention in recent months has focused on area land owners signing over leasing rights to energy companies and the high prices these companies may pay for such rights.

The goal of this study is to examine information regarding the impact of increased population and wealth as it relates to charitable donations and the need for social services. Other U.S. regions have demonstrated that when something of this nature occurs in an area, a ripple effect causes money to flow into surrounding communities. Drilling and production wells eventually impact area restaurants, clothing stores, and other businesses because of population increases that coincide with a lucrative natural gas industry. Beneficiary landowners often invest their new income, job growth results in population increases, and new businesses and industry sprout to support new clusters.

This document utilizes case study methodology to compare the area of study in Northeast Pennsylvania with other regions that have already experienced similar situations. Using publicly available data, interviews, and modeling, JUSC examines the potential of Marcellus Shale deposits in the counties comprising Northeast Pennsylvania, including: Bradford, Lackawanna, Luzerne, Lycoming, Susquehanna, Wayne, and Wyoming Counties.

Marcellus Shale, also referred to as the Marcellus Formation, is a Devonian-age black, low-density, carbonaceous (organic-rich) shale. Located in the Appalachian Basin, it stretches over 600 miles from southern New York into West Virginia and Ohio. Natural gas distributed throughout rock, such as Marcellus Shale, is known as an unconventional reservoir. The shale’s natural fractures are key to recovering large amounts of natural gas. Typically, Marcellus Shale exists a mile or more below the ground’s surface.<sup>1</sup> When multiple rights owners have property in a unit, the lessees receive royalties based on the percentage of mineral rights they own and the lease they sign. Not all leases are created equal, and mineral owners are encouraged, at the very least, to consult with

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<sup>1</sup> Powell Barnett Shale Newsletter. <http://www.barnettshalenews.com/>

surrounding property owners and compare contracts before they sign. Consulting with an attorney with leasing experience is an excellent idea.<sup>2</sup>

Successful wells must yield large volumes of natural gas to pay for drilling costs, which may exceed \$1 million for a traditional vertical well, and much more than that for a horizontal well with hydraulic fracturing.

Natural gas occurs within Marcellus Shale in three ways: 1) within the shale's pore spaces; 2) within vertical fractures (joints) that break through the shale; and 3) adsorbed on mineral grains. Of these likely occurrences, most natural gas is contained in pore spaces. The natural gas, however, has difficulty escaping through such spaces, as the spaces are very small and poorly connected.<sup>3</sup>

Historic Marcellus Shale wells produced natural gas at a very slow rate because of the low permeability mentioned above; this is typical for shale. However, the most successful historic Marcellus Shale wells share a common characteristic – they intersect numerous fractures. Such fractures allow natural gas to flow through the rock unit and into the well bore. The fractures intersecting the well also intersect other fractures and those fractures intersect even more fractures. Thus, an extensive fracture network allows one well to drain natural gas from a very large shale volume.<sup>4</sup>

Marcellus Shale fractures are vertical, so a vertical borehole would be expected to intersect very few fractures. However, a horizontal well, drilled perpendicular to the most common fracture orientation, may intersect a maximum number of fractures. Some horizontal Marcellus Shale wells yield over a million cubic feet of natural gas per day. This decade, horizontal wells have been some of the most productive wells drilled in the eastern U.S.<sup>5</sup>

Past studies by the U.S. Geological Survey determined that Marcellus Shale contained an estimated undiscovered resource of about 1.9 trillion cubic feet (Tcf) of natural gas.<sup>6</sup> More recently, however; Terry Englander, a geosciences professor at Pennsylvania State University, and Gary Lash, a geology professor at the State University of New York at Fredonia, estimated that Marcellus Shale could contain 516 Tcf of natural gas. Using new horizontal drilling methods and hydraulic fracturing of the productive rock unit, up to 10% of that natural gas may be recoverable. If recovered, such volume would be enough to supply the entire U.S. with natural gas for about two years, with a wellhead value of about \$1 trillion.<sup>7</sup>

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<sup>2</sup> Farm Bureau of Arkansas. *The Fayetteville Shale – A Mineral Right Challenge*.

<sup>3</sup> Geology.com. *Marcellus Shale – Appalachian Basin Natural Gas Play*.

<sup>4</sup> Ibid

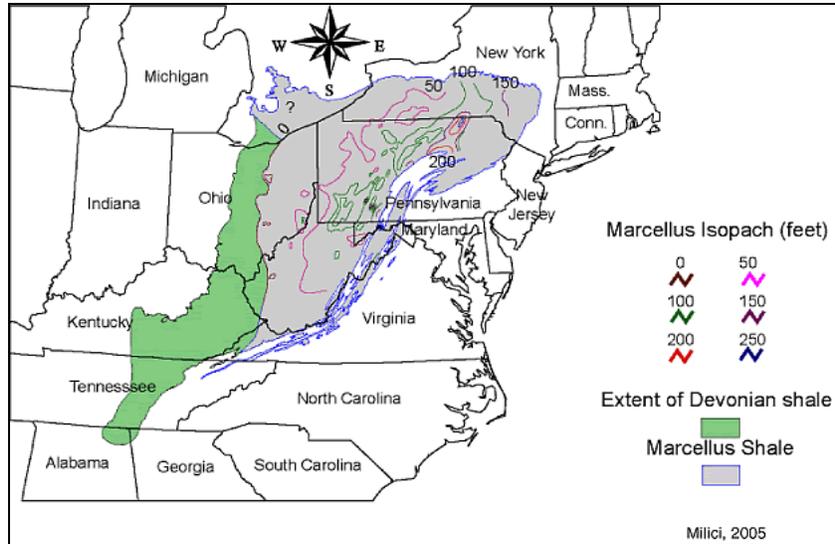
<sup>5</sup> Ibid

<sup>6</sup> Ibid.

<sup>7</sup> Penn State Live. *Unconventional natural gas reservoir could boost U.S. Supply*.

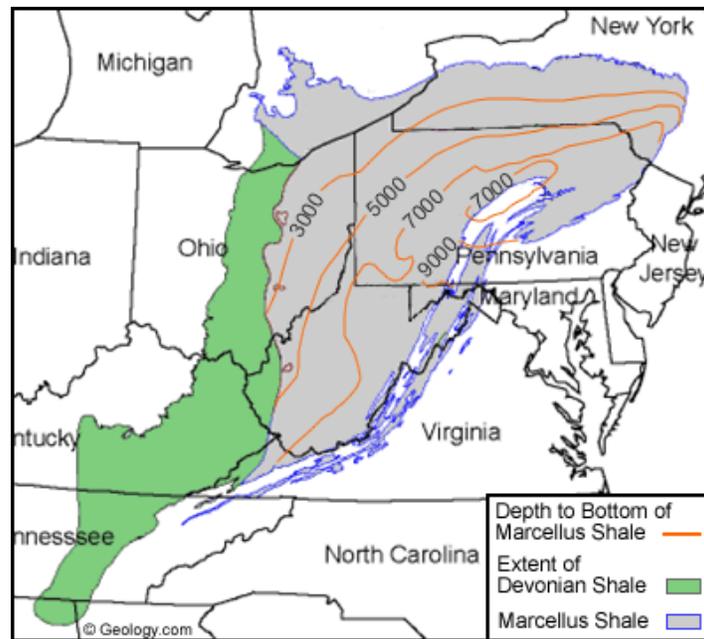
Figures 1 and 2 show the extent and depth of Marcellus Shale in New York, Pennsylvania, West Virginia, and Ohio.

### The Distribution of Shale in the Appalachian Basin



Source: AAPG

### The Depth of Shale in the Appalachian Basin



Source: AAPG

## Research Methodology

For purposes of this study, JUSC employed a case study methodology. JUSC examined four counties that have experienced population increases and economic growth during the period of time before horizontal drilling for natural gas began and the most current data available. Counties examined were selected based on their population size, median household income, and owner occupied household value in 1990, before natural gas drilling became such a highly profitable industry; again in 2000 and 2006 to track changes in the three categories over time. JUSC also used IRS tax return data to gauge the extent of residents' income changes.

JUSC also sought to contact energy companies drilling in Texas and/or Arkansas to obtain information on leasing, drilling, finances, charitable giving, and several other categories believed important to this study. Questions were selected specifically to gauge what Northeast Pennsylvania may expect. JUSC also contacted energy companies currently setting up operations in our region to assess where they are and where they are planning to go in the near future in terms of permits, wells, and charitable giving. (See Appendix for surveys.)

In order to study the impact on charitable organizations, JUSC contacted several charities and examined IRS Form 990. JUSC looked for increases in support by examining direct public support and net assets. "Direct public support" is defined as contributions, gifts, grants, and bequests received directly from the public. Direct public support includes amounts received from individuals, trusts, corporations, estates, foundations, public charities, or raised by an outside professional fundraiser.<sup>8</sup> The term "net assets" is defined as the difference between a charity's assets and its liabilities. Although charities do not exist to make money, they do work to build and maintain reasonable reserves of net assets. Growing its net assets helps a charity outpace inflation and sustain future program activities.<sup>9</sup>

Last, crime statistics were examined in the same "pre and "post" fashion. JUSC obtained data from 1990 and compared it with the most current data available at the county level.

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<sup>8</sup> GuideStar

<sup>9</sup> Charity Navigator

## Companies Operating in Marcellus Shale in Northeastern Pennsylvania

Several energy companies are seizing upon Northeast Pennsylvania's mainly untouched natural gas reservoir and are making significant investments in Marcellus Shale. Many of these companies have drilled for natural gas in Texas, Arkansas, Oklahoma, and West Virginia, and are just beginning to set their sites on Pennsylvania. Some estimates predict that more than 20 oil and gas companies will invest \$700 million this year to develop the Marcellus Shale. Up to 50% of that investment is expected to occur in Pennsylvania. The cost to companies for leasing mineral rights jumped from \$300 per acre in early 2008 to nearly \$2,500 per acre in May 2008. All companies pay landowners royalty rights, which have jumped from 15% to 20%. Below are summaries of some of the region's major players in this natural gas rush:<sup>10</sup>

- Chesapeake Energy Corporation, based in Oklahoma City, Oklahoma, is a Fortune 500 company and one of the nation's largest natural gas exploration firms. Its stock price opened the year at approximately \$36 per share, and has recently topped \$60 per share. Chesapeake Energy is the country's second largest independent natural gas producer and its third largest overall natural gas producer. The company is the largest leasehold owner in the Marcellus Shale play that spans from West Virginia to southern New York. The company is currently using two operated rigs to further develop its one million net acres of Marcellus leasehold. Assuming 1,400 net wells are drilled in the years ahead, Chesapeake Energy's estimated risked unproved reserves are approximately 1.4 Tcf (5.7 Tcf of unrisked-unproved reserves). The company's targeted results for vertical Marcellus Shale wells are \$1.6 million to develop 1.25 Bcf (billion cubic feet) of natural gas on approximately 160 acres. The company has not yet developed a model for targeted results from horizontal wells in the play.
- North Coast Energy, Inc., based in Akron, Ohio, develops and explores new natural gas and oil properties in the Appalachian basin. In 2004, the company became the petroleum exploration division of Exco Resources, Inc. The company has 9,274 wells in Marcellus Shale and 360,000 acres under lease, most which are in Pennsylvania. This year, the company plans to drill 600 vertical and horizontal wells.
- Range Resources Corp., based in Fort Worth, Texas, explores and develops oil and natural gas properties in the southwestern Appalachian, and Gulf Coast regions. Range Resources plans to allocate about \$200 million this year, one-fifth of its capital spending, to Marcellus Shale.

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<sup>10</sup> Scranton Times. *Gas drilling Firms in Rush for Riches.*

Range Resources is traded on the New York Stock Exchange (NYSE) under the ticker RRC.

