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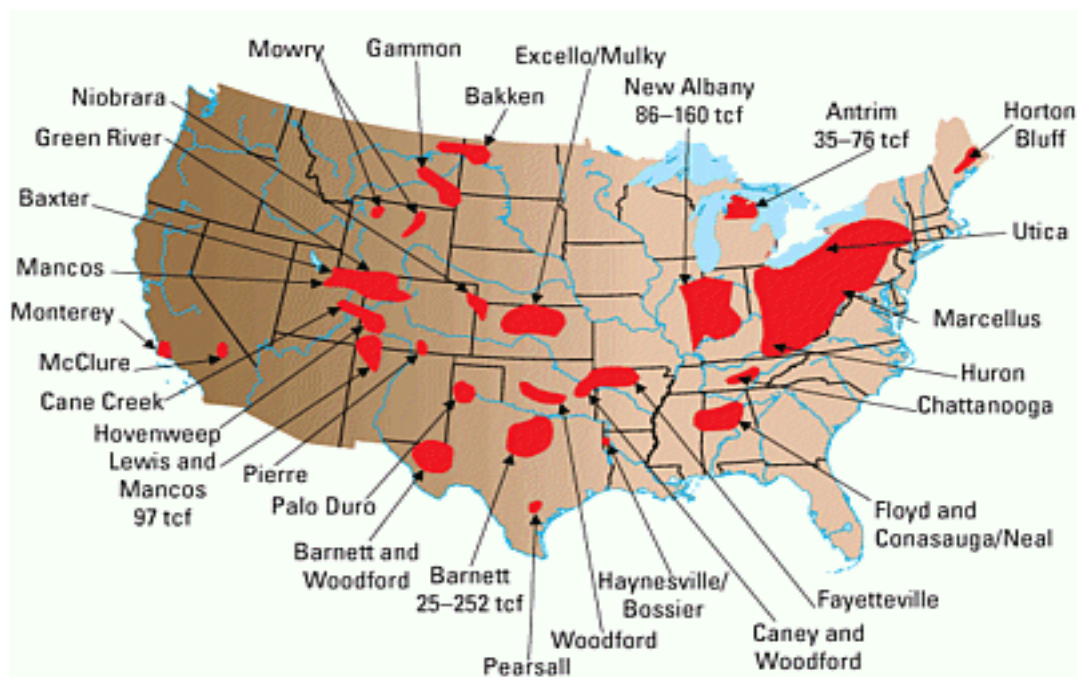
State Regulations in Hydraulic Fracturing

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Introduction

Regulation of hydraulic fracturing, or fracking, has become one of the most complex environmental and political issues of the 21st century. Because of the prominent global conflicts over oil and gas, as well as pressing air pollution problems, the United States and many other countries have begun to look for alternative energy sources to address these concerns. Natural gas is proving to be one of the cheapest and most plentiful energy resources, and may be a viable renewable energy solution if the total supply continues to increase along with energy demand as predicted (AEO Table Browser, 2013).

States are facing a critical turning point in terms of taking responsibility for health and the environment because of the rapidly evolving natural gas industry. The large number of unprecedented questions waiting to be answered concerning safety, land rights, policy and pollution among other issues, have caused a great deal of political and some civil unrest. Because federal regulations are so broad and vaguely defined, states are left with a great deal of power to set the tone for future fracking endeavors and test government decision-making power. Controversy exists and will continue to exist in almost all facets of fracking until much more scientific research can definitively evaluate the impacts of chemical use on factors such as health and the environment. Until that point, it is up to states to wade through the sea of issues and competing opinions regarding fracking.



This map of the major oil plays in the United States includes the Marcellus Shale in Pennsylvania and large deposits in western Colorado. Photo taken from http://www.un-naturalgas.org/hydraulic_fracturing_a-z.htm

Decisions made by a state could directly impact ordinary citizens, especially when dealing with setting limits on fracking around schools, drinking water supplies and private land. Uninvolved people could very easily be swept into the fracking scene if a natural gas play is discovered near their homes or workplace.

