

AN ENGAGEMENT GUIDE FOR SHALE ENERGY SUPPLY CHAIN COMPANIES



COLLEGE OF WILLIAM & MARY POLICY RESEARCH SEMINAR

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SECTION 1: INTRODUCTION

Ten years ago, a drive through many small and medium-sized communities in Pennsylvania and eastern Ohio would have been non-descript. Following the demise of the U.S. steel industry and the waning manufacturing industry, both of which provided a living-wage to middle class workers, young adults finishing up school in these communities had to look elsewhere for decent, well-paying jobs. Main Street in these communities often had several “for sale” signs, and it was readily apparent that each community was just barely surviving. For these communities, there was no sense of economic opportunity and vibrancy, at least until shale energy development came in.

That same drive today through small communities like Washington, PA reveal an economically vibrant community. The city and its workers (county population 14,000) have greatly benefited from shale energy development and the network of supply chain businesses that are required to support the industry. Local construction and trucking firms are booming; Main Street no longer has vacancy signs; blue-collar workers are in high demand; several new businesses, restaurants, and hotels have opened; and a new school, new roads, and expanded city services are funded from the additional tax revenues that the shale energy industry pays.¹

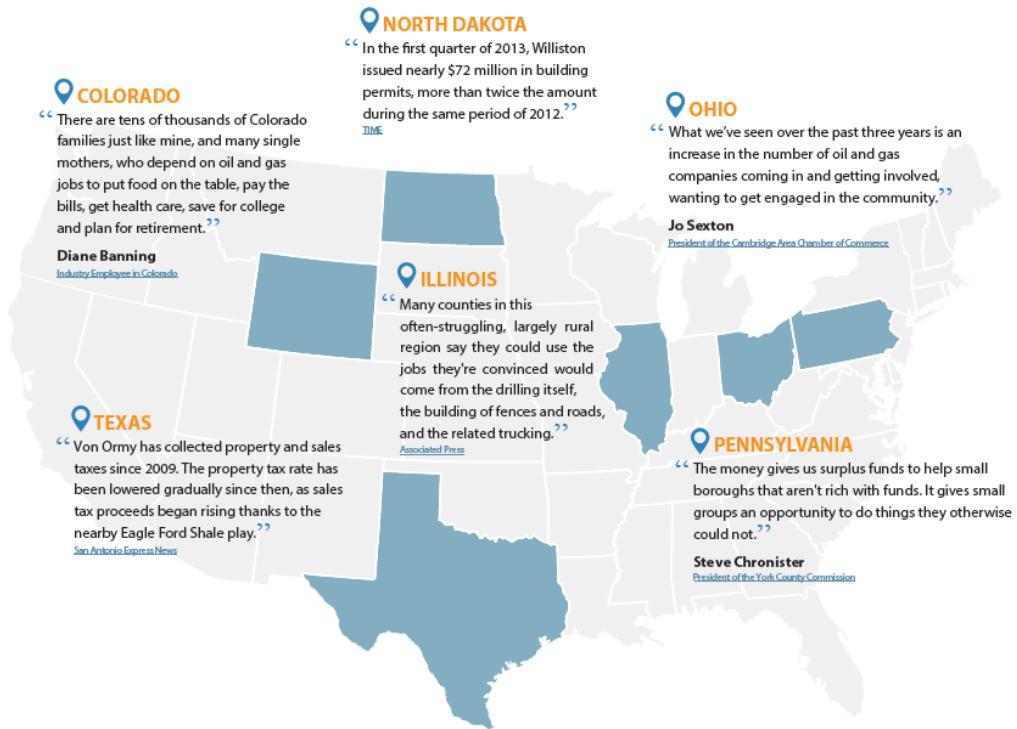
“I have never seen an opportunity like this, ever,” says Larry Michael, executive director of workforce and economic development at Pennsylvania College of Technology, who spearheaded a study on the new industry’s need for workers. “Words absolutely cannot describe what is going on.”

National Geographic²

¹ Marcellus Shale: Supporting Pennsylvania Communities, Williamsport PA U-tube video describes a similar revitalized economy; <https://www.youtube.com/watch?v=n3sGdfE9nXg> .

² A State Booms with New Energy, National Geographic Magazine, Oct. 22, 2010, <http://news.nationalgeographic.com/news/2010/10/photogalleries/101022-energy-shale-natural-gas-economic-pictures/>

Figure 1: State and Community Benefits from the Shale Energy Supply Chain³



Shale energy development in the United States is experiencing economic expansion that is quickly becoming “the next big thing” that will drive economy development in dozens of industries beyond the oil and gas sector for the foreseeable future. Every state will benefit, regardless of whether oil and gas resources are native to the state or not. To develop these energy resources, major capital and operating investments are flowing to an extensive range of supply chain companies that enable upstream, midstream, and downstream economic development. The supply chain companies include firms like yours -- construction contractors, construction equipment manufacturers and dealers, logistics companies, well services providers, professional services such as engineering and architectural firms, and providers of materials and supplies such as sand, cement, and steel pipe. Figure 2 illustrates the interconnected shale energy supply chain network

³ Community Benefits Provided by Shale Development, ShaleInDepth, http://energyindepth.org/wp-content/uploads/2014/09/community_benefits_shale.pdf

Figure 2: The Shale Energy Supply Chain⁴

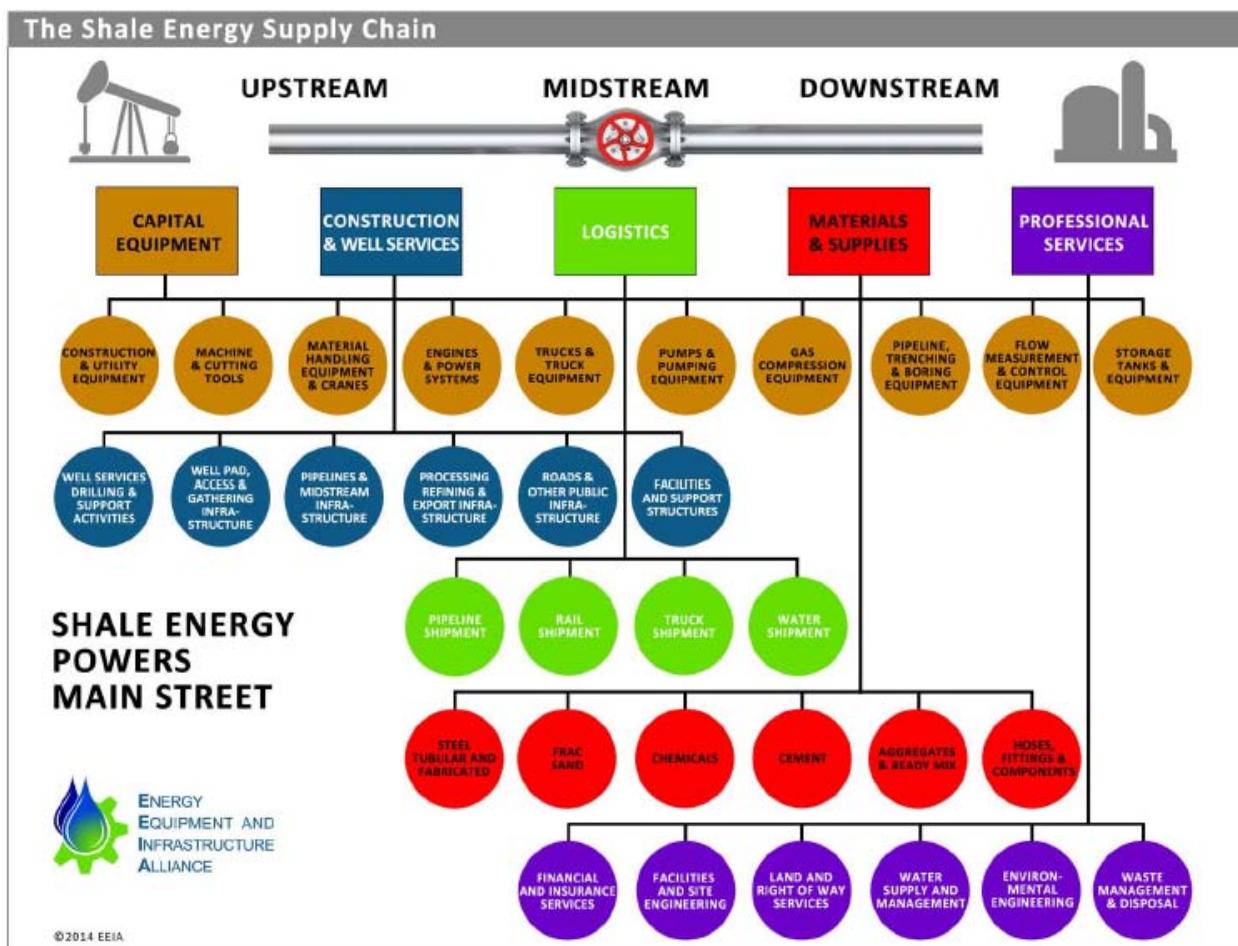


Figure 2 illustrates some of the interconnectedness, depth, and breadth of the companies that make up the shale energy supply chain. Indeed, for every job generated in the production of shale oil and natural gas, three additional jobs are created throughout the supply chain. You may well recognize your firm's capabilities to provide products and services in this diagram. Forming an alliance with other energy equipment and infrastructure supply chain firms in your local area provide you with the capability to form a powerful coalition to support shale energy developers and expand your business.