- Chief Oil & Gas, LLC, based in Dallas, Texas, was founded in 1993 and is one of the first companies to have drilled for natural gas in Texas' Barnett Shale, which is similar to Marcellus Shale. The privately-held company accumulated 200,000 leased acres of Barnett Shale and had 250 wells producing 100 MMcf per day. The company divested many of its assets in order to focus on exploration in the Rocky Mountains and Pennsylvania.
- East Resources, Inc., based in Vienna, West Virginia, leases more than 1.25 million acres and operates more than 2,400 wells in New York, Pennsylvania, West Virginia, and Colorado. In Bradford, Tioga, Sullivan and Wyoming Counties, the company has leased more than 300,000 acres. The company also owns a West Virginia natural gas utility.
- Fortuna Energy, Inc., based in Horseheads, New York, had 63 wells in the Southern Tier in 2006. Fortuna is a subsidiary of Talisman Energy, Inc., of Calgary, Alberta, Canada, which has operations worldwide.
- Equitable Production Co. is a subdivision of Pittsburgh-based Equitable Resources, which is traded on the NYSE under the ticker EQT. The company finds, delivers and deals natural gas in the Appalachian region.
- Cabot Oil & Gas Corp., of Houston, Texas, is an independent exploration and production company. This year, the company plans to spend 80% of its capital budget in East Texas and on Marcellus Shale. The company intends to drill 20 wells in Pennsylvania in 2008, which a company executive described as "scratching the surface of one of the hottest plays in the industry today." The company has an extensive leasing program targeting Marcellus Shale in six areas of Pennsylvania and West Virginia. According to the company, more than 100,000 acres have been leased. In addition, two vertical wells have been drilled in one area with limited tests from a thick Marcellus Shale section at rates between 800 and 1,000 Mcf (thousand cubic feet) per day. According to Cabot Oil, this rate exceeds most reported industry rates from vertical Marcellus Shale completions.
- Southwestern Energy Production Co., headquartered in Houston, Texas, expects to invest \$26 million in various exploration and new ventures, including drilling up to three vertical wells targeting Pennsylvania's Marcellus Shale. The company is traded on NYSE under the ticker SWE. At the end of 2007, Southwestern Energy held 156,465 net undeveloped acres in areas of the country outside of its core operating areas in connection with its new ventures. This compares with 89,592 net undeveloped acres held at year-end 2006. Of its 156,465 net undeveloped acres held at year-end 2007, approximately 88,000 net undeveloped acres were located in Pennsylvania's Marcellus Shale play.

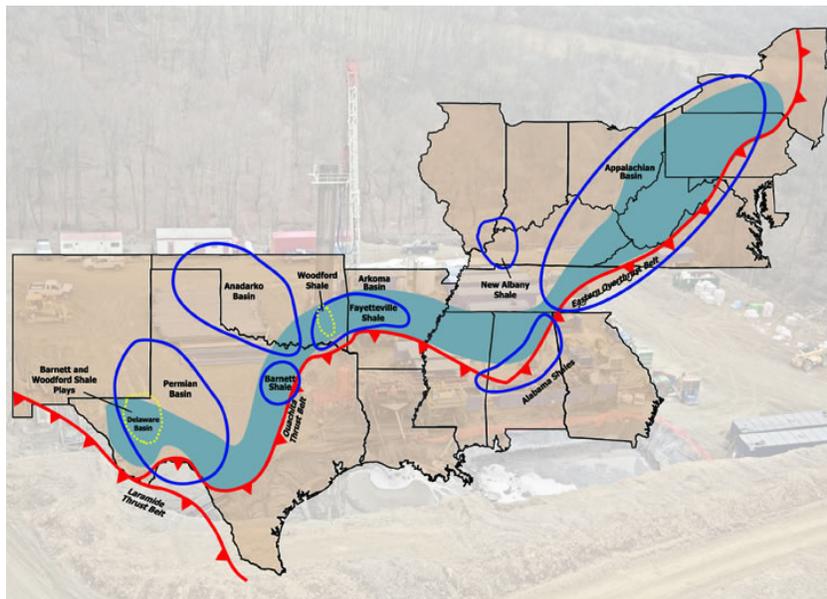
## Case Studies

### The Impact of Other Unconventional Shale Gas Basins throughout the U.S.

This section offers a detailed look at the impact of various types of natural gas producing shale on local economies. The purpose of providing a case study in this analysis is to demonstrate how an industry, such as the natural gas industry, can affect a region. Although case studies do not allow us to make a direct presumption of what will occur in the Pennsylvania region studied, they offer a glimpse into possibilities and demonstrate lessons that may be learned.

This report examines four case studies within two U.S. regions that have experienced the effects of natural gas drilling. First, JUSC studied Barnett Shale located in Dallas/Fort Worth, Texas. The area's regional economy is booming and will likely maintain vitality through the country's current economic slowdown. We examined Barnett Shale in Texas' Denton and Wise Counties – counties that are similar to the Pennsylvania counties studied. Both counties have experienced significant growth in the last fifteen years, in part due to Barnett Shale. Finally, JUSC examines Fayetteville Shale in Arkansas. Although this play is newer than the Barnett Shale play, the region is already feeling the industry's impact and, through 2025, is expected to grow in terms of population, economy and workforce.

### Unconventional Shale Gas Basins



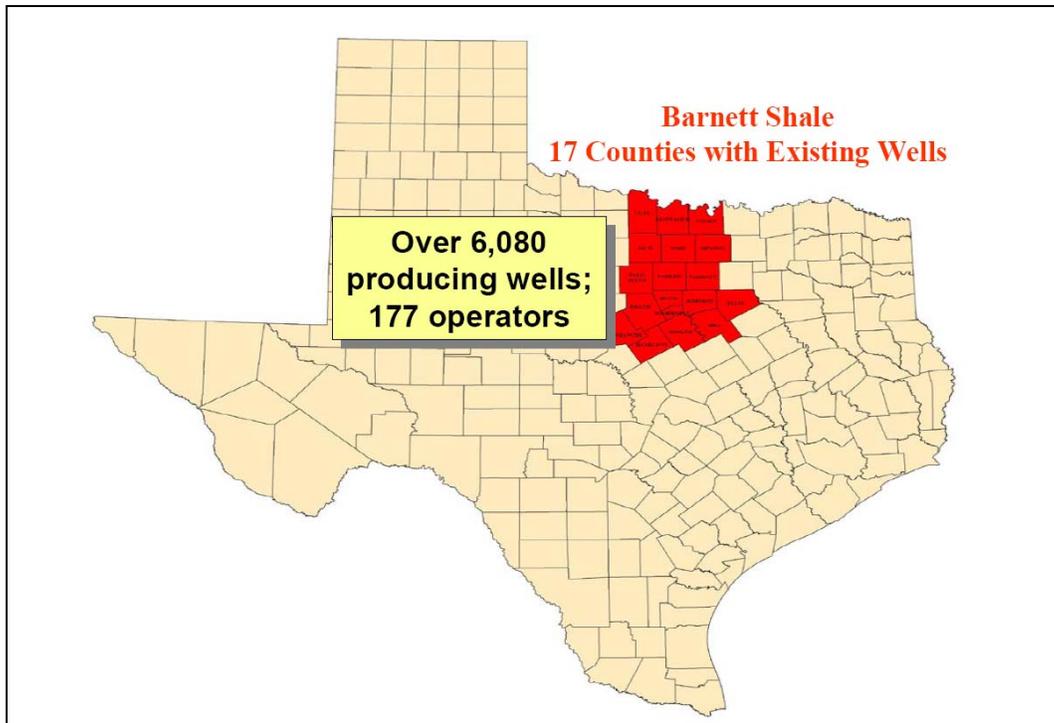
Source: AAPG

## Barnett Shale

Barnett Shale is a hydrocarbon-producing geological formation of great economic significance to Texas. It consists of sedimentary rock and the productive part of the formation is estimated to stretch west and south from the City of Dallas, covering 5,000 square miles and at least eighteen counties.<sup>11</sup> It is the nation's second largest producing on-shore domestic natural gas field.

Texas' Barnett Shale field, located in the Dallas/Fort Worth area, was discovered in 1981 by Mitchell Energy. It was only after improvements in recovery methods during the late 1990's that significant production was made possible. When price increases in natural gas made recovery economically feasible, Barnett Shale production markedly accelerated.<sup>12</sup>

### Counties with Existing Wells



Source: Texas Railroad Commission

<sup>11</sup> Rail Road Commission of Texas. Barnett Shale Information.

<sup>12</sup> Bounty from Below. The Perryman Group.

The Dallas/Fort Worth area is one of the nation's largest natural gas production regions. According to an economic impact analysis of Barnett Shale, total natural gas production has grown sharply in recent years and has accounted for 12% of Texas' 2006 total natural gas production. This development has produced a substantial number of businesses, leading to the creation of jobs and economic opportunities for thousands of area residents and companies. Retail sales taxes, occupancy taxes, and other sources of fiscal revenue have increased, as the enhanced level of aggregate performance spans a broad spectrum of sectors.<sup>13</sup> These resources afford numerous opportunities for investments in overall community well-being. In addition, companies operating in the Barnett Shale have provided substantial time and monetary contributions to local charities.<sup>14</sup>

Prior to the emergence of Barnett Shale, Fort Worth had established itself as one of Texas' largest cities and a major contributor to the state's overall business prosperity. It is also central to a dynamic urban region, the population of which recently exceeded six million. Its Barnett Shale is has been described as 'icing on the cake' for an area already performing quite well; once the Barnett Shale play is exhausted, many of its impacts and economic benefits will remain.<sup>15</sup>

## Drilling and Production

There are 177 companies with operations in Texas' Barnett Shale.

### Major Operators in the Barnett Shale 2006

Operator Name	Oil (BBL)	Casinghead (MCF)	GW Gas (MCF)	Condensate (BBL)
Devon Energy Production Co., L.P.	8,414	503,894	236,977,466	393,878
XTO Energy Inc.	0	0	90,661,322	1,216
EOG Resources Inc.	0	0	61,085,218	29,414
Chesapeake Operating Inc.	0	0	56,276,424	5,723
EnCana Oil & Gas (USA) Inc.	106,516	615,700	48,642,290	155,352
Burlington Resources O&G Co., L.P.	0	0	32,106,724	422,750
Chief Oil & Gas LLC	15,482	745,598	18,441,349	12,780
J-W Operating Co.	0	0	12,086,942	0
Denbury Onshore LLC.	0	0	10,637,777	5,788
Quicksilver Resources Inc.	0	0	10,582,810	82,658

Source: Drilling for Dollars

<sup>13</sup> Bounty from Below

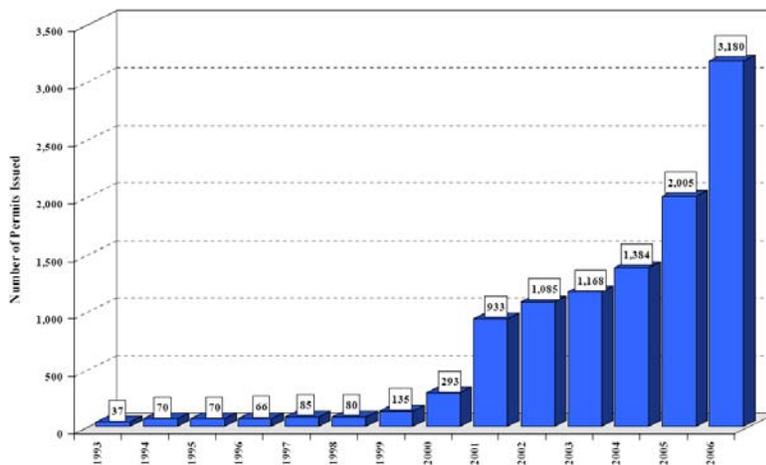
<sup>14</sup> Ibid

<sup>15</sup> *The Icing on the Cake*. Perryman Group Newsletter

Drilling for and production of natural gas has skyrocketed over the last fifteen years, and more so in the last six years. Currently, Texas has thousands of wells producing hundreds of billions of cubic feet of natural gas each year.<sup>16</sup> In 2007, Barnett Shale produced 1,165 Bcf of natural gas. Assuming an average sale price of \$7 per Mcf (thousand cubic feet), and an average royalty rate of 20%, last year royalty owners split just more than \$1.6 billion in royalty payments. Texas' Barnett Shale is estimated to contain a trillion cubic feet of natural gas every seven square miles. The average natural gas in place within Barnett Shale is 160 Bcf (billion cubic feet) of natural gas per square mile. The expanded play now has well over 2,000 successful commercial wells, with very few disappointments and marginal wells, attributable to the low-risk, blanket nature of the productive formation. Driven by technological advances in fracturing techniques and horizontal drilling, natural gas production from the Barnett Shale has now reached levels exceeding 900 Mmcf (million cubic feet) per day.<sup>17</sup>