Regulation and enforcement of fracking laws at the state level is a disorganized, unconsolidated process at best. Although fracking has been around for decades in the western United States, especially in rural areas, the recent discovery of many more natural gas deposits has opened the doors to new fracking possibilities and left state governments in a tailspin trying to keep up.

Fracking differences West to East: Colorado versus Pennsylvania

Colorado, Pennsylvania and other states have made strides in trying to regulate fracking on private and public lands through taxation, chemical disclosure and drilling site inspections to avoid environmental and water contamination, as well as create more transparency for the public.

The biggest struggle for states has been creating and enforcing policies that not only benefit the economy and industry, but also comply with citizens' safety concerns. Federal regulations are beginning to seem more and more outdated and inconsistent, creating turmoil as to how states should be regulating to protect everyone. Regulation at the state level often involves more detailed and stringent rules than those proposed by the Environmental Protection Agency (EPA), especially in areas where fracking affects more densely populated areas such as Boulder, Colorado, and the many towns in the Marcellus Shale play in Pennsylvania.

The Colorado Oil and Gas Conservation Commission (COGCC) and the Office of Oil and Gas Management in the Pennsylvania Department of Environmental Protection are two of the primary regulators at the state level, but power is spread over a number of different organizations, which compounds the complications of fracking regulation.

The Colorado Oil and Gas Conservation Commission works to maintain balanced regulation and attempts to connect all parties affected by fracking under common, fair guidelines consistent with local, state and federal regulations. Colorado has been ranked in the top 10 oil and gas producing states for decades, but the state's traditionally "green" mindset has raised a call by many citizens to stop or at least curb fracking activity (Wittmeyer, 2013). Pennsylvania's Office of Oil and Gas Management boasts a similar mission but is much more focused on making information, resources and reports available for public use rather than acting as a central control center for all regulators.

The Pennsylvania Office of Oil and Gas Management is extremely effective at providing a plethora of information in an organized manner while finding information from the Colorado Oil and Gas Conservation is much more difficult. The Colorado Oil and Gas Association (COGA), a nationally recognized trade association, is the main source of public information in Colorado. Between Colorado and Pennsylvania, the hierarchy of command within the state is extremely different. These inconsistencies in delegating regulatory responsibility serve as a primary roadblock in creating an efficient enforcement model for fracking.

Taxation on Fracking Companies

Taxation imposed on fracking companies has been the main form of compensation to the state for land use and environmental damage from fracking, and many states have taken advantage of the potential for an increased income. For example, 12,000 acres of public land near Mesa Verde in Colorado were set to be auctioned off to oil companies last November, a decision made by the state in an attempt to generate money and boost the economy (Goud, 2013). In this case, the state would benefit both from the money earned directly from the lease, as well as from the taxes imposed on the natural gas the company finds.

Colorado, and nearly every other state besides Pennsylvania, has imposed a severance tax on natural gas. A severance tax has historically been placed on many nonrenewable natural resources such as coal and oil and now has been introduced to the natural gas industry as an additional fee paid to the state by the drilling company on top of income taxes. Different states use different criteria, such as location and production to decide tax rates so there is little uniformity in this type of regulation, a common theme in natural gas drilling. For example, Colorado, whose wells produced over 1.2 million cubic feet of natural gas in 2007, imposes a 2 to 5% tax rate depending on the company's gross income, but other states may have a much more complicated system (Taxing Natural Gas Production). The state ideally uses the money from the severance tax to repair and renew land after the fracking companies move out, but sometimes the state uses most of the money for other causes it deems important, such as roadwork or schools.