Direct supply chain companies in Figure 2 above include⁵:

⁴ Energy Equipment and Infrastructure Alliance (EEIA), as illustrated in "Supplying the Unconventional Revolution: Sizing the Oil and Gas Supply Chain," IHS Economics, Englewood, Colorado, September 2014.

⁵ See Appendix B and the IHS Supply Chain report for a more complete economic analysis and growth forecast for these supply chain business sectors.

- **Capital Goods** – Manufacturing of heavy construction equipment, trucks, controls, support, and storage equipment
- **Construction and Well Services** – Construction of concrete, forms, electrical, access roads, and supporting infrastructure to the well site
- **Logistics** – Truck transportation from the well, rail transport to market; and huge growth potential exists for future construction of pipelines for economical logistical transport
- **Materials** – Local sand and gravel supplies, cement, chemicals, and fabricated steel required at the well site
- **Professional Services** – Architectural, environmental impact, wastewater, survey, and other support engineering services

Why is the development of shale energy and associated products vital to the continued U.S. economic recovery? It isn't just for fuel -- shale gas and petroleum products form the chemical base for nearly all of plastics manufacturing -- it contributes to a competitive metals industry, and is the foundation for fertilizers required that make food production affordable. After all the refining is complete, the remaining elements are also valuable for asphalt. Essentially every ounce of a barrel of raw petroleum or natural gas gets used. Finally, the additional supply of U.S. developed shale gas and petroleum is one of the critical elements for making U.S. industries competitive against world competitors who have to pay higher prices for their energy. When the manufacturing industry has more affordably priced U.S. shale energy to count on, businesses are encouraged to expand and hire additional workers.

The U.S. Bureau of Labor Statistics projects the U.S. economy is growing at approximately 1% annually over the coming decade, which produces approximately one million additional jobs in the nation each year.⁶ However, there are nearly two million college graduates entering the work force annually, in addition to new immigrants and guest workers. Even accounting for those retiring from the workforce, where are the jobs going to be available? Answer: Shale energy development will boost the number of projected jobs and get Americans working again.

⁶ Bureau of Labor Statistics, U.S. Department of Labor, Future Employment Projections; <http://www.bls.gov/news.release/ecopro.toc.htm>

EEIA is a 501(c)(6) advocacy and service association headquartered in Washington, DC. Its members include supply chain companies, trade associations and labor unions. Its mission is to organize, mobilize and lead the supply chain's voices to achieve widespread public acceptance and support for shale energy development, and policies at all levels of government that encourage full development of shale resources while protecting the environment and minimizing community impacts.

Among the primary players in the energy renaissance, the energy supply chain's voice must be a powerful and persuasive messenger in terms of communicating the positive economic and security contributions of energy development, both to the public and to policy makers. Supply chain companies operate from, employ workers in, and are part of the fabric of the communities where this activity occurs. The shale energy supply chain is made up of many diverse industries that in the aggregate account for over 40% of the jobs and economic output generated by shale energy operations. EEIA aggregates the full scale of the supply chain's economic contribution into one powerful voice.

EEIA engages in legislative, regulatory, judicial, and public advocacy directed at all levels of government and within communities. Among other activities, EEIA undertakes economic research and information-gathering to measure and report the scale of supply chain economic and employment contributions, and to document and emphasize shale energy's positive messages.

SECTION 2: ECONOMIC BENEFITS

Firms located in shale energy producing states (Texas, Louisiana, Arkansas, Pennsylvania, Ohio, West Virginia, Oklahoma, Colorado, North Dakota, California, Utah, Montana, Wyoming, New Mexico, Kansas, and Mississippi) contribute to all five of the shale energy business core groups illustrated in Figure 2. Firms located in the 34 non-producing states also make important contributions to support shale energy development in the five supply chain business groups.

Your firm may benefit from the growing shale energy industry even if your operation is in a non-producing state, or if you provide component parts or ancillary services to the shale energy supply chain.

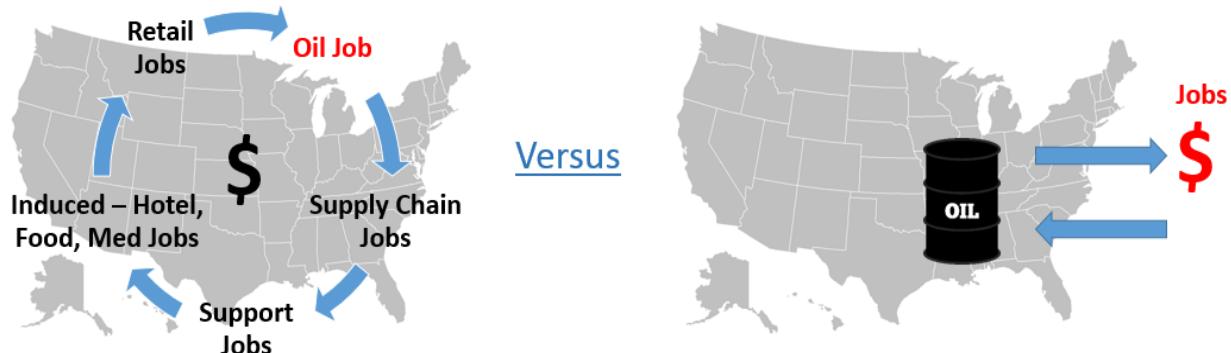
More than 233,000 new American jobs will be created between 2012 and 2025 with firms supplying goods and services to companies producing oil and gas from shale. The new jobs will be in addition to the 524,000 current shale energy supply chain jobs, bringing the total to over 757,000 jobs by 2025 for a growth of over 44 percent.⁷ The overall shale supply chain forecast is a 2.9% annual job growth through 2025, with higher jobs growth in producing states and less than this figure in the majority of non-producing states. Non-producing states have significant contributions to make in capital equipment, logistics, materials, and professional services sectors. Appendix B has detail broken out by each sector for both the leading producing and non-producing U.S. states.

For every shale energy production job, approximately three additional jobs are created in your local economy.

- One additional job is generated in one of the direct supply chain companies from Fig. 2
- A second additional job is generated in the indirect supply chain companies that produce component parts for capital goods, concrete plants, and parts suppliers for well service construction support, support staff and suppliers for logistics trucking and pipeline firms, material suppliers, and engineering services.
- A third job is induced on Main Street in support businesses that provide housing, restaurants, medical, retail, and educational services for the growing number of workers and their families in shale energy production areas.
- To complete the interconnectedness of jobs growth in the supply chain, Figure 3 shows how the shale energy boom keeps and grows job in the U.S.
- The alternative is to import these energy resources that merely involves large financial transactions, where U.S. capital leaves the country and the vast majority of the energy and supply chain jobs remain overseas.

⁷ “Supplying the Unconventional Revolution: Sizing the Oil and Gas Supply Chain,” IHS Economics, Englewood, Colorado, September 2014, p.11, 44, 95.

Figure 3: Keeping and Growing Jobs in the U.S.A.