The cost of drilling an "average" well in Barnett Shale is \$2.5 to \$3.3 million. Drilling in urban areas, like many of the wells in the Barnett region, is 5% to 10% higher than in rural areas. The average cost of drilling a well has not changed significantly in the last two to three years, despite higher commodity prices. New technology has allowed a well to be completed in about sixteen days, compared to 33 days just a few years ago.<sup>18</sup>

**Barnett Shale Drilling Permits**  
(1993 through 2006)



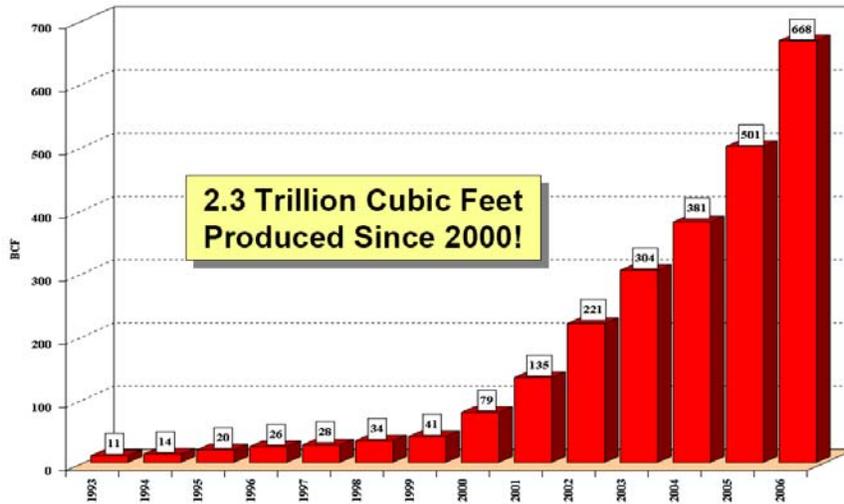
Source: Texas Railroad Commission

<sup>16</sup> Drilling for Dollars. The Perryman Group.

<sup>17</sup> The Oil Drum.

<sup>18</sup> Wise County Messenger Online. *Devon completes 1,000th horizontal well in Barnett.*

## Natural Gas Production in Barnett Shale (1993 through 2006)



Source: Texas Railroad Commission

### Economic Impacts

Activity in Barnett Shale generates thousands of jobs and tens of billions in investment dollars. Royalty and bonus payments to area residents, cities, school districts, and others continue to rise, as do property tax receipts to local taxing authorities. Barnett Shale generates a multi billion dollar direct impact on the economy, with multiplier effects rippling through virtually all regional industries.<sup>19</sup> Texas production has resulted in \$10.1 billion in annual output, and 55,000 permanent jobs.<sup>20</sup>

Activity has risen sharply over the past several years due to recovery technique improvements. Figure 4 demonstrates Barnett Shale's rapid production growth over a seven-year period.

The fiscal impact of Barnett Shale on local taxing entities stems from two primary sources: 1) taxes paid on oil and gas properties, and 2) enhanced retail sales and real estate development due to its economic impact. In addition to these major income sources, Texas' Barnett Shale leads to payments of royalties and bonuses directly to cities, school districts, and others, as well severance taxes of approximately \$165.4 million to the State of Texas in 2006. There are also various permits and fees payable to local governments and other state revenues stemming from various types of taxable activity.<sup>21</sup>

Exploration, drilling, and production in the Barnett Shale have:

<sup>19</sup> Drilling for Dollars. The Perryman Group.

<sup>20</sup> Ibid.

<sup>21</sup> Bounty from Below. The Perryman Group.

- Transformed the economy through thousands of new jobs and millions of investment dollars;
- Resulted in royalty and bonus payments to local residents, cities, school districts, and others totaling millions of dollars each year;
- Increased property tax receipts to counties, schools, and other entities; and
- Contributed to opportunities and prosperity for the entire region.<sup>22</sup>

When all major categories of stimulus from Barnett Shale activity are summed, the result includes \$5.2 billion in annual output and some 55,385 permanent jobs. Such impacts are notable, even in this region's large and diverse economy. The overall effects of Barnett Shale activity are expected to account for an average of more than 108,000 jobs and \$10.4 billion in output per year through 2015.

For Tarrant County, oil and natural gas property values escalated from \$1.2 million in 2000 to a staggering \$741.8 million in 2005. This resulted in a substantial increase in property tax receipts. One particular city plans to use money generated from the Barnett Shale for general operations as well as improvements to the arts, parks, and other amenities – making the city more appealing to its businesses and residents.<sup>23</sup>

### Historical and Projected Values for Key Economic Indicators for the Barnett Shale Region

Date	Gross Area Product	Private Gross Area Product	Real Gross Area Product	Private		Real		Real Personal Income (by place of work)
				Real Gross Area Product	Personal Income (by place of residence)	Personal Income (by place of residence)	Personal Income (by place of work)	
2001	\$73,082.660	\$65,783.714	\$85,048.633	\$75,969.208	\$74,941.131	\$86,986.647	\$49,533.454	\$57,495.116
2002	\$76,343.722	\$68,499.154	\$88,606.969	\$79,262.763	\$76,349.170	\$88,554.889	\$42,602.240	\$49,412.936
2003	\$80,082.608	\$71,718.384	\$89,927.581	\$80,382.536	\$78,841.470	\$88,413.448	\$43,850.862	\$49,174.704
2004	\$86,461.309	\$77,540.460	\$95,103.181	\$85,290.687	\$83,615.133	\$91,972.528	\$46,688.991	\$51,355.590
2005	\$96,878.852	\$86,884.967	\$100,357.220	\$90,004.511	\$90,121.190	\$93,356.928	\$50,278.803	\$52,084.029
2006	\$106,011.651	\$95,077.629	\$106,011.651	\$95,077.629	\$98,378.761	\$98,378.761	\$55,041.789	\$55,041.789
2007	\$113,257.264	\$101,578.056	\$110,563.640	\$99,162.201	\$105,635.625	\$103,123.268	\$59,098.496	\$57,692.943
2008	\$121,276.907	\$108,772.981	\$115,407.139	\$103,508.400	\$113,066.853	\$107,594.450	\$63,252.567	\$60,191.161
2009	\$129,734.453	\$116,360.970	\$120,380.673	\$107,971.411	\$120,879.692	\$112,164.335	\$67,619.343	\$62,744.027
2010	\$138,785.006	\$124,481.165	\$125,562.590	\$112,621.514	\$129,157.787	\$116,852.582	\$72,245.887	\$65,362.830
2011	\$148,384.419	\$133,094.002	\$130,923.817	\$117,432.645	\$137,911.498	\$121,683.260	\$77,137.942	\$68,061.013
2012	\$158,527.414	\$142,194.778	\$136,432.404	\$122,376.155	\$147,162.870	\$126,651.811	\$82,307.797	\$70,836.017
2013	\$169,251.068	\$151,816.781	\$142,104.799	\$127,466.807	\$156,930.842	\$131,760.621	\$87,766.000	\$73,689.165
2014	\$180,579.264	\$161,981.467	\$147,942.174	\$132,705.659	\$167,235.658	\$137,010.231	\$93,523.828	\$76,620.749
2015	\$192,536.093	\$172,710.480	\$153,945.429	\$138,093.531	\$178,097.652	\$142,400.933	\$99,592.603	\$79,630.919

Source: Bounty from Below

<sup>22</sup> Ibid.

<sup>23</sup> Ibid.

## Case Study 1: Denton County, Texas

Denton County is located in North Texas and is part of the Dallas/Fort Worth metropolitan area. Pre-Barnett Shale, the county was comparable to Lackawanna and Luzerne Counties. The three counties were similar in terms of household income and educational attainment, among several other categories. It is a moderately-sized county that has experienced rapid growth since the late 1990's, when Barnett Shale came into play. It is important to look at the impact of Barnett Shale on Denton County's local economy in order to draw a comparison to our region. This county is used as a case study because of its similarities to some of the counties comprising Northeast Pennsylvania.

In 1995, Denton County had a population of 317,850. At the time, 156 wells provided the county with mineral revenue of \$88,786. By 2004, Denton County's population reached 528,950 and 1,460 wells provided the county with mineral of more than \$2.7 million. This represents a 66.4% increase in population, an 835.9% increase in wells, and a whopping 2,976% increase in mineral valuation.<sup>24</sup>

A variety of factors contributed to Denton County's growth, including the fact that state and local regulations facilitated natural gas drilling and production. In addition, each well can produce fuel for up to two decades; and it is estimated that the Barnett Shale formation can produce natural gas for up to 30 years.

This case study examines Denton County's population, economic, and social data at three distinct time periods: 1990 – before energy companies were able to recover Barnett Shale; 2000 – a few years after the technology to drill for this type of shale became available; and 2005 or 2006 (depending on data source) – the most recent data available, which provides a current snapshot of the county's social and economic status.

<b>Denton County Population 1990 – 2006</b>					
<b>1990</b>		<b>2000</b>		<b>2006</b>	
Total population	273,525	Total population	432,976	Total population	584,238

Source: U.S. Census Bureau

<sup>24</sup> Denton County Oil and Gas Task Force Summary Report. June 1, 2005

Barnett Shale is largely responsible for Denton County's growing population, which has more than doubled since 1990. The county's largest population increase occurred in residents age 45-59. This may infer that the Barnett Shale industry is attracting older, more experienced workers.

The table below demonstrates the effects of Barnett Shale on business activity. Clearly, the Barnett Shale industry has had a ripple effect on many business activities. For example, the industry has created 2,569 permanent jobs. The industry has also increased gross product and personal income.