In place of a severance tax, Pennsylvania passed Act 13 in 2012, adopting a unique policy called an impact fee which brings a portion of the income from wells back to the state. Some money collected will then be allotted to various towns and counties to offset side effects of fracking or to improve other aspects of the area as seen fit by local officials and citizens (PUC, 2013). This system may seem more ideal than a severance tax in writing, but may fall short if wells in these areas fail to produce a lot of oil. With a severance tax, taxation is usually imposed regardless of net income, but with the impact fee, areas with the highest production may not necessarily see

State	Marketed Production (million cubic feet)	Method of Taxation
Alabama	270,407	4-8%
Alaska	433,485	25% to 50% based on net value of oil and gas (value at point of production less all qualified lease expenditures)
Arizona	655	3.125% state rate (counties impose additional tax rates)
Arkansas	269,886	5% of market value
California	307,160	Assessed each June based on estimated budget for upcoming fiscal year and total amount of assessable oil and gas produced during the prior calendar year. For FY 2009/10, the tax rate was \$0.0880312 per 10 MCF of natural gas produced.
Colorado	1,242,571	2% to 5% based on gross income

The chart above shows a few examples of different states' natural gas taxation methods. The marketed production numbers are from 2007.

<http://www.ncsl.org/research/energy/taxing-natural-gas-production.aspx>

the most money come back. For instance, an area may also have been expected to produce a lot of gas, so many drilling rigs were installed, but the wells failed to produce. In this case, the land was still wrecked but those wells did not generate a great deal of natural gas, so only a minimal amount of money will be given back to that community because of the lack of production (Pennsylvania Impact Fee Summary).

The impact fee is determined by the average selling price of natural gas for the year, but as the value of natural gas production in the Marcellus Shale increases, it is predicted that an annual severance tax of only 4% could generate roughly three times as much income as the current impact fee, which brought in only \$202 million in 2012 (Pennsylvania Budget and Policy Center, 2013). Pennsylvania's impact fee is the only system of this kind right now, but citizens of profiting towns and cities have generally been pleased with their monetary allotments. For instance, Dr. Alice Davis, administrative director at Susquehanna County Career and Technology Center, and Art Donato, 911 Coordinator and Forest Lake Township Supervisor, of Susquehanna County, Pennsylvania, both described the new roads and increased prosperity brought to their tiny town, Dimock, which had previously struggled economically. They claim that the town is more prosperous than it has ever been

and that many locals are now able to earn a living through a combination of the new jobs created and the income from leases. Because the wells of Dimock have produced so much gas, people said the town has benefitted greatly from the impact fee since it pays the town in terms of how much gas was drilled.

Inspections

Although measures have been taken to hammer out the details of land inspections, one of the chief complaints from environmental groups like the Oil & Gas Accountability Project is that inspectors are few and far between. The Project, a subdivision of Earthworks, a self-identified environmental watchdog group, created a Colorado Model County Oil and Gas Regulations document intended to be used by all states as a template for its own plan (Earthworks, 2003). One highlight of this document states that inspectors be required to only give one hour's notice before their arrival, severely limiting the ability of companies to attempt to cover anything up for the inspections.

However, a 2012 Earthworks study that included six states, claimed that “hundreds of thousands of active oil and gas wells go without government inspection in any given year, and fines for regulatory violations are too small to change drilling company behavior” (Zeller, 2012). Furthermore, “The analysis suggested that state regulators are often understaffed, underfunded, or otherwise unable to keep pace with rapidly expanding oil and gas exploration and the attending risk of spills, leaks, contamination and accidents that might arise through negligence or deliberate shortcutting” (Zeller, 2012).

Inspectors at the state level are important in keeping drilling companies in check on a more regular basis than national inspectors from the U.S. Bureau of Land Management (BLM) since oftentimes BLM inspectors are spread extremely thin. Ironically, state inspectors are actually few and far between in booming states such as North Dakota in 2013 and BLM officials are a much more common sight, according to Susan L., a field compliance coordinator working on drilling sites there. BLM regional offices are often spread across states in an effort to keep federal oversight present.