Shale energy development will also contribute to your community development through increased tax revenues, benefiting the quality of infrastructures such as schools and highways. Several shale energy developers have also contributed directly to local high school and junior college education programs. Some examples follow:⁸

- Producers are funding K-12 teachers in some localities for science, technology, engineering, and math (STEM) courses—skilled high school graduates are needed immediately for local shale energy development.
- Producers are partnering with the State of Pennsylvania junior college system to develop an industry technical apprenticeship program for welding, technical machine tools, and high school work experience at local shale development sites.
- All Texas public school districts are benefiting financially from shale energy development in west and southeast Texas. Some of the previously poorer school districts in shale development communities are now sharing hundreds of thousands of dollars annually with suburban Texan schools.

Supply chain jobs account for 41 percent of all jobs attributable to shale energy activities in the country throughout the period 2012-2025. The jobs cited only include those directly attributable to supporting energy operations. Gross output, or the dollar value of goods and services produced by supply chain companies to support shale energy development, is expected to grow from \$145

⁸ Shale Insight Conference, Pittsburgh PA, Presentations by Philadelphia shale energy associations, shale energy major and mid-size producers, and Pennsylvania state government panel members, September 24, 2014.

billion in 2012 to \$206 billion by 2025, for a compound annual output growth rate of 2.74 percent in constant 2012 dollars.⁹

SECTION 3: COMPANY ENGAGEMENT¹⁰

3.1 General: To engage employees as ambassadors, give your employees the narrative about how they and their families' future prosperity are tied with healthy energy development. While this information will be different for each company, clearly identifying and explaining how your company has been involved in this energy will help the employees understand the benefits of the energy operations as well as show how it is driving the growth of the company.

Expand out from the company and explain what's also happening in the community as a result of shale energy development. Because it's such a relatively new phenomenon, some companies are just beginning to feel some of the economic benefits. However, with such a rapid growth trajectory, shale energy and the companies involved in the supply chain have a huge future. It's therefore important to be aware and have the right points to stress to the employees as well as to the community.

3.2 Communication Strategies

Communication, as you know, is your greatest tool. Leading your employees into being advocates of shale energy will depend on how effectively you communicate with your managers and your employees. Ken White, Associate Dean at William & Mary's Mason School of Business, promotes two big rules. First, use as many communication channels as possible. That includes utilizing monthly newsletters, emails, videos, the company Twitter account and other social media outlets. Second, answer any questions employees will have before they ask them. You want to ensure you have the answers or can quickly get them.

3.3 Internal Communication

When creating a strategy, invest more effort in internal communication. Your employees are your first line of audience, and by successfully communicating to them, you can leverage their connections for spreading your message. Give your employees the facts and the resources

⁹ Ibid.

¹⁰ Thanks to Ken White for providing information for this section. Ken White, Ph.D. is Associate Dean for MBA & Executive Programs at the College of William & Mary's Mason School of Business. He specializes in executive communication.

necessary to increase their knowledge on your message topic. Feed them information on a regular basis, so that the employees are up to date and well scripted.

3.3.1 Meetings allow you to present information and provide the regulation updates. Drive the meetings by content and make sure any and all questions are answered at these meetings. You want to fill the role of the ultimate resource. In addition, make sure the communication is multi-channel. If you present facts and figures during a meeting, considering also emailing the information. Remember, every employee can be an advocate if they understand your mission and support the industry.

3.3.2 Ensure that your employees receive the information at the same time. Live feed is a great and easy way to provide your employees with access. Having your managers pass along the information almost never works because some of the message gets lost or altered. You want to control the content and providing the information yourself gives you that control. Personalize the information for the employees by explaining what's in it for them. Refer back to the economic benefits that shale energy provides in terms of employment and additional tax revenue.

3.3.3 When publishing material, emailing, or even holding employee meetings, keep the content relevant to ensure employees remain engaged. Bogging workers down with large amounts of information on a wide topic makes a message lose credibility.

3.4 External Communication

External communication, thanks to technological advantages, is now easy to use and virtually costless. Use social media, like Facebook, Twitter and LinkedIn, to spread information.

3.4.1 Not surprisingly, external communication runs a large risk, especially if “crises” occur. Create a communication unit specifically for crisis management and involve your employees to ensure that the right and beneficial information is shared. In addition, set out a procedure to ensure the “crisis” doesn’t come from your company. Regulate your social media and monitor comments and replies to ensure that misinformation is reported.

SECTION 4: BEST PRACTICES

4.1 General: Every business and engagement strategy has its own characteristics and challenges. You, being a skilled business owner or executive, know how to adapt to these issues. The list of

best practices for company engagement below are the steps that are necessary in every campaign. Through an extensive literature review and review of case studies, we have developed a checklist of the core components of an effective engagement campaign.

4.2 Best Practices Checklist

4.2.1 Make a plan: The first step of effective company engagement is making a plan. A plan formalizes your message, goals, and initiative moving forward. The plan should establish three significant points. This will be your roadmap for the rest of your engagement campaign.

1. Establish your message. What do you want your employees to hear and what is most important? Your message should convey your stance regarding shale energy. An effective message is concise and narrowly focused. When developing your message consider who the decision makers are. Identifying who has influence can help narrow the scope of your message. Similarly identify your goal(s) and what people or institutions have the capability to encourage your success.

2. Formalize a communication strategy. How are you going to get the message to your employees? Each supply chain company is different, however communication is the core of engagement. Will you utilize email blasts, in person meetings, or social media? Communication methods will be discussed in more depth in the following section.

3. Designate an energy champion. Create a shale energy champion who will lead the shale energy discussion within your company and act as a resource for your employees. Maybe you are the best person for the position, especially with your knowledge how about the industry interacts with and benefits your firm. As an additional resource, EEIA is available. If you need help answering a particular question or have questions of your own, you can send an email to info@EEIA.org.

4.2.2 Communicate: The goal of any communication strategy is to motivate employees around a company's cause. Your plan established a communication strategy, however there are effective as well as ineffective ways to communicate. Some of the best ways to communicate with your employees are: PowerPoints to describe how your business benefits from shale development, newsletters, emails, nominating employee ambassadors who can spread the message to fellow employees, and one on one meetings. Not every situation and business is the same however, so

you need to use your judgment and choose what works best for you. Some of the most effective components of communication are listed below.

- 1. Meet with managers first and engage them about the benefits that shale energy brings to your business.** Managers have the day-to-day interactions with employees that you may not have. Once the managers understand your position and your plan, they will communicate the benefits of shale to other employees. This top-down method of communication will allow for managers to help once employees have questions.
- 2. Create a conversation.** Lecturing and berating your employees about the benefits that shale energy has for your business will not be as effective. This may seem elementary, however having an open door and quickly answering questions can sometimes be forgotten. The key to having effective employee conversation is creating a two way street. Management or the designated thought leaders should be available to answer questions and continue employee engagement throughout the process. It is critical that employees know where to go with questions and know that they will receive an answer in a timely fashion.
- 3. Publish your issues.** This form of communication can be through newsletters, social media, email blasts, and many other forums. Be concise and relevant in your communications. Concise information is effective whether you are sending emails or holding meetings. The concise message will create a central rallying point for employees. A constant reminder of this message will also increase the likelihood that employees will choose to become supporters.

4.2.3 Build Coalitions: You understand where you and your company or organization fall in the shale energy supply chain. Many businesses in your community who are also benefitting from shale may not know their role. They are however, interested in the same development and economic growth as you. Identifying these like-minded businesses and fostering relationships with them could greatly benefit you.

Creating relationships with these companies will bolster your voice in the community. You also receive the benefit of expanding your network as you gain access to these companies' groups and contacts. The shale energy industry has not always been seen in a positive light, so working

together and promoting a unified industry can put a positive spin on shale oil. Partnership is generally looked upon favorably, particularly in the local community.

Companies and organizations can come together formally, through business meetings, town hall sessions, or splitting the costs of advertisements. You can also come together informally through supply chain sponsored barbecues, parties, or other events promoting family and community fun. These relationships cannot only be good for your business and the shale industry, but good for the community as well.

Lastly, it is important to create these relationships in good times rather than bad times. That way, it is easier to mobilize in an emergency situation. Relationships are much easier to establish when there is success. The supply chain is interconnected, and if the industry does well, everyone benefits. Relationships can raise the success rate of any engagement campaign.

4.2.4 Influencing Decision Makers: There are many similarities between communicating with government and local officials and communicating with your own employees. However, this communication is much more delicate. Every local community and municipality is different in the way community members and businesses can approach them. Below are some basic mechanics that every government engagement campaign should have.