**The Current Annual Impact of Exploration, Drilling, and Operations in the Barnett Shale on Business Activity in Denton County**

Category	Total Expenditures	Gross Product	Personal Income	Employment (Permanent Jobs)
Agricultural Products & Services	\$7,471,466	\$2,079,176	\$1,416,033	26
Forestry & Fishery Products	\$9,294	\$11,402	\$4,221	0
Coal Mining	\$11,287	\$3,280	\$3,464	0
Crude Petroleum & Natural Gas	\$469,658,936	\$102,933,330	\$47,472,730	271
Miscellaneous Mining	\$45,368	\$19,307	\$11,345	0
New Construction	\$0	\$0	\$0	0
Maintenance & Repair Construction	\$37,083,620	\$20,031,460	\$16,507,173	271
Food Products & Tobacco	\$8,495,185	\$2,185,723	\$1,116,574	22
Textile Mill Products	\$4,552	\$1,541	\$1,312	0
Apparel	\$3,676,115	\$2,019,994	\$1,023,558	32
Paper & Allied Products	\$2,413,115	\$1,109,884	\$501,763	9
Printing & Publishing	\$3,355,360	\$1,687,521	\$1,101,484	22
Chemicals & Petroleum Refining	\$17,583,842	\$3,096,852	\$1,454,148	12
Rubber & Leather Products	\$1,813,009	\$761,100	\$444,932	10
Lumber Products & Furniture	\$1,106,387	\$355,033	\$253,116	5
Stone, Clay, & Glass Products	\$2,363,147	\$1,201,889	\$628,593	11
Primary Metal	\$77,412	\$23,285	\$17,329	0
Fabricated Metal Products	\$5,883,591	\$2,192,617	\$1,415,554	28
Machinery, Except Electrical	\$3,363,235	\$1,425,545	\$1,018,412	12
Electric & Electronic Equipment	\$2,596,597	\$1,434,956	\$857,855	8
Motor Vehicles & Equipment	\$1,277,000	\$304,162	\$197,602	3
Transp. Equip., Except Motor Vehicles	\$405,260	\$170,080	\$111,145	1
Instruments & Related Products	\$567,808	\$245,519	\$186,620	2
Miscellaneous Manufacturing	\$1,091,051	\$404,629	\$279,081	5
Transportation	\$7,910,097	\$5,192,149	\$3,433,903	55
Communication	\$9,673,043	\$5,974,783	\$2,550,831	26
Electric, Gas, Water, Sanitary Services	\$22,575,780	\$5,051,829	\$2,204,482	11
Wholesale Trade	\$19,040,534	\$12,866,700	\$7,419,052	97
Retail Trade	\$41,095,996	\$34,088,970	\$20,384,111	621
Finance	\$7,520,353	\$4,185,859	\$2,437,439	24
Insurance	\$5,148,632	\$3,097,012	\$1,851,523	26
Real Estate	\$84,159,982	\$22,819,264	\$3,676,681	37
Hotels, Lodging Places, Amusements	\$3,858,521	\$2,019,564	\$1,324,905	38
Personal Services	\$8,639,341	\$5,332,693	\$4,148,911	81
Business Services	\$16,180,887	\$9,429,208	\$7,691,827	109
Eating & Drinking Places	\$22,277,966	\$13,070,464	\$6,954,183	365
Health Services	\$14,519,641	\$10,137,786	\$8,571,591	165
Miscellaneous Services	\$13,737,290	\$5,677,253	\$4,921,704	137
Households	\$329,914	\$329,914	\$322,942	26
<b>Total</b>	<b>\$847,022,624</b>	<b>\$282,971,729</b>	<b>\$153,918,129</b>	<b>2,569</b>

Source: Bounty from Below

Denton County residents also benefited directly from the Barnett Shale industry. The county experienced tremendous growth in median household income – from \$36,914 in 1990 to \$66,792 in 2006. The largest increase occurred in the \$100,000 - \$149,999 income range. In 1990, just 3% of the county’s population fell into that income bracket; by 2006, it was more than 16%.

<b>Denton County Income 1990 – 2006</b>								
<b>1990</b>			<b>2000</b>			<b>2006</b>		
<b>Total households</b>	<b>102,025</b>	<b>100</b>	<b>Total households</b>	<b>159,062</b>	<b>100</b>	<b>Total households</b>	<b>198,774</b>	<b>100</b>
Median household income (dollars)	36,914	(X)	Median household income (dollars)	58,216	(X)	Median household income (dollars)	66,792	(X)

Source: U.S. Census Bureau

JUSC also examined poverty status among families from 1990 to 2006. Although median household income increased from 1990 to 2006, Denton County also saw an increase in its poverty rate. From 2000 to 2006, its poverty rate increased from 4.1% to 5.7% in families with children under age 18. The number of families below the poverty level receiving Supplemental Security Income (SSI) and/or public assistance income increased from 8.9% to 27.9%. The poverty level increased from 4.1% in 2000 to 5.7% in 2006. The number of individuals receiving public assistance dollars also increased from 1,805 to 2,324.

JUSC also looked at income in terms of individual tax return data, which was obtained from the Internal Revenue Service (IRS). Denton County showed a 325% increase in dividends from 1990 to 2005, with adjusted gross income of 312.8%.

<b>Denton County Tax Return Data 1990 – 2005</b>							
	<b>Number of Returns</b>	<b>Number of Exemptions</b>	<b>Adjusted Income</b>	<b>Wages &amp; Salaries</b>	<b>Dividends Before Exclusions</b>	<b>Interest Received</b>	<b>Gross Rents &amp; Royalties</b>
1990	92,235	219,385	3,432,829	3,005,711	29,004	151,178	89,091
2000	163,704	373,348	10,831,294	9,019,378	110,453	198,085	168,374
2005	209,681	488,001	14,171,829	12,072,937	123,211	182,459	N/A
Percentage Change	127.3%	122.4%	312.8%	301.7%	324.8%	20.7%	N/A

Source: Internal Revenue Service

(numbers in thousands)

Denton County's number of owner-occupied housing units soared during the time period studied. In 1990, the county contained 48,766 units; by 2006, that number increased to 135,650 – a 178% jump.

Denton County Owner-Occupied Households 1990 – 2006								
1990			2000			2006		
Total households	48,766	100	Total households	88,484	100	Total households	135,650	+/-3,436
Median (dollars)	89,100	(X)	Median (dollars)	133,200	(X)	Median (dollars)	171,700	+/-2,942

Source: U.S. Census Bureau

### Impact on Charity – Review of IRS Form 990

JUSC examined several non-profit 501(c)(3) public charities. Specifically, those who had filed Form 990. Form 990 is used by tax-exempt organizations to provide IRS with financial information. The forms were examined before and after fashion – before the Barnett Shale became such a lucrative industry and after, to include the most current information available. For the purposes of this study, JUSC looked at direct public support to test whether each organization saw increases in donations, both individual and corporate.

#### United Way of Denton County

United Way of Denton County is a catalyst that facilitates the community's organized efforts to identify and address its residents' existing and emerging needs.<sup>25</sup> This organization's Form 990 for tax year 1997 revealed that it had received approximately \$1.2 million in direct public support. Its direct public support increased to more approximately \$1.7 million in 2006. Net assets or fund balances at the end of the year also increased from more than \$1.4 million in 1997 to over \$2 million in 2006. Last year, this charity received unsolicited donations from two natural gas companies. However, the organization plans to solicit donations from several energy companies in this year's campaign. It hopes that more energy company donations will offset the economic slowdown.

JUSC contacted and had the opportunity to survey a representative of the United Way of Denton. Below is an excerpt from that survey.

**Question:** How long have natural gas companies been a presence in your area?

<sup>25</sup> United Way of Denton County

**Response:** Natural gas companies have been visible in the area for nearly three years.

**Question:** Overall, would you say that the presence of natural gas companies in your area has been a positive experience?

**Response:** It has been a very positive experience.

**Question:** Have you received funding from the natural gas companies in your area?

**Response:** Two unsolicited donations were received.

**Question:** From which companies have you received funding/contributions?

**Response:** Chesapeake Energy and Devon Energy.

(Although the respondent did not comment on the amounts contributed, she indicated the Devon Energy donated a particularly large sum.)

Overall, the respondent was very positive about energy companies and the Barnett Shale industry.

#### Community Foundation of North Texas

Community Foundation of North Texas is a tax-exempt organization that provides stewardship for individual charitable funds. With its specialized services, Community Foundation provides efficient charitable fund administration.<sup>26</sup> As detailed in the table below, its charitable contributions between 1998 and 2006 increased by more than \$5 million.

Revenue	1998	2006
Contributions	\$4,651,631	\$9,817,876
Government Grants	\$0	\$0
Program Services	\$256,612	\$589,557
Investments	\$3,098,141	\$17,949,769
Special Events	\$0	\$0
Sales	\$0	\$0
Other	\$0	\$7,217
Total Revenue	\$8,006,384	\$28,364,419

Source: GuideStar

#### Habitat for Humanity of Denton, Inc.

Habitat for Humanity of Denton is an independently chartered affiliate of Habitat for Humanity International. Form 990 for this organization revealed that it received \$94,662 in direct public support in 1997 and \$445,122 in 2006. Net

<sup>26</sup> Community Foundation of North Texas.

assets for Habitat for Humanity of Denton also increased from \$320,676 in 1997 to more than \$1.6 million in 2006.

### **Impact on Crime**

JUSC examined Denton County crime statistics between 1990 and 2002. During that time period, crime increased slightly, with violent crimes increasing from 344 to 479, and property crimes increasing from 1555 to 2035. When reviewing individual crimes, we found slight increases in most categories, including: murder, rape, robbery, aggravated assault, burglary, larceny, and motor vehicle theft. During the specified time period, Denton County's population increased from 204,734 in 1990 to 474,498 in 2002. Obviously, a more than doubling in Denton County's population is one reason for its increased crime statistics.

## Case Study 2: Wise County Texas

Wise County, Texas, is a smaller county, and similar to Wyoming and Wayne Counties, in Pennsylvania. In 1990, Wise County's population was 34,679; by 2006, it increased to 57,589.

Wise County Population 1990 – 2006					
1990		2000		2006	
Total population	34,679	Total population	48,493	Total population	57,589

Source: U.S. Census Bureau

From 1990 to 2000, Wise County's median household income increased by over \$15,000. Looking at poverty level, we saw a decrease in those who are considered living below poverty level. In 1990, nearly 14% of Wise County residents were living below poverty level; by 2000, this figure dropped to 7.5%.

Wise County Income 1990 – 2000*					
1990			2000		
Households	12,179	100	Households	17,180	100
Median household income (dollars)	25,885	(X)	Median household income (dollars)	41,933	(X)

Source: U.S. Census Bureau

\* 2006 Data not available

The table below display additional effects of Barnett Shale on business activity. There has been a ripples effect on Wise County, similarly to that of Denton County. The industry has created over 7,000 permanent jobs and increased gross product and personal income.

**The Current Annual Impact of Exploration, Drilling, and Operations in the Barnett Shale on Business Activity in Wise County**

Category	Total Expenditures	Gross Product	Personal Income	Employment (Permanent Jobs)
Agricultural Products & Services	\$22,627,449	\$6,300,949	\$4,291,309	78
Forestry & Fishery Products	\$470,062	\$579,101	\$214,809	3
Coal Mining	\$3,126,767	\$909,628	\$968,510	7
Crude Petroleum & Natural Gas	\$1,518,076,756	\$332,707,340	\$153,444,222	876
Miscellaneous Mining	\$1,353,938	\$576,436	\$338,850	4
New Construction	\$0	\$0	\$0	0
Maintenance & Repair Construction	\$114,437,055	\$61,838,529	\$50,958,808	836
Food Products & Tobacco	\$0	\$0	\$0	0
Textile Mill Products	\$0	\$0	\$0	0
Apparel	\$3,875,865	\$2,129,456	\$1,079,031	32
Paper & Allied Products	\$0	\$0	\$0	0
Printing & Publishing	\$4,308,576	\$2,166,575	\$1,414,157	25
Chemicals & Petroleum Refining	\$1,145,931	\$202,277	\$94,986	1
Rubber and Leather Products	\$2,325,957	\$975,926	\$570,523	12
Lumber Products & Furniture	\$2,377,481	\$761,583	\$542,989	13
Stone, Clay, & Glass Products	\$7,260,948	\$3,689,037	\$1,929,358	35
Primary Metal	\$0	\$0	\$0	0
Fabricated Metal Products	\$19,628,764	\$7,317,290	\$4,724,054	93
Machinery, Except Electrical	\$7,911,289	\$3,354,250	\$2,396,303	28
Electric & Electronic Equipment	\$8,272,399	\$4,570,953	\$2,732,681	25
Motor Vehicles & Equipment	\$3,884,615	\$926,383	\$601,812	8
Transp Equip, Except Motor Vehicles	\$1,609,441	\$675,222	\$441,231	5
Instruments & Related Products	\$0	\$0	\$0	0
Miscellaneous Manufacturing	\$311,300	\$115,285	\$79,541	1
Transportation	\$42,401,239	\$27,665,037	\$18,296,650	295
Communication	\$15,650,981	\$9,683,722	\$4,134,268	42
Electric, Gas, Water, Sanitary Serv	\$61,605,487	\$13,785,457	\$6,015,603	29
Wholesale Trade	\$34,029,520	\$22,994,931	\$13,259,087	174
Retail Trade	\$121,396,500	\$100,695,093	\$60,212,466	1,837
Finance	\$21,969,652	\$12,238,994	\$7,126,801	72
Insurance	\$10,370,186	\$6,238,556	\$3,729,664	49
Real Estate	\$161,826,954	\$39,712,347	\$6,398,536	66
Hotels, Lodging Places, Amusements	\$13,087,318	\$6,839,311	\$4,486,840	127
Personal Services	\$25,379,485	\$15,658,618	\$12,182,661	238
Business Services	\$26,345,274	\$15,036,516	\$12,265,950	172
Eating & Drinking Places	\$66,347,302	\$38,928,965	\$20,712,308	1,090
Health Services	\$30,359,964	\$21,287,482	\$17,998,765	346
Miscellaneous Services	\$41,382,791	\$17,131,418	\$14,851,498	414
Households	\$1,451,531	\$1,451,531	\$1,420,806	114
<b>Total</b>	<b>\$2,396,598,776</b>	<b>\$779,144,199</b>	<b>\$429,905,079</b>	<b>7,146</b>

The table below depicts Wise County IRS tax return data. The data shows a 148% increase in dividends, with 213% included in adjusted gross income.