Inspectors across the country are supposed to visit well sites regularly to check for proper labeling of chemicals and mechanical components, security diagrams, safety plans and Spill Control and Countermeasure (SPCC) plans. Inspectors also look to make sure well signs are openly displayed with proper information where anyone can find it and that equipment is made with specific types of steel or other appropriate metals. Susan also said that it is becoming increasingly more common for companies to now hold internal regulatory inspections making sure that all of these rules are followed. The inspection process can be sped up substantially if state or national inspector arrives at a site and there are records showing that the company is proactively following all of the rules.

The responsibilities taken by companies to perform inspections should be comforting to the public since study results revealed that only an estimated 1 in 10 of about 155,000 wells in Pennsylvania and Ohio were inspected per year by outside inspectors (Nearing, 2012). A shift toward putting more internal pressure on companies to make sure they are complying with regulations would aid in better record-keeping and therefore easier and less time-consuming regulation for state officials. Colorado is one state that has begun trying to increase efficiency to supplement the hiring of new inspectors by training these officials in computerizing records and giving them access to full well histories on laptops that travel with them to sites (Lustgarten, 2009). With the number of wells having gone up over 149% since 2003, this type of action is crucial to maintain on a widespread basis because it is just not feasible for the number of inspectors to keep pace with the industry the way they are operating now (Lustgarten, 2009).

The effort by states to regulate effectively is apparent, but without the manpower to actively inspect and enforce regularly, there is no way that the rules and regulations can reach their potential impact within the current structure of the system. The chart below shows the proportion of wells inspected and total well numbers in various states as of 2010.

State	Inspectors	Active wells	Number of wells inspected	Inspections	Active wells per inspector	Inspections per inspector
CO	15 ¹	46,835 ²	No data	12,239 ³	3,122	816
NM	12 ⁴	53,209 ⁵	No data	25,543 ⁶ or 29,394 ⁷	4,434	2,129 or 2,450
NY	14 ⁸	11,852 ⁹	No data	No data	848	No data
OH	27 ¹⁰	64,481 ¹¹	6,590 ¹²	10,422 ¹³	2,388	341
PA	84 ¹⁴ or 88 ¹⁵	77,898 ¹⁶	11,283 ¹⁷	22,670 ¹⁸	927 or 885	270 or 258
TX	97 ¹⁹	261,476 ²⁰	No data	114,878 ²¹	2,696	1,184

Distributions of inspectors and inspections conducted in various states are alarmingly low compared to how many active wells are in place. Photo taken from http://www.earthworksaction.org/issues/detail/ohio_oil_gas_enforcement_inspection#.UoQo3xaTP-Y

Chemical Disclosure

Many states including Colorado have also adopted a policy of requiring companies to provide a full disclosure of chemicals used in their fracking fluids with the exception of chemicals the company deem to be “trade secrets.” According to the National Resource Defense Council (NRDC), 14 out of 29 states with fracking activity have disclosure rules in effect requiring all chemicals in base fluids to be listed and publicly available. Some states even require that this information be disclosed before use of the fluid (McFeeley, 2012). Colorado requires companies to disclose all chemicals to FracFocus, a public chemical disclosure registry intended to increase public accessibility to information about fracking within 60 days of concluding a fracturing treatment or no later than 120 days after starting the fracturing (Notice to Operators, 2013).

One aspect of the Colorado disclosure policy requires companies to provide information on all chemical components in their fracking fluid to doctors if they ask for this information, in exchange for a promise to keep those components confidential. Interestingly enough, that clause was a major point of contention with Act 13, Pennsylvania’s fracking measure, because companies were concerned about trade secret leaks (Detrow, 2012). To hold Colorado doctors accountable for this confidentiality agreement, all signed a nondisclosure form agreeing to keep the chemicals secret. This confidentiality agreement has been criticized for being a “gag clause” since doctors are informed of all chemicals in the fluid but legally must keep from revealing the specifics of these chemicals to their patients even if they cause illness. Pennsylvania voters and lawmakers fought hard for legislation requiring companies to disclose all chemicals to the public and eliminate the gag clause, but that was an uphill battle. Instead Pennsylvania adopted the same disclosure requirements as Colorado and other western states such as Wyoming and Texas (StateImpact, 2013).