1. Have a consistent message. Once your message is delivered to policy makers, it is important to stick with it. The message is most likely to get accepted if it is kept positive rather than combative. Having a conversation, rather than an argument, keeps your business and shale energy in a positive light.

2. Follow up. Once you have communicated what shale energy has done for you, keep the conversation going. Policy makers should not just hear your message once. Reinforcing your argument and clarifying it for them is essential. Engaged employees can also follow up with these officials, if the community structure allows for it. Promote attendance at town meetings and allow them to be advocates for shale development. This signals the importance of an issue to the community rather than just a company initiative.

3. Below is a list of the best methods when communicating with policy makers. Due to the varying nature of local governments it is not a comprehensive list. It is a solid base for the steps to engage policy makers.

- Understanding the issues and government structure
- Subscribe to your elected officials' communications
- Meet with officials
- Invite officials to tour your business operation (open door)
- Write editorials, letters to officials, and messages to the community
- Attend town hall meetings
- Vote for officials who support responsible energy development
- Recruit friends, family members, and coworkers to become advocates
- Participate in social media venues

It is critical to note that through all of these methods, you need to stick to your message. Just like when you engaged employees, a single issue can be rallied around and supported. Bogging officials down can result in a loss of focus and a lack of attention to the benefits that shale energy has to local supply chain companies.

SECTION 5: ADVOCACY

5.1 General: In its most basic form, advocacy is a tool to determine how you are going to engage with your community or with local leaders. The Association for Progressive Communications (APC) defines it as “the active support of an idea or cause expressed through strategies and methods that influence the opinions and decisions of people and organizations.”¹¹

The increased growth of shale energy and its economic benefits means that the discussion of the industry will continue, especially around the time of elections. Therefore, you must include active and consistent support, whether it be at the local, state, or federal level. As part of the shale energy supply chain, you possess the credibility to influence others. Within your own company, start the advocacy process by influencing your employees and giving them the necessary information to become ambassadors. With your influence, build your support base starting with your employees.

¹¹ Association for Progressive Communications, “Advocacy Strategies and Approaches: Overview Paper,” Steve Buckley <http://www.apc.org/en/node/9456>

Advocacy is an effective tool for:

- Expressing your views and/or your concerns
- Accessing information and services
- Defending and promoting your message
- Exploring choices and options

5.2 Six Step Model

- 1. Focus on the goals and objectives:** Set measurements of success by asking yourself what you hope to achieve. Write down your optimal goal(s) and include both your primary and secondary objectives.
- 2. Identify the target audiences:** Determine what audience you want to cater to. That includes distinguishing between your primary and secondary audiences.
- 3. Identify allies and opponents:** Build partnerships and coalitions within the community to leverage existing resources. Join the local Chamber of Commerce and/or energy associations. Know your opponents and the arguments they are likely to make. Prepare broad counterarguments so both you and your employees feel comfortable talking.
- 4. Select your advocacy approach:** Ask yourself which strategy is appropriate for meeting your goals and objectives while also targeting your audience. Make your approach flexible so that you can alter your strategy to become more effective.
- 5. Identify your key message:** Ensure that your message applies to your target audience and is persuasive. When in doubt, talk about the economic benefits of shale energy to the community and to the nation.
- 6. Go Local:** Focus on how your message can relate to the community by personalizing it to make a local connection.

5.3 Advocacy Strategy

“An advocacy strategy is a combination of approaches, techniques, and messages by which the planner seeks to achieve the advocacy goals and objectives.”¹² Ensure that your final strategy or any combination of strategies is appropriate both for your audience and for addressing your issue. A successful advocacy strategy gives you the ability to have your voice heard on your issue, allows you to defend your issue and in the instances where policy decision-making is occurring, have your message considered.

5.3.1 Understand your environment by compiling information on policies and regulations, the political issues, the principle actors, and the political relationship at stake. After this analysis, you should identify and analyze both your issue and the stakeholders. With the former, build your strategy around the strengths of your company. With the latter, determine your partners, resistant groups and critical community leaders.

5.3.2 Pick your particular strategy based on the six-step model. Some examples that can augment your message include:

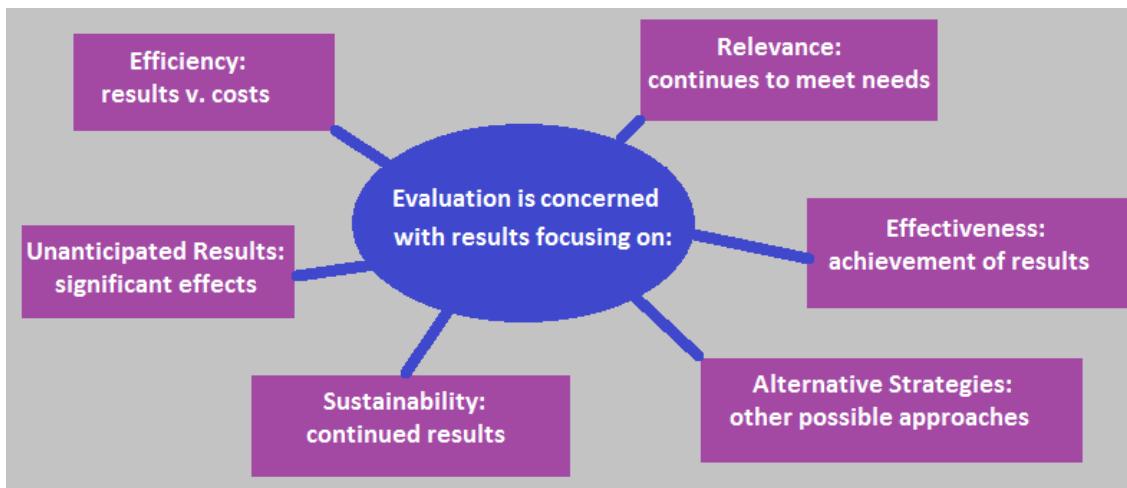
- **Action research:** Identify and analyze the environment you’re working in to determine which strategies would be the most successful.
- **Public hearings:** At the local community level, public hearings or town meetings spread your message. Utilize public hearings for employee engagement as well. This allows true engagement in terms of letting your employees or the community get involved in conversations.
- **Consciousness-raising:** Consciousness-raising ensures that the community and your own employees understand the impact of the industry. Use the economic benefits from the IHS report so your audience can see their stake in the game.
- **Model projects:** This tactic works best for showing the community your involvement and how you might be changing the physical environment with your company in the supply chain.

5.3.3 Constantly evaluate your success based Figure 6. Trial and error happens, but as you become more connected with methods that are successful for your employees and in the

¹² University of Pittsburgh, “Advocacy Strategy Planning,” N. Assifi www.pitt.edu/~super7/18011-19001/18351.ppt

community, you will meet your goals and objectives. Be flexible and don't be afraid of making changes to your strategy.

Figure 6: The Evaluation Process¹³



5.4 Advocacy Tips

5.4.1 Outside of your strategy, take three actions to help augment your advocacy approach.

- **Build partnerships and coalitions:** Alliances help mobilize community support and allow you to leverage the resources of your new partners. When your issue comes up as a political point in your community, having your coalition will not only give you a larger voice, but will also provide additional credibility. Use your influence to persuade other key local leaders or businesses, which also helps to create a more positive public reputation.
- **Cultivate a relationship with the staff:** The staff of community leaders plays an invaluable role in shaping the agenda on your issue. By cultivating a positive working relationship over time, the staff will see you as a helpful resource and therefore go to you for information concerning your issue.
- **Join the local Chamber of Commerce:** If you haven't joined already, join. If you aren't an active participant, be active. The Chamber of Commerce keeps you on top of the changing issues and trends in the community. Membership offers increased credibility and opportunities for promotion and publicity.