Wise County, Texas							
	Number of Returns	Number of Exemptions	Adjusted Gross Income	Wages & Salaries	Dividends Before Exclusions	Interest Received	Gross Rents & Royalties
1990	11,752	29,479	313,104	246,361	2,787	28,742	22,147
2000	16,880	40,325	722,205	574,436	5,446	24,081	31,238
2005	19,456	46,213	980,012	750,709	6,913	17,335	N/A
Percentage Change 1990 - 2005	65.60%	56.80%	213.00%	204.70%	148.00%	-39.70%	N/A

Source: Internal Revenue Service

The number of Wise County's owner-occupied housing units also increased between 1990 and 2000. In 1990 it reported 48,766 units; by 2006, the number of units increased to 135,650 –178% jump.<sup>27</sup>

<b>Wise County Owner Occupied Households</b>				
	<b>1990</b>	<b>2000</b>		<b>Percentage Change 1990- 2006</b>
Owner Occupied Housing	4760	6,680		40.3%
Median Home Value	\$49,700	\$89,100		79.3%

Source: U.S. Census Bureau

### **Impact on Charity – Review of IRS Form 990**

As founding sponsor of the “Wise Eyes” crime watch program, Devon Energy works with law enforcement to encourage community involvement in crime prevention. Under Wise Eyes, county sheriffs and police departments establish communication networks that make it easier for private citizens to report crimes or suspicious activities in their communities. The program began in Wise County, Texas, in 1993 and has expanded to numerous other Texas counties.<sup>28</sup>

#### United Way of Wise County

As a registered Texas non-profit corporation, United Way of Wise County conducts annual fund raising campaigns and allocates proceeds to local charities on the basis of their needs, specific services provided, number of families served, and other considerations. The United Way of Wise County’s website lists its major donors, the top donor being Devon Energy. The company received Diamond Level Recognition by contributing \$50,000 or more last year. IRS Forms 990 indicate that the United Way of Wise County received a significant increase in direct public support between 1997 and 2006. The organization received \$93,270 in 1997 and \$367,843 in 2006. In addition, there was an increase of over \$400,000 in net assets or fund balances, which jumped from \$94,286 in 1997 to \$367,843 in 2006.

#### Wise Regional Health Foundation

The Wise Regional Health Foundation’s exempt purpose is to organize and operate for the support and benefit of the Wise Regional Health System. The foundation solicits, receives, acknowledges, and disburses gifts to the Wise Regional Health System. Gifts are applied in a variety of ways, including for

<sup>27</sup> Census Data for Wise County, Texas not available for 2006.

<sup>28</sup> Devon Energy 2007 Corporate Responsibility Report.

renovations to and construction of medical facilities, as well as to purchase medical equipment and technology. The foundation saw a tremendous jump in contributions between 1998 and 2003 which increased from \$199,795 to \$736,637.

Revenue	2003	2006
Contributions	\$199,795	\$736,637
Government Grants	\$0	\$0
Program Services	\$0	\$0
Investments	\$1,153	\$25,753
Special Events	\$11,722	(\$21,061)
Sales	\$0	\$0
Other	\$0	\$0
Total Revenue	\$212,670	\$741,329

### Impact on Crime

Reviewing crime statistics from 1990 to 2002, JUSC found that similar to Denton County, Wise County's crime had also jumped, whereby total arrests increased from 246 to 302, violent crime increased from 25 to 25, and property crime increased from 221 to 252. In further review of arrest data, JUSC noticed slight increases in several crime categories, including: murder, rape, robbery, aggravated assault, burglary, larceny and motor vehicle theft. Similarly, Wise County's population increased from 34,679 to 50,965 during this time period.

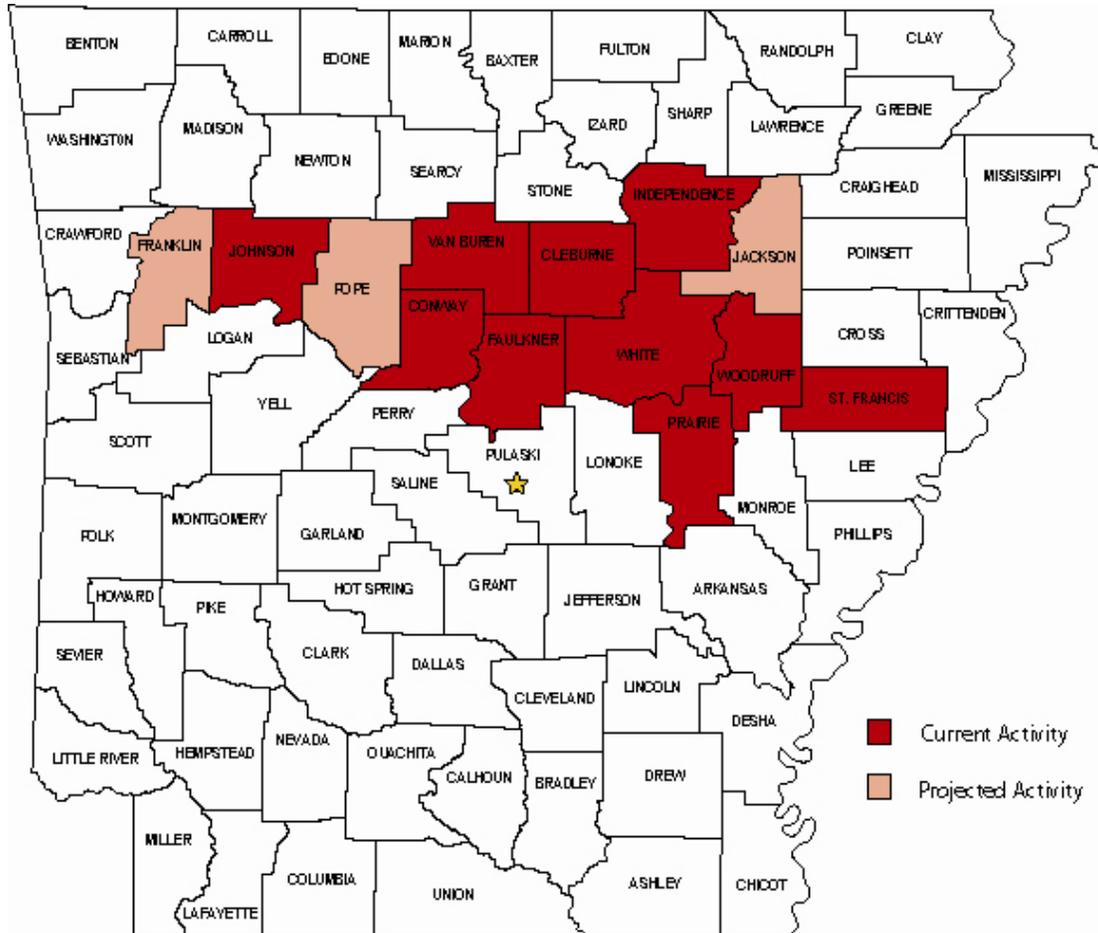
### Fayetteville Shale

Fayetteville Shale is an unconventional natural gas reservoir located on the Arkansas side of the Arkoma Basin, ranging in thickness from 50 to 325 feet and ranging in depth from 1,500 to 6,500 feet. Fayetteville Shale is a Mississippian-age shale that is the geologic equivalent of Caney Shale, which is found on the Oklahoma side of the Arkoma Basin, and Barnett Shale found in North Texas.<sup>29</sup> Fayetteville Shale is aerially extensive and may exist across numerous counties in Central and East Arkansas, including Cleburne, Conway, Faulkner, Independence, Johnson, St. Francis, Prairie, Van Buren, White, and Woodruff Counties. Direct economic activities associated with the development of

<sup>29</sup> Southwestern Energy Company.

Fayetteville Shale include: exploration, extraction, production, transportation, storage, and distribution.<sup>30</sup>

### Arkansas Counties Involved in the Fayetteville Shale Play



Source: Projecting the Economic Impact of the Fayetteville Shale Play for 2005-2008

Fayetteville Shale is a recently-tapped, unconventional natural gas source. The tight, finely-grained rock formation, 300 million years old, ranges in thickness from 50 to 550 feet and in depth from 1,500 to 6,500 feet. Its "sweet spot," where geologists believe the rock holds the greatest natural gas reserve, exists in five Central Arkansas counties, including: Cleburne, Conway, Faulkner, Van Buren, and White. It is anticipated that by the end of 2008, this newly tapped energy source could have a \$5.5 billion impact on Arkansas.<sup>31</sup>

In 2002, Houston-based Southwestern Energy began natural gas exploration in Arkansas, where it holds mineral rights on about 887,000 acres, which are

<sup>30</sup> Arkansas Oil and Gas Commission

<sup>31</sup> Cleburne County Office of Economic Development.

estimated at having the capability to produce 11 Tcf (trillion cubic feet) of natural gas. Southwestern Energy predicts that it may drill as many as 8,000 wells.

Other companies involved in the Fayetteville Shale play, and their approximate acreage, include:<sup>32</sup>

- Chesapeake Energy (1 million acres)
- Hallwood Energy (480,000 acres)
- Maverick Oil & Gas (125,000 acres)
- Shell Exploration & Production Co. (70,000 acres)

By the end of 2006, about 180 wells in Fayetteville Shale were completed.

U.S. natural gas production amounts to approximately 18 Tcf to 19 Tcf annually' Arkansas' production, before the tapping of shale, amounted to about 1% of total U.S. production. A production "unit" in the Fayetteville Shale is normally 640 acres with a maximum of 16 wells in that area, a protective measure instituted after other energy developments witnessed oil rigs packed tightly together, with the first one to strike oil declared the winner.<sup>33</sup>

<b>Projected Economic Impact of the Fayetteville Shale Play in the State of Arkansas</b>					
<b>Year</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>Total 2005-2008</b>
<b>Output Impact</b>	\$520.7 million	\$1.1 billion	\$1.6 billion	\$2.3 billion	\$5.52 billion
<b>Employment Impact</b>	2160	4394	6,661	9,683	9,683
<b>State and Local Tax Impact</b>	\$28.1 million	\$69.5 million	\$105.9 million	\$154.1 million	\$357.7 million

### **Case Study 3: Faulkner County, Arkansas**

According to an economic impact study conducted by the University of Arkansas, Faulkner County's population is expected to increase to 133,170 by 2025.<sup>34</sup> The county's major industries include: manufacturing (19%), retail trade (14%), and accommodation and food services (10%). Leasing land and mineral rights, drilling, and other activities of energy companies within Faulkner County are

<sup>32</sup> Ibid.