Although providing information about chemical use has been a crucial first step, the lack of scientific research about the effects of combining these chemicals with other environmental components makes the data less than useful. Dangerous chemical reactions may be happening when chemicals from fracking fluid mix with chemicals from the environment or other pollutants, but states cannot finance detailed enough investigations to measure these effects. Having records of the base chemicals holds companies accountable to some degree, but states still lack the resources and manpower to fully use the information it requests.

Public Opinion Influencing State Decisions

Counties and townships across Pennsylvania and Colorado are rising up against fracking because of a combination of concerns over health and environmental issues that may be related to the process. Citizens in Boulder, Fort Collins and Lafayette, Colorado, voted in 2013 to pass fracking moratoriums that essentially force the cities to delay drilling until 2018 when the issue will probably

be voted on again. (Rael, 2013). Pennsylvania does not have as many moratoriums in place as Colorado, but the state Democratic Party has attempted to introduce a bill that would not allow any new drilling permits until after-effects, as well as pros and cons, can be studied and weighed in more detail. Deep divides between the views of the Democratic and Republican parties in Pennsylvania will likely prevent any consensus on this bill anytime soon (Colaneri, 2013).

Citizens have also voiced concerns about the environmental consequences of installing drilling rigs or wells near natural wonders like Mesa Verde and the Grand Teton National Park (Iberlkamp, 2013). Drilling in proximity to schools and other populated areas on public land has become a concern that Coloradans are actively attempting to force local politicians to address more aggressively. Online forums and blogging sites such as EcoWatch allow users to express concern and plea for help. For example, this user said: “[The Bureau of Land Management’s] proposed rules are too weak and pave the way for corporate profits at the expense of our American treasures” (Iberlkamp, 2013). People across the nation are voicing their opinions louder than ever in the new age of technology and social media. Transparency will be the key to success if fracking companies want to win over public support.

Major Differences Between Colorado and Pennsylvania

Both states have similar regulations, but are organized quite a bit differently. The biggest difference between regulations in Colorado and Pennsylvania lays in the severance tax versus the impact fee. Colorado also has more central organization than Pennsylvania, but concerned citizens in both states hold major influence in the politics behind fracking. Chemical disclosure has had more time to settle into acceptance by companies in Colorado while Pennsylvania is still facing some resistance to the newer policy. The people’s concerns are reflected in the environmental precautions taken in Colorado and the increased inspection rates in Pennsylvania that far surpass those taking place anywhere else aiming to reduce worries about public health.

What can Citizens do?

The biggest impact citizens can make in reforming state regulations is to vote and stay actively informed. If voters are concerned about these issues, state officials will be forced to look into them and address flaws in the system or else face replacement by someone who will. Most controversy arises in the public eye over health and environmental issues and the only way to make a difference is to invest in the cause and stay alert. If the public demands and uses information provided by the government, people’s concerns will hopefully be respected by the state government with measures like hiring more inspectors and increasing transparency.

Q&A with Field Compliance Coordinator Susan L.

*(views expressed here do not reflect those of her company)

Susan L. has been with her company (she requested that the company be kept confidential and her last name was omitted to ensure that) for about three years, now as a Field Compliance Coordinator. Currently she visits North Dakota and Montana, two major boom states, every couple of weeks. Her primary job is to make sure that after locations are drilled that they are in compliance with the various regulatory agencies.