¹³ Ibid. www.pitt.edu/~super7/18011-19001/18351.ppt

Figure 4: Benefits of Chamber of Commerce Membership¹⁴

The Impacts of Chamber Membership on Small Business				
	% Increase in Consumer Favorability	% Increase in Consumer Awareness	% Increase in Local Reputation	% Increase Likelihood of Future Patronage*
Overall	44%	51%	57%	63%
Region				
Northeast	44%	54%	34%	66%
Midwest	28%	55%	53%	49%
South	45%	43%	82%	82%
West	51%	47%	54%	56%
Age				
18-29	--	53%	62%	56%
30-39	34%	--	54%	--
40-49	54%	63%	54%	68%
50-59	44%	54%	67%	86%
60+	43%	52%	50%	61%
Income				
Less than \$20,000	--	--	89%	--
\$20,000 to \$40,000	54%	55%	59%	64%
\$40,000 to \$60,000	33%	40%	58%	55%
\$60,000 to \$80,000	45%	50%	61%	86%
\$80,000 to \$100,000	--	69%	50%	--
More than \$100,000	49%	75%	44%	77%
Gender				
Male	48%	53%	53%	69%
Female	36%	51%	61%	63%
Leadership				
Business Decision-Makers	37%	51%	58%	59%

5.4.2 Build awareness among your employees and within the community by offering the necessary resources. Information is your most important resource, so allow access to shareable content. Research shows that one of the easiest ways to share information is through information graphics, or infographics. While they should be visually appealing, the main goal of the infographic is to inform without oversharing. Get employees involved by featuring them in YouTube videos, which you can share on your company's Twitter page. Social media augments your message and informs your audience for little to no cost.

5.4.3 Your audience is local. Therefore, focus on how your message relates to the community, including the measurable community benefits. By humanizing the message and relating it to your

¹⁴ American Business Magazine, "Why Join Your Local Chamber of Commerce," Betsy Demitropoulos <http://www.americanbusinessmag.com/2012/05/why-join-your-local-chamber-of-commerce/>

local community, you've made a "personal" connection. This effort creates stronger ties in the community, which brings its own kind of leverage if you need it later on.

5.4.4 Increase support by asking for members and removing all barriers to participation. Use your employees as ambassadors and expand the support outward into the community. However, let people participate on their own terms. Over time, the more passive supporters will ideally become more engaged ambassadors for the community.

APPENDIX A

Helpful Sources of Educational Information for Your Firm:

- EEIA: <http://www.eeia.org/>
- IHS Shale Energy Supply Chain Report: <http://www.eeia.org/signup/signup-sum.cfm>
- American Petroleum Institute: <http://www.api.org/>
- Energy in Depth: <http://energyindepth.org/>
- Energy from Shale: www.energyfromshale.org
- U.S. Department of Energy: <http://energy.gov/fe/shale-gas-101>
- PWC's Shale Oil – the next energy revolution report: <http://www.pwc.com/gx/en/oil-gas-energy/publications/shale-oil-changes-energy-markets.jhtml>

APPENDIX B

For the most detailed analysis, business leaders should also reference the complete IHS Shale Supply Chain Special Report to understand growth prospects for their particular business sector, core group, and national location. To expand on the information from Figure 2, a summary from the IHS Report describes the five core groups within the shale energy supply chain:¹⁵

1. **Capital Goods:** Off-highway equipment and industrial machinery are widely used throughout the shale value chain, including construction and access machinery; pumps and compressors; power generators; and power boilers and heat exchangers. This group includes component suppliers to equipment manufacturers as well as equipment distributors and rental companies.

Economic Benefits from Capital Goods: This sector is expected to grow at about 4% a year, supporting \$8 billion of output to shale oil and gas development in all states by 2025. The growth in the equipment sectors is far reaching and the largest change in capital goods growth that will occur in the nonproducing states from 2012 to 2025.

Top Producing States: Texas, Colorado, California, New Mexico, Louisiana, Ohio, Pennsylvania, Arkansas, and Oklahoma

¹⁵ Shale Supply Chain Special Report, IHS global analysis, Sept. 2014, <http://www.ihs.com/info/0914/shale-report.aspx>

Top Non-Producing States: New York, Illinois, Minnesota, Missouri, Iowa, Wisconsin, Florida, Oregon, and Kentucky

2. **Construction and Well Services:** Construction activity is present through all aspects of the shale energy value chain as well as the supplemental construction. Suppliers within this group include general and specialty contractors, building trades, and services related to well surveying, preparation, and clean up. Well services include well drilling and other oil and gas field services performed on a contract basis.

Economic Benefits from Construction and Well Services: This sector is forecast to grow at a strong compound annual rate of 4-5% a year between 2012 and 2025 primarily from producing states, expanding its contribution to output from \$8.1 billion in 2012 to \$13.5 billion in 2025.

Top Producing States: Texas, Louisiana, Colorado, Oklahoma, North Dakota, and Pennsylvania

3. **Logistics:** The transportation systems supporting shale energy activity consists of road, rail, water, and pipeline transportation. While truck transportation is, and will continue to be, the main part of the shale energy supply chain logistics system, pipeline, water, and railway traffic are expected to increase in the coming years.

Economic Benefits from Logistics: Within the logistics core group, the General Freight Trucking sector gains the largest employment contributions stemming from the shale value chain activity. The total number of workers is estimated to increase from more than 24,000 in 2012 to almost 45,000 workers by 2025. The pipeline transportation sector is expected to increase at an annual average compound rate of 5% from 2012 to 2025.

Top Producing States for Logistics: Texas, Louisiana, Oklahoma, North Dakota, and Pennsylvania

Top Non-Producing States: Illinois, Tennessee, Georgia, Indiana, and Michigan

4. **Materials:** Within this group fall various raw materials producers such as steel and nonferrous metals; sand, gravel, and other aggregates; chemicals; and other value-added services such as metal fabrication and distribution. Key materials include oil country

tubular good and other pipeline products, cement for well casing, and sand and chemicals associated with hydraulic fracturing. These raw materials are also critical inputs for finished and semi-finished supply chain goods such as the gears and forgings in machinery.

Economic Benefits from Materials: Hardware, Plumbing, and Heating Equipment industries are expected to increase employment steadily at an average compound annual growth rate of about 3% over the forecast period. The number of workers will increase from an average of 6,400 in 2012 to almost 10,000 in 2025. The Construction Sand and Gravel sector is the most dynamic in terms of number of workers and labor income. Total employment in this sector is projected to increase from 28,000 workers in 2012 to nearly 50,000 workers in 2025. Gross revenues in Construction Sand and Gravel sector is expected to increase at a compound annual rate of 4%, going from \$6 billion in 2012 to more than \$10 billion in 2025.

Top Producing States: Texas, Louisiana, Arkansas, Ohio, California, and Pennsylvania

Top Non-Producing States: Minnesota, Wisconsin, Illinois, Missouri, and Iowa

5. **Professional and Other Services:** Typically associated with operational expenditures, the wide range of professional and other services include environmental engineering; occupational health and safety; architectural and civil engineering; and financial, insurance, and real estate services.

Economic Benefits from Other Services: Producing states compose the bulk of the supply chain in professional and other services output, where the top-five states generate nearly \$14 billion of output in 2012, growing to over \$18 billion of output by 2025. Nonproducing states will still provide a contribution of \$3.7 billion of professional and other services in this sector by 2025.

Top Producing States: Texas, Louisiana, North Dakota, Pennsylvania, and Ohio

Top Non-Producing States: Virginia, New York, Michigan, Florida, and Massachusetts

APPENDIX C¹⁶

US unconventional energy supply chain contribution*					
	2012	2015	2020	2025	CAGR**
Employment (Number of workers)					
Supply chain total	524,413	615,910	638,762	757,802	2.9%
Energy activity total	1,100,573	1,419,214	1,562,229	1,834,306	4.0%
Share of supply chain in employment	47.6%	43.4%	40.9%	41.3%	
Gross output (2012 \$M)					
Supply chain total	145,681	173,522	180,620	205,907	2.7%
Energy activity total	345,089	463,538	516,689	582,706	4.1%
Share of supply chain in gross output	42.2%	37.4%	35.0%	35.3%	
Labor income (2012 \$M)					
Supply chain total	41,015	48,915	51,381	59,502	2.9%
Energy activity total	97,291	130,593	146,432	168,146	4.3%
Share of supply chain in labor income	42.2%	37.5%	35.1%	35.4%	

* Energy activity total represents the combined direct and indirect contributions of upstream, midstream, and downstream as reported in America's New Energy Future, Volume 3.

** Compound annual growth rate from 2012 to 2025.

Source: IHS

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Additional information, including specific benefits by state, can be found by downloading the 2014 IHS report, “Supplying the Unconventional Revolution: Sizing the Oil and Gas Supply Chain,” at <http://www.eeia.org/signup/signup-sum.cfm>.