<sup>33</sup> Farm Bureau of Arkansas. *The Fayetteville Shale – A Mineral Right Challenge*.

<sup>34</sup> Projecting the Economic Impact of the Fayetteville Shale Play 2005-2008

expected to account for total economic activity of \$308.6 million from 2005 to 2008. By 2008, 0.9% of Faulkner County employment, or 484 jobs, will be attributable to Fayetteville Shale play activities. A total of \$21.5 million in local and state tax revenues will result from energy company investments made between 2005 and 2008.

### Population Impact

Between 1990 and 2006, Faulkner County's population increased by nearly 40%, as detailed in the table below.

<b>Faulkner County Population 1990 – 2006</b>					
<b>1990</b>		<b>2000</b>		<b>2006</b>	
<b>Total population</b>	<b>60,006</b>	<b>Total population</b>	<b>86,014</b>	<b>Total population</b>	<b>100,685</b>

*Source: US Census Bureau*

### Economic Impact

Similar to the previous case study, Faulkner County also experienced a tremendous increase in household income statistics. The number of households earning between \$100,000 and \$149,999 increased from 204 in 1990 to 3,604 in 2006.

<b>Faulkner County Income 1990 – 2006</b>								
<b>1990</b>			<b>2000</b>			<b>2006</b>		
<b>Total households</b>	<b>21,193</b>	<b>100%</b>	<b>Total households</b>	<b>31,853</b>	<b>100%</b>	<b>Total households</b>	<b>39,351</b>	<b>+/-735</b>
Median household income (dollars)	23,663	(X)	Median household income (dollars)	38,204	(X)	Median household income (dollars)	41,748	+/- 2,945

*Source: U.S. Census Bureau*

And while Faulkner County's median household income increased between 2000 and 2006, so too did its poverty level looking at families with children under age eighteen, 7.9% fell below poverty level; this number increased to 15.5% in 2006. The number of families living below poverty level and receiving SSI or public assistance increased from 13.4% in 2000 to 34.2% in 2006.

Faulkner County is a strong example of increased wealth. The table below shows a 222.3% increase in dividends before exclusions, with a 204% increase in adjusted gross income.

<b>Faulkner County Tax Return Data</b>							
	<b>Number of Returns</b>	<b>Number of Exemptions</b>	<b>Adjusted Income</b>	<b>Wages &amp; Salaries</b>	<b>Dividends Before Exclusions</b>	<b>Interest Received</b>	<b>Gross Rents &amp; Royalties</b>
1990	20,814	49,635	\$551,153	\$449,095	\$4,930	\$29,262	\$18,903
2000	32,498	74,563	\$1,376,962	\$1,099,476	\$14,083	\$37,050	\$30,045
2005	35,624	80,670	1,680,270	1,314,348	15,889	27,603	N/A
Percentage Change 1990 - 2005	71.2%	62.5%	204.9%	192.7%	222.3%	-5.7%	N/A

Source: IRS

(numbers in thousands)

Employment has increased tremendously in Faulkner County. Its civilian labor force increased from 31,913 in 1990 to 49,014 in 2006.

<b>Faulkner County Employment Data</b>					
	<b>1990</b>	<b>2000</b>	<b>2004</b>	<b>% Change 1990-2000</b>	<b>% Change 1990-2000</b>
<b>Civilian Labor Force</b>	31,913	45,335	49,014	42%	8%
<b>Employment</b>	29,618	43,704	46,615	48%	7%
<b>Unemployment</b>	2,295	1,631	2,399	-29%	47%
<b>Unemployment Rate</b>	7.2%	3.6%	4.9%	-3.6%	1.3%

Source: *Projecting the Economic Impact of the Fayetteville Shale Play*

With increased income and employment comes increased home ownership. Faulkner County's number of owner-occupied housing units increased by nearly 17,000 from 1990 to 2006 – a 170% jump. Median home values also skyrocketed from \$55,400 in 1990 to \$115,000 in 2006 – a 107% change.

<b>Faulkner County Owner Occupied Households</b>				
	<b>1990</b>	<b>2000</b>	<b>2006</b>	<b>Percentage Change 1990- 2006</b>
Owner Occupied Housing	9,913	21,874	26,824	170%
Median Home Value	\$55,400	\$92,900	\$115,000	107%

Source: U.S. Census Bureau

## **Impact on Charity – Review of IRS Form 990**

### *United Way of Faulkner County*

The mission of the United Way of Faulkner County is to develop teamwork among approved agencies serving Faulkner County and their constituencies in the collection and distribution of funds for the various approved benevolent, charitable health, and social service agencies in the Faulkner County area.<sup>35</sup> In 1998 the organization received \$839,967 in direct public support and \$952,724 in 2006, an increase of over \$100,000. Net assets increase from \$254,554 to \$619,488 during the same time period.

### *Habitat for Humanity of Faulkner County*

Habitat for Humanity is a non-profit housing organization dedicated to eliminating substandard housing and homelessness worldwide and to making adequate, affordable shelter a matter of conscience and action. Habitat invites people from all faiths and walks of life to work together in partnership, building houses with families in need.<sup>36</sup> Upon review of IRS Form 990, Habitat for Humanity's Faulkner County chapter experienced an increase in direct public support, which jumped from \$45,354 in 1999 to \$54,491 in 2006. Net assets increased exponentially, from \$134,266 in 1999 to \$453,461 in 2006.

## **Impact on Crime**

Looking at crime data from 1990 to 2002, JUSC found that Faulkner County's crime had increased; similar to the other counties examined, Faulkner County's population increased during this time, from 60,006 to 87,194. Total crime increased from 217 in 1990 to 462 in 2002. Violent crime decreased from 79 to 34 and property crime increased from 183 to 383. When examining arrest data by crime type, JUSC found slight decreases in several categories, including: murder, rape, robbery, aggravated assault, and burglary.

## **Case Study 4: White County, Arkansas**

By 2025, the population of White County, Arkansas, is expected to increase from 71,332 to 91,640. The county's major industries include: manufacturing (21%), retail trade (16%), and transportation and warehousing (11%). Leasing land and mineral rights, drilling, and other activities of energy companies within White County are expected to account for total economic activity of \$892.2 million from 2005 to 2008. By 2008, 4.8% of White County's total employment, or nearly 1,598 jobs, will be attributable to Fayetteville Shale play activities. Between 2005 and 2008, \$55.6 million in local and state tax is attributable to energy company investments.

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<sup>35</sup> GuideStar

<sup>36</sup> Ibid

White County Population 1990 – 2006 <sup>37</sup>								
1990			2000			2006		
Total population	54,676	100%	Total population	67,165	100%	Total population	72,560	100%
Sex and Age			Sex and Age			Sex and Age		
Male	26,539	48.5%	Male	32,753	48.80%	Male	35,756	49.30%
Female	28,137	51.5%	Female	34,412	51.20%	Female	36,804	50.70%

Source: U.S. Census Bureau

White County benefited directly from the Fayetteville Shale play. The county experienced growth in median household income – from \$19,879 in 1990 to \$27,792 in 2006. Table 14 demonstrates this growth

White County Income 1990 – 2006							
1990		2000			2006		
Households	19,879	Households	25,158	100%	Total households	27,454	+/- 1,038
Median household income (dollars)	19,722	Median household income (dollars)	32,203	(X)	Median household income (dollars)	36,259	+/- 4,066

Source U.S. Census Bureau

Similar to the other counties examined, White County's median household income and poverty rate increased between 2000 and 2006. Looking at families with children under age eighteen, 7.5% fell below poverty level. This number increased to 17.8% in 2006, and the number of families below poverty level receiving SSI or public assistance increased from 12.4% to 17.8%.

The table below demonstrates IRS tax return data from 1990 through 2005. White County, while not as wealthy as the other counties examined, shows increases in dividends of 146.7%, while adjusted gross income increased 122.4% during the same period.

<sup>37</sup> Note: Age statistics were broken into different categories in 1990 than in 2000 and 2006.

### White County Tax Return Data

	Number of Returns	Number of Exemptions	Adjusted Income	Wages & Salaries	Dividends Before Exclusions	Interest Received	Gross Rents & Royalties
1990	19,351	46,191	\$442,316	\$350,362	\$4,561	\$30,186	\$14,399
2000	22,493	51,458	\$787,262	\$608,403	\$8,543	\$31,430	\$24,006
2005	24,962	57,802	983,765	754,359	11,254	22,499	
Percentage Change	29.0%	25.1%	122.4%	115.3%	146.7%	-25.5%	N/A

Source: IRS

Employment has increased tremendously in White County, whose civilian labor force increased from 26,310 in 1990 to 32,008 in 2006.

### White County Employment Data

	1990	2000	2004	% Change 1990-2000	% Change 1990-2000
<b>Civilian Labor Force</b>	26,310	30,893	32,008	17%	4%
<b>Employment</b>	23,772	29,436	30,006	24%	2%
<b>Unemployment</b>	2,528	1,457	2,399	-43%	37%
<b>Unemployment Rate</b>	9.6%	4.7%	6.3%	-4.9%	1.6%

Source: U.S. Census Bureau

In addition, from 1990 to 2006, White County's median home value increased from \$43,200 to \$88,800 – an increase of 105%.

### White County Owner Occupied Households

	1990	2000	2006	Percentage Change 1990-2006
Owner Occupied Housing	8,982	11,169	19,691	119%
Median Home Value	\$43,200	\$72,100	\$88,800	105%

Source U.S. Census Bureau

## Impact on Charity – Review of IRS Form 990

### United Way of White County

Upon review of IRS Form 990, in 1990, the United Way of White County received \$372,692 in direct public support; that number increased to \$463,714 in 2006.

Net assets also increased during this period from \$266,980 in 1990 to \$475,122 in 2006. JUSC spoke with a representative of the United Way of White County. The representative relayed that the organization received \$20,000 in donations from energy companies over the last two to three years. The representative also stated that the organization solicited donations from several energy companies, sending nearly 80 letters. At time of the interview, three companies had sent responses and donations of an unspecified amount. Interestingly, we were told that an area natural gas company employee sits on United Way's board of directors.

*White County Aging Program, Inc.*

This program provides services to White County residents age 60 plus, including: meals, transportation, recreation, and homemaker services. Upon review of IRS Form 990, the organization received \$25,812 in direct public support during 1997, which increased to \$81,886 in 2006. Net assets also increased during this period from \$26,912 in 1997 to \$64,014 in 2006.

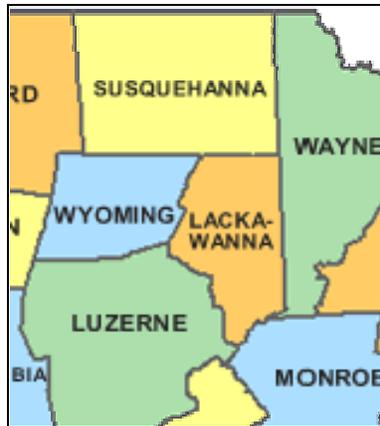
**Impact on Crime**

Examining crime data from 1990 to 2002, JUSC found that White County's crime increased overall; similar to the other counties examined in this study. The County's population also increased from 54,676 to 69,354. Violent crimes increased from 65 to 67 and property crimes increased from 1,420 to 1,947. JUSC found slight decreases aggravated assaults and burglary.