1. What is your job title and what does your job entail?

Susan commonly checks for things like proper labels on locations, that proper metals were used to construct pipelines, well signs include all required information and are plainly visible, and the well site has security diagrams. The Environmental Health and Safety group within the company deals with compliance issues and checks for Spill Prevention Controls and Countermeasures (SPCC) plans.

2. What are the main pros and cons of fracking from your point of view?

According to Susan, a couple of the major advantages of fracking include a positive move toward a greener energy use and energy independence. Obviously the U.S. cannot completely cut off petroleum use, but natural gas has the power to slowly ease the country off of oil use. She says, "If we can wean off of one dirty product, maybe in the future we can move into more wind power." The biggest downside to fracking is obviously environmental pollution and she recognizes that the industry is a double-edged sword. Although she does cite the negative connotations that accompany the fracking industry, she says that "a lot has been changed and been updated in the fracking industry." She notes that people want the profit and economy but not in their own backyard, which is the source of most conflicts

3. Who are the primary groups and organizations you work with to regulate? Specifically in Colorado?

The U.S. Bureau of Land Management (BLM) serves as the primary national regulator and the regional offices located in various locations around each state work very hard with companies drilling to make sure that everything is being properly regulated and taken care of. Each county or city can set a lot of regulations of its own as long as these regulations meet the state and federal laws. A couple of the Colorado state governing entities are COGCC and COGA.

4. How do you believe the industry is working to improve fracking regulations?

Within her company, Susan cites many other positions like hers that have become much more common for companies trying to regulate better from within. Companies do not want to pollute or cause issues and know that it will only benefit them to have a good reputation in the eyes of the public. Employees like Susan take a proactive role in following federal and state guidelines by keeping all of their observations and issues filed to show state inspectors should they come. State officials conduct their own investigations, but having background information readily available makes the process much more quick and effective. Groups like the Environmental Health and Safety group are working to make sure public and employee health are a top priority for the company as well. As mentioned above, SPCC plans have also become a staple for the company and basically she says, "We have to hold the plan and if anyone requests it, it has to be ready and available on-site or at the office nearby."

Important Influences on Colorado and Pennsylvania Fracking Regulation

Colorado Governor John Hickenlooper

Governor John Hickenlooper served as Denver's Mayor from 2003-2010, then was elected Governor in 2010 and has been re-elected ever since (About the Governor, 2013). Hickenlooper, previously a geologist, has advocated for the development of the hydraulic fracturing industry across Colorado and even drank Halliburton fracking fluid at a meeting to prove its safety (Norris, 2013). Hickenlooper has been wildly popular but his open support for fracking may jeopardize his 2014 re-election (Norris, 2013). With the passing of stricter laws regulating pollutants, his stance on the industry has significantly impacted environmental controversies across Colorado. On Governor Hickenlooper's website is a link to write to the governor (<https://www.colorado.gov/governor/>).

U.S. Bureau of Land Management (BLM) Regional Offices

The BLM regional offices are a primary enforcers for fracking regulation on public lands at the local level. The BLM is a federal organization, but offices scattered throughout the states are extremely involved in keeping state and local fracking restrictions in line with federal policy. Inspectors from the BLM enforce policy when state officials are spread too thin and actively visit sites in boomtowns and other locations in need. The BLM is working to improve efficiency and transparency with updated computer systems that make data about drilling on public land openly available. The best website to find this information is http://www.blm.gov/wo/st/en/prog/energy/oil_and_gas/statistics.html.

Additionally, the BLM website has a “Contact Us” page to send e-mails as well as lists of regional offices across the country.

Gas Drilling Awareness Coalition

The Gas Drilling Awareness Coalition started as a small group of activists in Luzerne County, Pennsylvania, and has continued to grow and share information with the public via open meetings, social media, brochures and its own website. In its mission statement, the group claims that it is an organization “whose members are concerned with the negative effects of the Industrial Process of Drilling for Natural Gas in PA.” (Gas Drilling Awareness Coalition, 2012). The website provides in-depth explanations of the fracking process and controversy along with numerous links to information about issues of concern, local news, education, and meetings. The website looks cluttered but provides a vast amount of useful information. The “Contact-Join” tab on the GDAC website is the best place to go to contact the Coalition (http://www.gdacoalition.org/GDAC_ABOUT_US.html).