¹⁶ Data table provided by EEIA and the IHS report, pg. 3 in the Executive Summary

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BIBLIOGRAPHY

- Armstrong, M. and Taylor, S. "Armstrong's handbook of human resource management practice." Kogan Page Publishers, 2014.
- Arnow, Rob, and Paul Platt. "The Mother of Movements: Beyond the single-issue campaign." *Race, Poverty & the Environment*. Fall 2003 10: 29-32.
- Barkan, Joel D., and James E. Burno. "Operations Research in Planning Political Campaign Strategies. *Operations Research*. Sep. – Oct. 1972 20: 925-941.
- Carson, Windy, and Patty Franklin. "Issues Update: Workplace Advocacy." *The American Journal of Nursing*. Feb. 2001 101: 55-56.
- Casey, Donald; CEO of Title Resource Group. 27 September 2014. Personal Interview.
- Dean, Amy. "Taking Over City Council: Lessons from labor's grassroots campaign." *Race, Poverty & the Environment*. Fall 2003 10: 52-54.
- Dun, Delmer D. "Review of *the Making of Campaign Strategy*," by Marjorie Randon Hersey. *Annals of the American Academy of Political and Social Science*. Nov. 1974 416: 237-238.
- Glanville, Jennifer L. "Review of *Activism, Inc.: How That Outsourcing of Grassroots Campaigns Is Strangling Progressive Politics in America* by Dana R. Fisher." *Social Forces*. Dec. 2008 87: 1151-1152.
- Green Richard; Director of North American Oil & Gas Development, DNV-GL. 24 Sept 2014. Personal Interview.
- Griggs, Kristy. Environmental Regulatory Specialist, Land Permits, Land reclamation, GIS, Contractor supporting the State of Pennsylvania. 24 Sept 2014. Personal Interview.
- Guest, D. E. (1987), Human Resource Management and Industrial Relations. *Journal of Management Studies*, 24: 503–521
- Howard, Philip N. "Deep Democracy, Thin Citizenship: The Impact of Digital media in Political Campaign Strategy." *Annals of the American Academy of Political and Social Science*. Jan 2005 597: 153-170.
- Johnson, Bill; Chairman, U.S. House of Representatives (R-OH) Energy Committee. James Balaschak; Chairman of Deloitte Energy Solutions. Kaz Onose; Senior Vice President of Sumitomo Corporation of America (Japan). How Shale is making America the World Leader in Energy Exports." Shale Insight 2014 Conference, Pittsburgh PA. 24 Sept 2014. Panel Discussion.
- Lavelle, Marianne. "A Drive for New Jobs through Energy." *National Geographic Magazine*. 14 Oct 2014.

- Loh, Penn. "We Must All Be Accountable in a Grassroots Movement." *Race, Poverty & the Environment*. Summer 2003 10: 28.
- Macey, William H. Employee Engagement: Tools for Analysis, Practice, and Competitive Advantage. Chichester, UK: Wiley-Blackwell, 2009.
- McCormick, Pamela; Public Policy Consultant, Philadelphia Chamber of Commerce. 24 Sept 2014. Personal Interview.
- Obama, Barak; U.S. President. "Executive Order 13605 for Supporting Safe and Responsible Development of Unconventional Domestic Natural Gas Resources." *Federal Register*. 13 April 2012.
- "Oil and Gas Exploration Tax Deductions." *IRS tax code*. 10 Jan 2014.
- Paynton, Scott T., and Maxwell Schnurer. "Corporate 'Grassroots' Activism: A Juxtaposition." *Business & Professional Ethics Journal*. 2010 29: 63-83.
- Piven, Frances. "Advocacy as a Strategy of Political Management." *Perspecta*. 1969 12: 37-38.
- Penland, Christy; Publisher of Ohio Shale Gas Monthly, Spectrum Communications. 24 Sept 2014. Personal Interview.
- Rinaldi, Philip, Philadelphia Energy Solutions. Robert Boulware; Seneca Resources. William Polacek; CEO of JWF Environmental Industries. "Game Changer--How Shale Development has Spurred a Regional Economic Renewal." Shale Insight 2014 Conference, Pittsburgh PA. 24 Sept 2014. Panel Discussion.
- "Supplying the Unconventional Revolution: Sizing the Oil and Gas Supply Chain," *IHS Economics*. Sept 2014.
- "The Outlook for Energy: A View to 2040." *Exxon Mobil Energy Outlook*. March 2014.
- "The State of American Energy, America's Choice." *American Petroleum Institute Energy Outlook*. Jan 2014.
- Walker, Edward T. "Privatizing Participation: Civic Change and the Organization Dynamics of Grassroots Lobbying Firms." *American Sociological Review*. Feb. 2009 74: 83-105.
- Wallack, Lawrence. "Media Advocacy: A Strategy for Empowering People and Communities." *Journal of Public Health Policy*. Winter 1994 15: 420-436.

WEBSITES

- "America's New Energy Future: The Unconventional Oil and Gas Revolution and the U.S. Economy." American Petroleum Institute, 1 Apr. 2014.
http://www.api.org/~media/Files/Policy/SOAE-2013/Americas_New_Energy_Future_State_Highlights_Dec2012.pdf

“ANGA Comments on Final DOE Approval of the Freeport LNG Export Facility.” Americas Natural Gas Alliance. 14 Nov 2014. <http://anga.us/media-room/press-releases/2014/11/14/anga-comments-on-final-doe-approval-of-the-freeport-lng-export-facility>

“America’s New Energy Future: The Unconventional Oil and Gas Revolution and the U.S. Economy.” American Petroleum Institute, 1 Apr. 2014.
<http://www.api.org/~media/Files/Policy/SOAE-2013/SOAE-Report-2013.pdf>

Barth, Jannette. “The Economic Impact of Shale Gas Development: Can New York Learn from Texas?” <http://www.catskillcitizens.org/barth/jmbtexas.pdf>

“Best Practices in Coalition Building” American Library Association.

www.ala.org/advocacy/advleg/advocacyuniversity/coalitionbuilding/bestpractices

“Chemical Disclosure Registry.” Frac Focus. 5 Oct 5 2014. <https://fracfocus.org/>

“Community Engagement” Chevron.

www.chevron.com/deliveringenergy/naturalgas/shalegas/communityengagement/

“Developing a Successful Grassroots Campaign” Small Business Advocate.

www.smallbusinessadvocate.com/small-business-articles/developing-a-successful-grassroots-campaign-837

Energy from Shale. 29 Sep 2014. <http://www.energyfromshale.org/>

Energy in Depth. 07 Dec. 2014. <http://energyindepth.org/>

“Effective Planning” Putnam Consulting. www.putnam-consulting.com/philanthropy-411-blog/philanthropy/effective-comm-planning/

“Future Employment Projections.” Bureau of Labor Statistics, U.S. Department of Labor. Web.
“Future Employment Projections.” Bureau of Labor Statistics, U.S. Department of Labor.
<http://www.bls.gov/news.release/ecopro.toc.htm>.

Independent Petroleum Association of America. 8 Sept 2014. <http://www.ipaa.org/>

“Marcellus Air Ohio Shale.” 15 Oct 2014. <http://www.marcellus-shale.us/MARCELLUS-AIR.htm>.

National Association of Royalty Owners. 16 Nov 2014. <http://www.naro-us.org/>.

Oil and Gas Journal. 6 Oct 6 2014. <http://www.ogj.com/index.html>

Pennsylvania Independent Oil and Gas Association. 1 Dec 2014. <http://www.pioga.org/>

Pennsylvania Landowners Association. 5 Dec 2014. <http://palandowners.org/>

“Shale Gas Subcommittee Report to Department of Energy.” Natural Gas Subcommittee.
http://www.shalegas.energy.gov/resources/111811_final_report.pdf

Shale in Depth. 20 Nov 2014. http://energyindepth.org/wp-content/uploads/2014/09/community_benefits_shale.pdf

“The Oil and Gas Law of the Land: Your Guide to Act 13.” 1 Apr 2014.
<http://stateimpact.npr.org/pennsylvania/tag/impact-fee/>

“U.S. Oil Shale: Our Economy, Our Jobs.” American Petroleum Institute. 22 Sept 2014. .
http://www.api.org/~media/Files/Oil-and-Natural-Gas/Oil_Shale/Oil_Shale_Factsheet_3.pdf

“Why Oil and Gas Today?” 4 Nov 2014. <http://www.oilcouncil.com/events>

ADDENDUM: CASE STUDIES

Cotulla, TX¹

In April, 2014 National Public Radio ran a story titled, “Drilling Frenzy Fuels Sudden Growth in Small Town.” The story is of Cotulla, Texas while lies on the Eagle Ford shale formation. This small town that was characterized by dry, flat ranch land is now the number two oil producing area in the United States with nearly 8,000 oil and gas wells drilled. Cotulla was a town with high unemployment and a high poverty rate, until 2008 when the first drill entered the ground and the drilling frenzy began. Lyndon Johnson taught school in Cotulla before he began his political career and his wife described the town as, “one of the crummiest towns in Texas.”