## Potential Impact on Northeastern Pennsylvania

In Pennsylvania, companies have been drilling for natural gas for many years. However, such drilling has been mainly confined to the western part of the state. In 2005, Pennsylvania produced about 168 Bcf (billion cubic feet) of natural gas. The state's average gas well production is less than 11 Mcf (thousand cubic feet) of natural gas per day (that's about enough gas to fuel one all-gas household for a month).<sup>38</sup> These numbers may soon increase exponentially. The analysis on the next few pages compares Pennsylvania counties to case studies and provides a glimpse of where the region may be headed.

### Map of Lackawanna, Luzerne, Wyoming and Wayne Counties



The population statistics below reflect a decrease in three of the four counties between 1990 and 2006. Lackawanna County's population decreased by 10,000 or 4.5%, while Luzerne County's decreased by over 15,000 or 4.6%. When compared with Denton County, which resembles Lackawanna and Luzerne counties best in terms of population, the regions do, indeed, have major differences. An assumption could be that increasing populations in Texas and Arkansas are due primarily to increased job availability – attributable to the new industry. In addition, natural gas exploration produced numerous ancillary jobs.

<b>NEPA Population 2000 - 2006*</b>			
	<b>1990</b>	<b>2000</b>	<b>2006</b>
Lackawanna	219,039	213,295	209,728
Luzerne	328,149	319,250	313,020
Wyoming	28,076	47,722	n/a
Wayne	39,944	28,080	n/a

Source U.S. Census Bureau

\*Date not available for Wyoming and Wayne Counties in 2006

<sup>38</sup> DEP Fact Sheet. Oil and Gas Well Drilling and Production in Pennsylvania.

<b>Denton County Population 1990 – 2006</b>					
<b>1990</b>		<b>2000</b>		<b>2006</b>	
Total population	273,525	Total population	432,976	Total population	584,238

Source: U.S. Census Bureau

The table below details Northeast Pennsylvania's median household income increases between 1990 and 2006. Wise County resembles Northeast Pennsylvania in terms of household income; however Northeast Pennsylvania's growth rate is much slower.

<b>NEPA Median Household Income*</b>			
	<b>1990</b>	<b>2000</b>	<b>2006</b>
Lackawanna	24,816	34,438	38,915
Luzerne	23,600	33,771	39,687
Wyoming	27,207	36,365	n/a
Wayne	24,912	34,082	n/a

Source: U.S. Census Bureau

\*Date not available for Wyoming and Wayne Counties in 2006

<b>Wise County Income 1990 – 2000*</b>					
<b>1990</b>			<b>2000</b>		
<b>Households</b>	<b>12,179</b>	<b>100</b>	<b>Households</b>	<b>17,180</b>	<b>100</b>
Median household income (dollars)	25,885	(X)	Median household income (dollars)	41,933	(X)

Source: U.S. Census Bureau

The table below reflects median home value changes, between 1990 and 2006, for the Pennsylvania counties examined. Although values increased significantly, such growth does not compare with the percentage changes for counties with successful natural gas exploration activity.

Median Home Value			
	1990	2000	2006
Lackawanna	68,000	93,400	122,800
Luzerne	55,500	84,800	102,800
Wyoming	67,600	93,900	n/a
Wayne	89,900	102,100	n/a

Source: U.S. Census Bureau  
 \*Date not available for Wyoming and Wayne Counties in 2006

### Drilling and Production

While energy companies have been exploring in Northeast Pennsylvania for quite some time, just over a year ago, such companies began obtaining drilling permits in Bradford and Lycoming Counties.

The tables below detail the number of permits issued and wells drilled in each Pennsylvania county. Lackawanna County does not currently have in place any permits issued or wells drilled; however, county records indicate that there are 85 leasing agreements for 2008. Wyoming County does not currently have any permits or wells drilled either; however, it does have in place 594 lease agreements with nine energy companies. Although this study does not examine three of the counties included in the table below, it is important to note activity in those counties since they neighbor the four counties examined.

PA Natural Gas Permits Issued											
County	Month/Year										
	May 07	July 07	Aug 07	Sep 07	Oct 07	Nov 07	Dec 07	Jan 08	Feb 08	Mar 08	Apr 08
Bradford	2	-	-	-	-	-	-	3	-	-	2
Lycoming	3	-	2	1	2	1	6	2	12	12	8
Susquehanna	-	1	-	-	1	-	12	3	5	7	7
Wayne	-	-	-	-	-	-	-	-	-	-	1

Source: Pennsylvania Department of Environmental Protection

PA New Natural Gas Wells Drilled							
County	Month/Year						
	Jul 07	Nov 07	Jan 08	Feb 08	Mar 08	Apr 08	May 08
Bradford					1	1	
Lycoming	1	1	1		2	3	
Susquehanna				1	2	2	1
Wayne					1		1

Source: Pennsylvania Department of Environmental Protection

At the time this study was completed, there was no data available on how much, if any, natural gas the region is now producing.

### Economic Impact

While it is very early in Pennsylvania's natural gas story potential to make any predictions as to how much natural gas is available, experts estimate that the Marcellus Shale play has more potential than both the Barnett and Fayetteville plays. Few can predict the output of a well at any point in time. Average cumulative production from the initial fracture stimulation is 1.25 Bcf (billion cubic feet) of gas per well. The wells initially produce about one million cubic feet of gas per day, and then experience a 50% decline in the first year. The wells then stabilize and produce for an average 20 years, with an expected life span exceeding 30 years.<sup>39</sup> Re-fracturing a well after 5 years can add another three quarters of a billion cubic feet of gas to a well's overall production.<sup>40</sup>

Provided this information, JUSC can make general predictions surrounding Pennsylvania's natural gas production potential. Here, JUSC uses a conservative figure to determine impact of an overall royalty.

Potential Royalties from Natural Gas Drilling	
Acres in Production Unit	100
Royalty percent from lease	15%
Price for natural gas per MCFE (value as of May 23, 2008)	\$10
Daily Production Rate (MMCFE)	2
TOTAL value of well - Production per day	\$20,000
Royalty per day	\$3,000
Royalty	\$1,095,000
Total principle value of Royalty for a 20 year period	\$8,386,856

<sup>39</sup> AAPG. *Barnett Shale Living up to Potential*.

<sup>40</sup> Ibid

Below is another example of cash flow from a natural gas well.

### Cash Flow for a Typical Gas Well in Southern Pennsylvania

Year	Gross Prod mcf	Net Prod. (7/8ths) mcf	Gas Price \$/mcf	Working Interest Revenue - \$	Expenses Leases oper. & overhead - \$	Cost Depreciation \$	Taxable Income \$	PA Corporate Income Tax (9.9%) - \$
1	16,544	14,476	8.00	115,808	3,600	31,020	81,188	8,038
2	10,969	9,598	8.00	76,783	3,600	20,567	53,616	5,209
3	8,490	7,429	8.00	59,430	3,600	15,919	39,911	3,951
4	7,039	6,159	8.00	49,273	3,600	13,198	32,475	3,215
5	6,070	5,311	8.00	42,490	3,600	11,381	27,509	2,723
6-10	22,486	19,675	8.00	157,402	18,000	42,161	97,241	9,627
11-15	15,906	13,918	8.00	111,342	18,000	29,824	63,518	6,288
16-20	12,633	11,054	8.00	88,431	18,000	23,687	46,744	4,628
21-25	10,623	9,295	8.00	74,361	18,000	19,918	36,443	3,608
26-30	9,240	8,085	8.00	64,680	18,000	17,325	29,355	2,906
<b>Total</b>	<b>120,000</b>	<b>105,000</b>			<b>108,000</b>		<b>507,000</b>	<b>50,193</b>

#### Cash Flow Assumptions:

*Drilling cost of \$225,000 per well amortized over 30 years	* Lease operating and overhead expense of \$300/well/month
*Landowner royalty of 1/8th (12.5%) of sales at wellhead	*PA Income Tax computed at corporate tax rate of 9.99%
*Wellhead gas price of \$8.00/mcf	*This analysis does not include payment of state franchise or capital stock tax which is scheduled to phase out by 2010
*No escalation of prices or expenses	

*Source: The Independent Oil & Gas Association of Pennsylvania*

In 2006, oil and natural gas production royalties paid to Pennsylvania landowners totaled approximately \$200 million. In 2006, Pennsylvania's oil and natural gas wells generated an estimated \$100 million in state income tax revenues. Pennsylvania's wells produce 26% of the state's total natural gas consumption. This volume of natural gas is equivalent to:

- 69% percent of the natural gas utilized by Pennsylvania's 2.6 million residential natural gas consumers; and
- 91% of the natural gas utilized by Pennsylvania's industries, which employ thousands of state residents.

## Possible Impact on Local Charities

If contributions to local non-profit organizations increased by \$1,000,000 in one year, this investment would create an additional \$1.1 million in additional impact in other sectors of the economy in Wyoming County, \$1.7 million in Lackawanna, and \$1.8 million in Luzerne County.

\$1,000,000 increase in investment to local non profits	
Lackawanna	\$1,728,600
Luzerne	\$1,847,400
Wyoming	\$1,187,500

### Non-Profit Activity

From the period 1997 to 2002, United States non-profit organizations grew 22-23 percent depending on the type. Their revenue decreased by 5.5% if they were involved in grant making such as charitable trusts, community foundations, and other grant making foundations, however they grew by approximately 60.3 percent if they were organizations working for a particular "cause" such as health related, social services, humane societies, etc. Both types of organizations had their annual payroll increase from 57.9 percent to 65.6 percent during the same time period. The number of paid employees grew in both sectors despite the grant making and giving non-profits losing revenue.

Description	United States											
	Establishments			Receipts (\$1,000s)			Annual Payroll (\$1,000s)			Paid Employees		
	2002	1997	% Change	2002	1997	% Change	2002	1997	% Change	2002	1997	% Change
Grantmaking & Giving	14,632	11,906	22.9	\$46,281,242	\$48,956,675	-5.5	\$5,102,093	\$3,080,424	65.6	136,608	104,807	30.3
Social Advocacy	12,473	10,120	23.3	\$12,059,900	\$7,524,552	60.3	\$3,162,672	\$2,003,063	57.9	104,504	85,041	22.9

Source: US Economic Census

During the same time period in Texas, the number of establishments grew at similar levels to that of the US. The grant making and giving non-profits decreased in revenue at a smaller rate than that of the US as a whole and the social advocacy groups increased in revenue, although not at the level of the US rate. Payroll increased similarly. Paid positions in the advocacy area increased 10% less than the US rate for the same time period.

Texas												
Description	Establishments			Receipts (\$1,000s)			Annual Payroll (\$1,000s)			Paid Employees		
	2002	1997	% Change	2002	1997	% Change	2002	1997	% Change	2002	1997	% Change
Grantmaking & Giving	847	708	19.6	\$1,811,877	\$2,425,360	-2.5	\$216,877	\$130,737	65.9	6,042	4,634	30.3
Social Advocacy	543	465	16.8	\$357,329	\$259,382	37.7	\$101,552	\$70,780	43.4	4,103	3,633	12.9

Source: US Economic Census

Based on this data, one can conclude that the contributions to non-profits either from the gas exploration companies or by individuals did not have a great affect in Texas. However, given the US economic conditions in 1999 (.Com bust) and a recession in 2000-2001, these factors could have negatively impacted the contributions.

## Conclusion

The goal of this study was to assess the potential economic impact of land leasing and drilling of Marcellus Shale deposits, with particular emphasis on charity and social services. It was intended to provide a comparison to other regions of the country that have experienced a sudden increase in population and wealth do to natural gas drilling from shale deposits. Looking at the case study regions from the “before and after” perspectives allows us to infer potential and possibilities in Northeast Pennsylvania. Considering results from the review of several public charities’ IRS Form 990, Pennsylvania may expect an increase in the number and amount of donations to regional non-profits. JUSC spoke with a representative of Stone Energy – a company currently drilling in Susquehanna and Wayne Counties. Stone Energy has given several thousand dollars to local organizations, including volunteer fire fighters. Several large companies, such as Chesapeake and Devon have given millions to several worthy causes in Texas and Arkansas; we should expect the same in Pennsylvania.