Abrahm Lustgarten

Abrahm Lustgarten, a 2003 MA Columbia University graduate, has been at the forefront of environmental journalism since he joined ProPublica, an investigative news site, in 2008. His work on hydraulic fracturing for ProPublica has won numerous awards (About Us: Abrahm Lustgarten, 2013). Lustgarten has immensely improved transparency of fracking by providing consistent and understandable coverage of the major news and progress concerning both the industry and politics of fracking. Lustgarten has written many stories and an e-book over the past few years focusing on the fracking controversy, issues and processes. He can be e-mailed at Abrahm.Lustgarten@propublica.org and is on twitter (@AbrahmL) as well.

Important Web Resources

1. FracFocus.org- FracFocus is a comprehensive resource with state-by-state and well-by-well information on fracking. The site is the first of its kind and provides a user-friendly way to find information about fracking close to home for many concerned citizens across the country. Additionally FracFocus provides many links to helpful external sites sending interested users to diverse information.

2. <http://www.coga.org/#sthash.yOoPO7FH.dpbs> -The Colorado Oil and Gas Association is one of the primary governmental resources for information about energy in Colorado. The site provides a great deal of information about political facts and figures with sections on how to take action, state representatives, energy facts and topics as well as answers to common myths and much more. COGA also provides ways to touch base with people outside of the political realm with links to blogs and social media sites to enhance communication across parties.

3. <http://stateimpact.npr.org> - StateImpact is a website run as a reporting project of National Public Radio (NPR) that provides many articles concentrated on the energy and environmental aspects of fracking in Pennsylvania. Specifically the site contains a great deal of information on the Marcellus Shale including maps, statistics and overviews, and addresses of current issues presented in a clear, concise manner that is easy to use. The website <http://stateimpact.npr.org/pennsylvania/drilling/> provides a particularly helpful overview of the Pennsylvania fracking scene.

4. <http://www.naturalgas.org/index.asp> - Naturalgas.org provides an excellent overview of the fracking industry and its most important considerations from a business perspective. The site provides an extremely detailed history and modern fracking concerns, as well as potential costs and benefits from an economic point of view. Looking at fracking through this economic lens is much different from any other site dedicated solely to natural gas energy.

5. <http://www.propublica.org/series/fracking> - ProPublica, a self-proclaimed public interest journalism site focusing on science, provides fracking research and a series of articles provides a detailed analysis of many different aspects of the fracking industry. This site is unique in that it provides information on taxation, regulation, inspection, landowner experiences, field work and company perspectives. ProPublic is slightly biased as an anti-fracking site, but does a good job explaining both sides and using creative resources like videos to go into enough depth to be informative but not overwhelming.

6. <http://www.fractracker.org>- FracTracker approaches the fracking industry from a unique perspective by trying to hone in on data and stories provided by affected people. The site takes these data and tries to analyze and compare them to national data acting as both a resource and a watchdog. There is a large amount of information on the site that may take a while to sift through and some links are not up-to-date, but overall the website does a good job of painting a complete and honest picture of fracking across the country.

Additional Useful Websites

1. <http://www.nrdc.org/energy/fracking-map/pa.asp>
2. <http://www.cleanwateraction.org>
3. <http://www.ncsl.org/research/energy/taxing-natural-gas-production.aspx>
4. <http://corporate.exxonmobil.com/en/>
5. <http://www.foodandwaterwatch.org/water/fracking/>
6. <http://www.eia.gov/naturalgas/>
7. http://earthjustice.org/our_work/campaigns/fracking-gone-wrong-finding-a-better-way

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