Due to the oil boom, Cotulla has seen dramatic increases in city revenues and taxes. This small town in Texas has become a growing city with ever increasing population and investment. The population has tripled and the tax revenue is going to build new roads and even opening a community college. Companies like Chesapeake Energy are greatly benefitting from shale development in the area, however believe in engagement in the areas they work. They attempt to build and maintain healthy communities by, “fostering economic growth and job creation, being accessible to community members, and contributing through corporate giving and volunteer programs.”

University of Texas at San Antonio has projected that shale in the region will support more than 196,000 jobs and generate \$137 billion in total economic output for Texas by 2023. This has led to the community push for investment in roads, water, education and medical facilities to sustain this long term development. Through the Texas Energy Summit and Shale Mag, the Shale Energy news magazine, shale advocates have been able to voice their opinions.

A particular example of a man who has benefited greatly from shale development is Darrel Brownlow, a rancher from Cotulla. He and his father ran the 1,000 acre ranch but were forced to sell off his herd due to drought. He leased part of his land for Chesapeake Energy who built a 3 acre pond to supply water for their drilling operations. The pond has allowed Brownlow to

¹ Sources:

<http://www.npr.org/2014/04/10/295332292/drilling-frenzy-fuels-sudden-growth-in-small-texas-town>

<http://www.chk.com/Corporate-Responsibility/Pages/Information.aspx>

<http://www.texasmonthly.com/story/the-oil-boom-of-south-texas/page/0/3>

<http://nation.time.com/2013/11/05/six-surprising-things-you-probably-didnt-know-about-the-texas-oil-boom/>

irrigate and the money has allowed him to rebuild the ranch and bring back his cattle. He says the drilling has brought about, “opportunity beyond belief.”

Bradford County, PA²

Bradford County is the most drilled country in Pennsylvania with 2,000 wells and that number is growing. Located in northern Pennsylvania, with New York just north across the border, Commissioner Doug McLinko is leading the campaign to change public opinion on shale energy. He invites critics and disbelievers to join him on a pickup truck tour to prove the misinformation campaigns wrong.

Commissioner McLinko understands the benefits that shale development is bringing into his community. For example, tax revenue brought in from shale energy operations has eliminated all the country debt and lowered taxes for the community. In addition, tax dollars are flowing into the cash-strapped state government as well. The growth of the industry has also brought in job opportunities for those unemployed in the community. However, the jobs aren’t just associated with shale energy. The insularly businesses brought it by the industry growth are other opportunities for jobs.

The economic benefits are enticing, but Commissioner McLinko also points out the ways that the industry is further strengthening the community. He notes that around \$300-\$400 million has been put toward infrastructure investment, specifically in the form of roads. Beyond the important infrastructure investment, the shale industry works well with municipalities around Pennsylvania. For example, Commissioner McLinko says that the industry is always willing to help out townships if they have equipment in the area.

As for the environmental concerns that are being argued just north of the border in New York, Commissioner McLinko uses his pick up tours to explain how the shale industry is using responsible development. Even though a large percentage of the country is developed, there is no physical scarring on the land. The industry also installed a water purification system, so that they could reuse the water.

² <http://naturalgasnow.org/bradford-county-shale-success-story/>

Addendum: Regulatory, Environmental Safety, and Land Use Precedents

1. **Regulatory Status of the U.S. Clean Power Plan.** The Environmental Protection Agency (EPA) Clean Power Plan, announced on June 4, 2014 for implementation beginning in 2015, directs each of the fifty U.S. states to develop individual plans to reduce carbon dioxide emissions.¹ The overall goal of the plan is for carbon emissions from all U.S. sources to be reduced by 30-percent from levels emitted in the year 2005. One of the significant impacts of the plan would be the likely closure of additional coal burning electric plants and converting them to cleaner burning natural gas, replacement of the generating capacity with renewable forms of energy, or both. EPA rules implemented after a comment period have the effect of law, but at the present time there are two separate lawsuits from twelve coal producing states opposing the Clean Power Plan.² Figure A below illustrates eight programs and proposals that contribute towards reduced carbon and greenhouse gas emissions.

Figure A.³



¹ EPA websites, <http://blog.epa.gov/epaconnect/2014/06/understanding-state-goals-under-the-clean-power-plan/> and <http://www2.epa.gov/carbon-pollution-standards/clean-power-plan-proposed-rule>

² Opposition block of states to EPA's power plant rule, Dec 2, 2014, <http://www.eenews.net/stories/1060009746>

³ Center for Climate and Energy Solutions, <http://www.c2es.org/blog/perciasepeb/5-ideas-epas-clean-power-plan>

Additional considerations for planning the future role of natural gas from shale and U.S. energy policy:

- Coal emits over 205-230 pounds of carbon dioxide per ton of coal burned, natural gas emits only half this amount for an equivalent amount of energy.⁴
- Electricity generating plants and heating and cooling buildings accounts for 70-percent of energy needs in the U.S., transportation accounts for only 30-percent, so the contributions of shale energy towards electricity generation are much more important than many people realize.
- Coal plants still generate approximately 40-percent of the electricity in the U.S.; natural gas generates 20-percent and is increasing; wind and solar power currently produce only 7-percent.
- The U.S. electric grid requires a base supply of steadily generated electricity from some type of fossil fuel; renewable wind and solar plants can contribute but cannot form the base since the wind is not always blowing, nor sun shining. Additionally, advanced digital controls are required to balance the contributions of renewables to the grid—30-percent renewable power is the approximate maximum the U.S. electric grid can sustain without surges running throughout the system and causing damage to transformers.
- Coal remains lower in price than natural gas, but dependable U.S. produced natural gas from shale is the most practical solution to meet environmental and climate change concerns. Adding additional nuclear or hydro-electric generating plants would be even more difficult to implement.
- Increased use of natural gas to generate electricity is a natural solution between the present time and 2030. This would provide the nation, U.S. states, and utility companies the time to build additional generating facilities, transmission lines, and new technical solutions. This plan would maintain competitive electric pricing necessary for business success while the nation makes reasonable progress towards carbon reduction and environmental concerns.