When JUSC reviewed the case study regions, we found unprecedented growth in population, income, and owner-occupied housing. In Case Studies One and Two – we found that Barnett Shale has resulted in population growth for both counties. Residents also benefited directly from the Barnett Shale industry. The county experienced growth in median household income and wealth. The Barnett Shale industry has also had a ripple effect on many business activities. The industry has increased the number of permanent maintenance, repair, and construction jobs by nearly 300. Jobs in the hospitality industry have increased by 365, while permanent jobs in the retail trade industry increased by more than 600. The industry has also increased gross product and personal income.

Case Studies 3 and 4 mirror results of Case Studies 1 and 2. Although the growth in Arkansas is slower and on a smaller scale, it is still easy to see the effects of Fayetteville Shale on Faulkner and White Counties.

In 1997, Faulkner County’s population was just over 97,000; by 2025, its population is expected to jump to 133,170. Leasing land and mineral rights, drilling, and other activities of energy companies within Faulkner County accounted for total economic activity of \$308.6 million from 2005 to 2008. By 2008, 0.9% of Faulkner County employment, or 484 jobs, will be attributable to Fayetteville Shale play activities. A total of \$21.5 million in local and state tax revenues will result from energy company investments made between 2005 and 2008.

White County’s population is also expected to increase by more than 20,000 from 2005 to reach 91,640 by 2025. Leasing land and mineral rights, drilling, and other activities of energy companies within White County will account for total economic activity of \$892.2 million from 2005 to 2008. By 2008, 4.8% of White County’s total employment, or 1,597.8 jobs, will be attributable to Fayetteville

Shale play activities. Between 2005 and 2008, \$55.6 million in local and state tax is attributable to energy company investments.

Overall, we saw increases in both poverty level and crime, yet these are natural occurrences that often accompany rapid population growth. In terms of charitable contributions, there were increases in both direct public support and net assets in all charities examined.

JUSC examined four counties in Northeast Pennsylvania, including: Lackawanna, Luzerne, Wyoming and Wayne. Lackawanna and Wyoming Counties have several permits issued, and Wayne has one gas well.

Although the Marcellus Shale play is in its early development, the comparison to the case study counties allowed JUSC to conclude that Pennsylvania is in for growth in terms of wealth, employment, and housing. Experts from financial markets, geologists, government officials, and economists all predict that Marcellus Shale is the next big opportunity for Appalachia, with unprecedented growth. Likewise, oil companies have already invested hundreds of millions of dollars in the Pennsylvania Marcellus Shale play; it is easy to conclude that opportunity exists.

It is likely that natural gas jobs will attract to our region workers from all walks of life. Unfortunately, we don't yet know when we will begin to see population and employment increases and how drastic they may be. As more energy companies come to our region to explore, the natural gas drilling picture will sharpen. The direct, indirect, and induced impact across the region's economy will also become clearer.

Natural Gas drilling from the Marcellus Shale has the potential to drastically change our region for the better. As jobs come and wealth increases, we may find Northeast Pennsylvania's population rapidly increasing and we must be prepared. With rapid growth comes many challenges.

## APPENDIX 1

### Charitable Giving Outside Case Study Areas

<b>Texas</b>			
<b>From</b>	<b>Amount</b>	<b>Purpose/Organization</b>	<b>Date</b>
<b>Chesapeake Energy Corporation</b>	20 Laptop Computers	Nash Elementary School, Fort Worth	May 2007
	\$54,000	Playground development in Fort Worth	2008
	\$1 million	Tarrant County United Way	March 2008
	1.25 million	Educational opportunities to minority and socially disadvantaged youth in Dallas and Fort Worth.	June 2007
<b>Devon Energy</b>	\$995,600	United Way	2007
	\$6,000	Wise County Sheriff's Department Drug Dog	2007
<b>XTO</b>	\$500,000	YMCA	March 2008
	\$50,000	Playground construction	October 2007

## Arkansas

From	Amount	Purpose/Organization	Date
<b>Southwest Energy</b>	\$250,000	Junior Achievement of Arkansas, with the money going to establish a three-year partnership on economics and energy industry curriculum for high school students	April 2007
	\$15,000	Local Fire Departments	April 2008
	\$25,000	American Red Cross to help tornado victims in Arkansas	February 2008
	\$10,000	Law Enforcement Grant	May 2008
<b>Chesapeake Energy Corporation</b>	\$3,000	North Central Arkansas Foundation for the Arts and Education to promote art appreciation in area schools.	June 2008
<b>Energy Executives</b>	\$70,000	Energy company executive scholarship fund - University of Arkansas Community College at Morrilton	January 2008

## Oklahoma

From	Amount	Purpose/Organization	Date
<b>Chesapeake Energy Corporation</b>	\$500,000	Local High School - Faculty Chair in Geophysics	December 2006
	\$300,000	University of Oklahoma Launch Long-Term Scholarship Program	March 2007
	\$50,000	Oklahoma City's KIPP Reach College Preparatory School	September 2007
	\$500,000	Oklahoma State University to assist with student scholarships in the Boone Pickens School of Geology and the College of Engineering, Architecture and Technology.	September 2007
	\$100,000	Hearts for Hearing	September 2007
	\$500,000	A five-year period to enhance business and energy-related facilities, equipment and courses	March 2007
<b>Devon Energy</b>	\$1.1 million	United Way	2007
	\$3 million	Fort Worth Museum of Science and History building project	2007
<b>XTO</b>	\$500,000	YMCA	March 2008
	\$50,000	Playground construction	October 2007

## **APPENDIX 2**

### **Leadership Questionnaires**

#### **Survey 1: Firms Exploring, Drilling, and Operating in Marcellus Shale**

##### General Information

1. Are you currently exploring or drilling in Lackawanna, Luzerne, Wayne, or Wyoming counties?
2. Current number of drilling permits in each county?
3. Number of current drilling sites and?
4. Date(s) exploration and drilling began?
5. Current number of employees involved in exploration and operations? – Are they from any of the counties
6. Average annual salary?
7. Have you received any complaints from local residents? If yes, can you provide some examples?

##### Financial Information

1. Current investment in all seven counties to date?
2. Annual taxes paid to state and local governments?
3. Annual charitable contributions in all seven counties? What charities?
4. If no charitable contributions have been made yet, do you plan to do so?

##### Leasing

1. Current number of acres being leased in each county?
2. Current price per acre?
3. When did CHK begin to make offers to landowners and what was the starting price per acre?

4. Number of individuals from which you are leasing?
5. What percent of royalties can landowners expect to receive?

#### Expansion

1. Do you plan to expand in to other drilling sites within these counties?
2. If yes, what municipalities do you plan on exploring the future?
3. How many employees do you plan to hire (in each county/municipality) in the next two years? Five years? Ten years?
4. How many years do you believe it will take to deplete the natural gas in our region?
5. Do you see more of it becoming recoverable as drilling technology increases?
6. Which are the most logical places (i.e. municipalities) to drill in each county?

#### Community

1. What types of resources do you need in a community to start drilling?
2. What kind of labor force?
3. What is the primary experience and education level of the workforce – both crews and office staff?
4. What type of infrastructure is necessary for the work involved in day to day operations?
5. How much office and warehouse space do you currently own/rent?
6. What types of local goods and services are required?
7. How is transportation affected?

**Survey 2:  
Firms Exploring, Drilling, and Operating in Barnett and/or Fayetteville Shale**

General Information

1. Current number of drilling permits?
2. Number of current drilling sites and wells?
3. Counties where drilling sites are located?
4. Date(s) your company began exploration and drilling?
5. Current number of employees involved in the exploration, drilling, and leasing?
6. Average annual salary – crew positions and office staff?
7. Does your company receive any complaints from local government or residents? If so, can you provide a few examples?

Financial Information

1. Current investment in Barnett and/or Fayetteville Shale to date?
2. Amount paid in annual taxes to local government (county/city)?
3. Amount donated to local charities on an annual basis?
4. To what charities do you contribute?

Leasing

1. How many acres of land is your company currently leasing for Fayetteville Shale drilling?
2. What is the current price per acre being paid to land owners?
3. Number of individuals from which you are leasing?
4. Total annual royalties being paid out to land owners?
5. What percentage of royalties do you pay to landowners?

### Expansion

1. What areas containing Barnett and/or Fayetteville Shale do you plan to explore the future?
2. What are the current natural gas production rates for Barnett and/or Fayetteville Shale?
3. For how long will you be able to sustain these production rates?
4. How far is your company from depleting the natural gas in Barnett and/or Fayetteville Shale?
5. Will improved drilling techniques allow you drill even further in the future or are you counting on upcoming plays to help sustain production rates?

### Community

1. What are your needs from the local governments in the areas you operate (i.e. regulation, permitting processes)?
2. What are some of the obstacles the company has faced when moving into a community?
3. What types of resources do you need in a community to start drilling?
4. What kind of labor force?
5. What is the primary experience and education level of the workforce – both crews and office staff?
6. What type of infrastructure is necessary for the work involved in day to day operations?
7. How much office and warehouse space do you currently own/rent?
8. What types of equipment are required in offices?
9. What types of local goods and services are required?
10. How is transportation affected?

### **Survey 3 Charitable Organizations**

1. What is the mission of your organization
2. How long have natural gas companies been a presence in your area?
3. Overall, would you say that the presence of natural gas companies in your area has been a positive experience?
4. Have you received funding from the natural gas companies in your area?
5. From which companies have you received funding/contributions?
6. To date, how much has your organization received from each company?
7. What is the average annual contribution from each company?
8. What percent of your budget come from natural gas companies?
9. Were the companies contributing prior to exploring and drilling?
10. Do they encourage employees to volunteer?

### **Survey 4 Government Organizations in Texas and/or Arkansas**

#### General Information

1. Current number of natural gas companies operating in your county/city?
2. Current number of permits issued?
3. Current number of drilling sites?
4. When did exploration and drilling began
5. Have there been any tax benefits to the citizens?
6. What effects has the presence of natural gas companies had on your county/city?

7. Have there been any negatives effects of the activities associated with exploring, drilling, and operating?
8. How has the presence of natural gas companies affected social services that local government(s) provide?
9. Have natural gas companies contributed to the quality of life in the area (building parks, recreation facilities, etc)
10. How have natural gas companies negatively affected the quality of life (noise, pollution, traffic, etc)

### Population Growth

1. Have there been challenges due to the rapid population growth?
2. How has local government confronted the challenges?
3. As population began to grow did government have to add police, fire departments, or emergency medical services?
4. How has increased population affected transportation (highway congestion, public transportation, and traffic from drilling sites)
5. How has increased population affected hospitals in the area?
6. School enrollment?
7. What types of ordinances have you enacted as a result of the exploring and drilling?
8. Have other industry clusters followed these companies into your communities, if so what kind?
9. How has this changed zoning? Planning processes?
10. Have you noticed increases in other types of businesses/industries and jobs created as a result?
11. Have crime rates increased? If so, what types of crime?

## **APPENDIX 3**

### **Firms and Organizations Contacted for Participation**

#### **Energy Companies:**

- Chesapeake Energy (Texas and West Virginia)
- Range Resources
- Southwesterns Energy Company (via Mitchell Communications Group)
- Cabot Oil and Gas
- Chief Oil
- Stone Energy

#### **Nonprofit Organizations:**

- United Way of Denton County
- United Way of Wise County
- United Way of Faulkner County, Inc.
- United Way of White County, Inc.
- Community Foundation of North Texas
- Dallas Foundation

#### **Local Government**

- Denton Chamber of Commerce
- Denton County Government
- Conway Chamber of Commerce
- Conway City Government

#### **Other**

- Terry Engelder, Penn State professor of geosciences

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