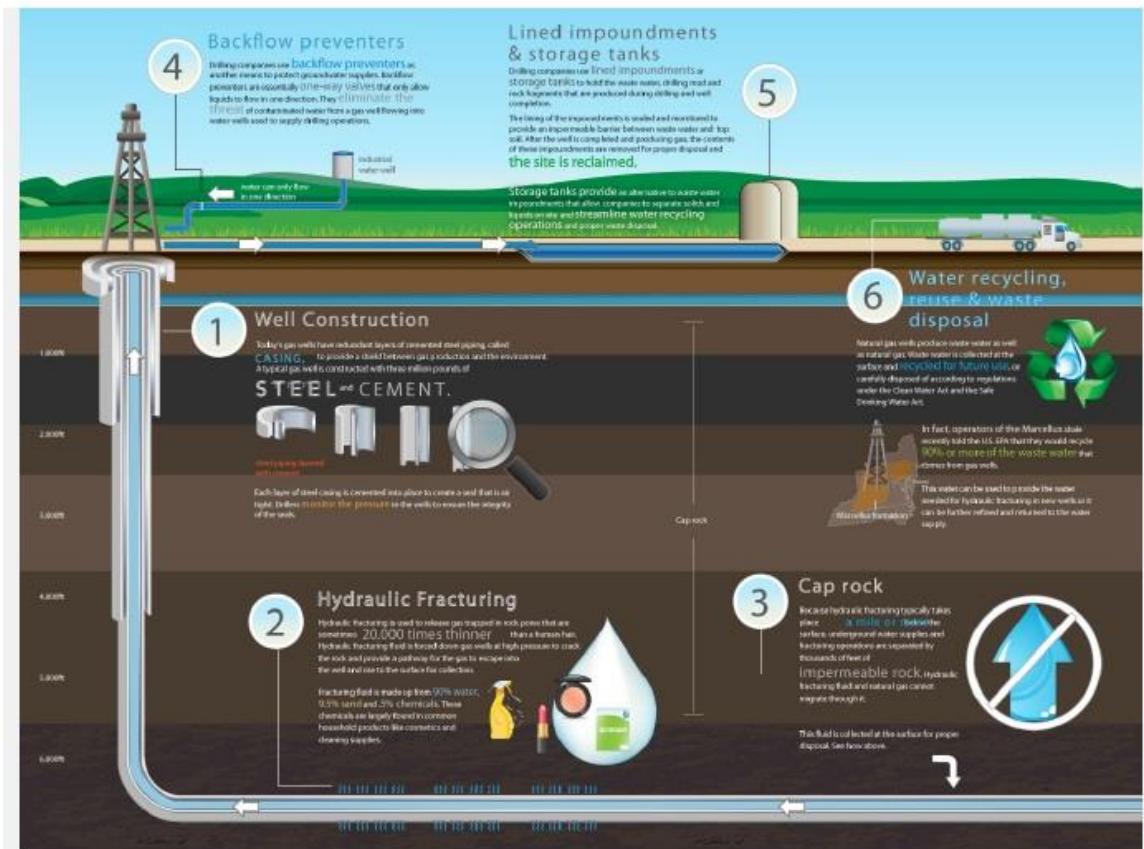
2. **Environmental and Safety Measures.** The unconventional natural gas drilling process, or hydraulic fracturing technology, is only a fifteen year old industry. The industry has made huge strides to institutionalize proven safety processes, training, inspections, and additional standards to ensure ground water, neighbors, and the environment is protected. Prior to the commencement of drilling, many states require a remediation fund to be in place in order to ensure the drilling site and environment are returned to their natural states after the drilling is completed. The keynote speaker at the 2014 Shale Industry Insight Conference emphasized to fellow leaders in the industry, state, and local government officials that it is essential for the shale industry to not only explain the economic benefits that shale development brings, but to work closely with local community and government leaders in a transparent way.⁵ Local community faith must be earned and all procedures should be shared with local decision

⁴ U.S. Energy Information Agency. Anthracite coal emits 228 pounds of Carbon Dioxide, Bituminous coal emits 205 pounds, Natural gas emits 117 pounds, <http://www.eia.gov/tools/faqs/faq.cfm?id=73&t=11>

⁵ Shale Insight 2014 Industry Conference, Pittsburgh PA, September 24, 2014.

makers in order to demonstrate that the risks have been mitigated to absolutely the minimum level. Figure B below is a useful graphic to use during company training and community engagements to describe the unconventional shale energy development process and the safety measures that protect the environment and ground water.

Figure B.⁶



Additional findings on safety engineering and the hydraulic fracturing process.

- It is common to hear both of the following claims: “Fracking pollutes ground water and causes earthquakes” and “There has never been a proven incident of ground water contamination.” Which claim is more correct?
- Our investigation included an examination of an independent Associate Press examination of this question and found an approximate 2-percent incidence of state confirmed water contamination over the last decade in four shale energy producing states from over 8,000 wells. The vast majority of these contaminations appear to have occurred nearly a decade ago and the Pennsylvania Department of Environmental Protection explained these have “...dropped substantially in 2013.”⁷

⁶ American Petroleum Institute (API) graphic, <http://www.api.org/policy-and-issues/policy-items/hf~/media/Oil-and-Natural-Gas-images/Hydraulic-Fracturing-Primer/Hi-Res/Drilling.jpg>

⁷ USA Today article quoting the Associate Press survey, <http://www.usatoday.com/story/money/business/2014/01/05/some-states-confirm-water-pollution-from-drilling/4328859/>

- We also found evidence that many of the small number of contaminations in the past have occurred because of faulty engineering procedures, not using safety measures now standard in the industry, no government inspections prior to pressure release, and very ill-advised drilling locations within city limits and community water supplies.
- The safety measures illustrated in Figure B, properly installed and inspected prior to use, are designed to further prevent and mitigate these risks.
- City water wells are typically drilled to depths of several hundred feet—the concrete and steel caps illustrated by (1) in Figure B are now installed to exceed the depths of community water supplies to ensure safety. The steel tube and concrete caps properly installed at significant expense to the developer, then inspected, and approved prior to drilling meet these safety requirements.
- Backflow preventers (4) and impervious fabric-lined slurry water capture ponds (5) further prevent surface contaminations that may have occurred upon pressure release on the first day of use by older technology wells a decade ago.
- Risk can never be reduced to absolutely zero, but it appears these additional safety measures, properly installed, and inspected by local and state government inspectors as now required in several states will mitigate any risk. A benefit to cost analysis including environmental risk is recommended for each shale development area and to ensure a remediation fund is available for communities prior to drilling approval.

3. Land Use Legal Principles and Precedents. Each U.S. state's constitution, real estate empowering acts, natural resources development restrictions, local land use comprehensive development plans, and local zoning restrictions, make shale energy development a unique endeavor for each state and locality. A recognized land use attorney, experienced in the state concerned, is highly recommended early in the feasibility study phase of potential shale developments. To illustrate, the state of Pennsylvania attempted to create a "state-wide zoning act" more friendly for shale energy development under Pennsylvania Act 13, but several localities took the state to court. The Pennsylvania Supreme Court recently heard oral arguments for whether this legislation is proper under the state constitution and their decision is pending. Other states and localities may wish to consider the following:

- The U.S. Constitution directs certain authorities to states, but makes no mention of localities. Local governments derive any decision making authority from their respective state constitutions.
- A "Dillon Rule" state is one where the state government remains supreme and only grants localities specific powers. The state government in these type of states retain more control in shale development decision making than non-Dillon rule states.
- Numerous state, federal, and U.S. Supreme Court decisions in regards to land use have found that owners are entitled to due process for developing their land, are entitled to "**just compensation**" by the 5th Amendment when their property is taken (and sometimes when development is prevented by regulation, "a regulatory taking").

- **14th Amendment; Equal Protection:** The right to develop land for maximum profit is not a fundamental right, only reasonable use of the land. When land use and property issues are attached to an equal protection claim, courts normally employ a rational basis review and defer to the land use policy decisions of state and local governments.
 - “Do no harm” to one’s neighbors is a significant factor in decisions by the courts.
 - Higher courts normally defer to localities to determine if land use has become a “public nuisance.”
 - If a group of several or many landowners organize as a group and either all or a majority (varies by state constitution) agree to develop their land for a common purpose, governments are normally more hard pressed to prevent such developments provided the activity does not damage the health, safety, and welfare of others.
- States and communities may also pass a “moratorium” on a proposed development while the government gathers facts and determines how to proceed. This is the situation at the present time in the states of New York and Colorado while they study shale energy issues and safety elsewhere and develop their respective state procedures.
 - State governments may not extend the moratorium indefinitely to prevent development, lest this becomes a “regulatory taking” or “per se taking.” The land owners would then be due compensation or relief to develop. One of the key legal precedents for this in land use law is *Tahoe-Sierra Preservation Council, Inc. v. Tahoe Regional Planning Agency*.⁸
 - If the state can show health, safety, and welfare concerns regarding the proposed use of the property, no just compensation is due the owner.
 - If the court finds no health, safety, or welfare concerns for the land development, the state can still prevent development but the owner is due just compensation. In this case, the burden of proof is on the state.
- Several 5th Amendment and 14th Amendment land use cases have gone to the U.S. Supreme Court in recent years.⁹

⁸ A general maximum time for a government to make satisfactory regulatory progress and come to a decision is on the order of one to three years. *Tahoe-Sierra Preservation Council, Inc. v. Tahoe Regional Planning Agency*, 535 U.S. 302 (2002), *Land Use Controls: Cases and Materials*, 4th Ed., Wolters Kluwer, 2014, p.193-203.

⁹ References for equal protection clause, <http://landuselaw.wustl.edu/equalprotection.html> and recent shale energy legal decisions by state <http://www.shaleenergylawblog.com/>.